Exploring first-year, rural students computer acquisition experiences at an urban university in South Africa.

ABSTRACT

Higher Education in South Africa still reflects its apartheid past. Historically white institutions of higher learning remaining well resourced, most of their students are white and these institutions still retain their colonial activities. Black students who attend these Higher Education Institutions do not perform as well as their white counterparts as a result of the inequalities that still exist in South Africa.

In South Africa, tertiary institutions are tasked with delivering skilled and computer proficient graduates as required by industry. These graduates are key to South Africa's participation in the Fourth Industrial Revolution, which will ensure the country's economic growth.

Gaining entry to higher education institutions has improved for black students. However, there are differentiated divides which exist within each aspect of these institutions that limit black students' engagement and full participation at previously white higher education institutions. Information and Communication Technology (ICT), especially at historically white institutions, has become a key component of their teaching and learning practice. However, the digital divide is most evident amongst black, rural students who often come into this learning environment with little or no computer experience. Their often, white privileged peers are mostly computer proficient. The study explored how underprivileged students experience the process of acquiring computer skills. It unpacks their perceptions of themselves in relation to their peers, the implications that this has on students' current journey at the University of Cape Town and their future computer use within a learning environment.

The case study, focused on first year, rural, black students, involved the use of a mixed method approach. Data were collected using a questionnaire, an observation and interviews. Critical Discourse Analysis is used to understand the data. Foucault's view of Critical Discourse, namely, the concepts of Power/Knowledge, Subject/Trust are used to understand how the structures and ways in which society creates levels of power and being within society are viewed. Credence is given to the opinions of some people in society and not to others through these Power/Knowledge and Subject/Trust discourse. Critical Discourse seeks to explore the social injustices inherent in society and to encourage it to be more equitable.

The research shows that the acquisition of computer skills for first year, rural, black students at a historically white university is not easy, especially for those who come with no computer knowledge. They lose their self-worth and may initially become computer averse even though they realise the value of computers. The gap between students who come in without computer skills and the computer proficient students grows as they progress. The lack of computer skills limits students without computer experience from fully benefiting from the array of opportunities computers bring to the learning environment. They only acquire the skills taught at the university, which limits their further acquisition of computer skills. Further research in this area is required to fully understand the rural students' experience.

ACRONYMS

CARS	Computer Anxiety Rating Scale
CTS	Computer Thoughts Survey
DHET	Department of Higher Education and Training
GATC	General Attitude towards Computers
HE	Higher Education
HEI	Higher Education Institutions
ICT	Information and Communication Technology
ICTS	Information and Communication Technology Services
IRTC	Institutional Reconciliation and Transform Commission
LMS	Learning Management System
MOOC	Massive Open Online Course
NSFAS	National Student Financial Aid Scheme
PMD	Personal Mobile Device
RDP	Reconstruction and Development Plan
REAP	Rural Education Access Programme
UCT	University of Cape Town
UN	United Nations

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1: INTRODUCTION

1.1 Background to the study

As South Africa enters the Fourth Industrial Revolution, jobs in Information Technology and Design fields require a high level of computer proficiency (Schlebusch, 2017). Industry expects Higher Education Institutions (HEIs) to provide skilled graduates for professions, such as Computer Programming and Engineering Science, to meet the ever-changing Information Technology (IT) environments in which they are located (Schlebusch, 2017).

The Higher Education sector is struggling with its own crisis which evolved during and after the apartheid era. There is a level of disparity in the preparedness for university between students who have access to good education and students who do not. Previously black schools were not well-resourced during apartheid and that legacy has remained (Belluigi, 2014; Badat, 2016). There is a sub-group of black, rural students who are the least equipped for the demands of higher education (HE) (Jones, Coetzee, Bailey & Wickam, 2008; Gardiner, 2008; Dlodlo, 2010; Dzansi & Amendzo, 2014). Most rural schools do not have the basic infrastructures, such as electricity, running water and textbooks, thus computer access is not a priority (Dlodlo, 2010; Mathevula & Uwizeyimana, 2014; Gardiner, 2008). Under-resourced rural schools are often characterised by poor teaching and learning practices (Couper, 2003; Medani, 2016). There are no exact statistics regarding the schools that do or do not have access to computers. However, researchers, such as Dzansi and Amendzo (2014), Hlalele (2014), and Maringe, Masinire and Nkambule (2015), reflect that the few rural schools that do have computers, have difficulty adapting to teaching and learning with ICT because of infrastructural challenges, outdated equipment which is donated (often the only way schools get computers or other ICT equipment), the high cost of installing and maintaining ICT and teachers' lack of basic ICT knowledge. The few rural students who reach HE have a huge adjustment ahead of them in their first year at university (Brown & Czerniewicz, 2007; MacGregor, 2008; Aungamuthu, 2010; Thinyane, 2010; Naidoo & Raju, 2012; Jansen & Hoffman, 2011 in Makura, 2014). This group is often characterised by students who have little to no computer skills.

Very little research has been done on the lack of computer proficiency when coming to

university and the acquisition of computer skills of first year, black students from rural schools. Hence, it is not clear how this impacts on their adjustment and future success at university. Researchers, such as Thinyane (2010), Gardiner (2008) and Schlebusch (2017), reflect on rural students' struggles to adapt but do not define what their struggles with computers are. Previous research has identified and measured that Computer Anxiety and computer self-efficacy (Powell, 2013) can predict the level of computer proficiency a student acquires. Other factors, such as age, gender, access to computers and the way the student is taught to use a computer, also impact computer skills acquisition and future use of computers to a lesser or larger degree depending on the context (Chien, 2002; Breedt & Pieterse, 2012). Computer anxiety, computer self-efficacy (general attitude towards computers) and access to computers are the measures used in this research to explore how rural, black students experience the acquisition of computer skills at university.

In South Africa, studies measuring the impact of being computer illiterate on first year students have been conducted at various HEIs. They began with Finnie in 1987 at the University of Natal and more recent studies have focused on black students' use of computers (see Aungamuthu, 2010; Brown, 2011; Naidoo & Raju, 2012; Coetzee, 2013). Related studies revealed that female, black students find it more difficult to gain computer skills than their male counterparts (Brown, Czerniewicz & Pedersen, 2008; Dlodlo, 2010; Brown, 2012; Magunje, 2013).

Foucault, a critical discourse theorist, believes that a discourse and the resulting power/knowledge dynamic it creates play a role in achieving success (Foucault, 1973 in Thomson, Hall & Jones, 2013). He also reflects that what is known (in the public domain) and "trusted" (approved of by professionals or broader society) is often constructed by those who have knowledge and can leverage it in their favour. A Foucauldian lens is used to reflect on rural, black students' experiences whilst acquiring computer skills at UCT.

1.2 Statement of the Problem

First year, rural, black students are the most vulnerable student population group coming to universities in South Africa (Dlodlo, 2010; Department of Basic Education [DBE], 2018; Gardiner, 2017). For most of these first-year students, the first six months are the most

difficult because they need to adjust to the university environment and its demands (Bangeni & Kapp, 2005; Pym, 2006; Brown, 2012). Most rural, black students do not have the computer skills required of university students because they have little to no access to computers before coming to university (Dlodlo, 2010; Dzansi & Amendzo, 2014). Little is understood about how the lack of computer skills affects these students' future computer use within an academic environment and their experiences during their computer skills acquisition at university.

Critical Discourse Analysis is used in this research study. It is a social theory orientated towards critiquing and changing society (Wodak & Meyer, 2016). Critical Discourse is often concerned with issues of social justice. Foucault's lens of discourse, power/knowledge and truth is used to analyse the research data. Researchers, such as Chronaki and Matos (2003), Biesta (2006) and Hope (2013), have used Foucault in previous research focusing on ICT in Education.

1.3 Purpose of the Study

The aim of the study was to understand rural, black students' experiences in their acquisition of computer skills at a historically white university.

1.4 Research Questions

How do first year, black, rural students with little to no computer proficiency experience the acquisition of computer skills at the University of Cape Town?

Secondary questions:

Does the lack of computer proficiency impact on black, rural students' perception of themselves and other students?

What factors impact on their acquisition of computer skills at UCT?

Hypothesis

Rural, black students, who are not computer proficient, find acquiring computer skills challenging at historically white universities.

1.5 Significance of the Study

Students at various South African HEIs are required to take a computer proficiency test (Coetzee, 2013; Makura, 2014; Naidoo & Raju, 2012). Students who do poorly in the university's computer proficiency assessment can elect to attend computer training during the orientation period (Nash, 2009). This training is usually only one day or at the end of lectures in their first week at university, which adds to their levels of anxiety and often results in alienation from the tool that will assist them to succeed at university (Nash, 2009; UCT Humanities Faculty, 2012; UCT Centre for Higher Education [UCT CHED], 2017). The skills needed to become computer literate therefore need to be acquired in a very short space of time (Goode, 2010). These students are also expected to adjust to all the university demands, such as increased workloads, in the space of six weeks. It is during this critical phase of adjustment to the university which will result in their failure or their success at university (Thinyane, 2010). The insight gained in this study, on the experiences of rural students' computer skills acquisition, will help universities understand the students' needs and allow them to develop appropriate interventions and support to facilitate the successful acquisition of and proficiency in the required computer skills.

1.6 Definition of Terms

Computer: "A device or system that is capable of carrying out a sequence of operations in a distinctive and explicitly defined manner. The operations are frequently numerical computations or data manipulation but also include input/output; the operations with sequence may depend on particular data values, called a programme. A computer can have a stored programme or wired programme. A stored programme may exist in an alterable (*read-write or *RAM) memory and in a non-alterable (*ROM) memory" (Pyle & Illingworth, 1996:93).

Computer Anxiety: The fear of computers when using one, or fearing the possibility of using a computer, whether in that moment or the future (Chua, Chen & Wong, 1997 in Barbeitte & Weis, 2004; Parasuraman & Igbaria, 1990; and Schlebusch, 2017). Computer Anxiety is characterised by high emotions relating to the potential negative outcome, such as breaking the equipment or looking foolish (Cambre &

Cook, 1985; Heinsen et al, 1987 in Barbeite & Weis, 2004: 3).

Computer Proficiency: "The abilities to perform the basic actions involved in computer manipulation (switching 'on' and 'off' of a computer, where to connect computer components and understanding the components of the machine); managing computer files, word processing, using spreadsheets and databases; creating presentations; finding information and communicating using computers; and being aware of social and ethical implications of Internet use". (Khosrow-Pour, 2005: 500)

Computer Self-efficacy: "A belief in one's ability to mobilise the motivation, cognitive resources and courses of action to meet the given situational demands" (Wood & Bandura, 1989:408 in Barbeite & Weis, 2004: 13). "This belief is influenced by the choice of activities, degree of effort expended and the persistence of effort" (Bandura, 1986 in Barbeite & Weis, 2004: 13). "Computer self-confidence/perception of ability. Beliefs about one's ability to perform a specific behaviour or task on a computer" (Khosrow-Pour, 2005: 1265).

Black: "a person classified by the University of Cape Town as being African, Black. It excludes students defined as 'Coloured', 'Indian' or 'Chinese' South African" (UCT Admissions Policy, 2012: 2).

Information and Communication Technology (ICT): "Can be used to indicate the organisation's technological infrastructure (comprising all hardware, software and telecommunications technology) and to indicate one or more specific collections of hardware, software, and telecommunications technology (i.e. one or more ICT applications)" (Khosrow-Pour, 2005: 1462).

Rural Student (South Africa): A student residing in a rural area that is far from resources, such as piped water and electricity, with schools located away from urban areas or in non-brick buildings, where schooling is not as good as in urban areas, people are dependent on social grants, seasonal wages and money from relatives who work in the city and where farming, whether subsistence farming or commercial

farming, is taking place and residents reside in housing provided by farmers, shacks or Reconstruction and Development Programme (RDP) houses, which are concentrated close to farming activities (Couper, 2003; Zuma, 2013; Medani, 2016).

White: "A student who self identifies as being classified white under the apartheid laws as white and of European descent" (UCT Admissions Policy, 2012: 2).

1.7 Limitations

The results of this study are only applicable to the rural, black, first year students attending the University of Cape Town, who participated in the research during the time in which the research was conducted. This period was influenced by student protests during the #FeesMustFall campaign. Purposive sampling meant that a specific group of students was targeted. Engineering students were identified as requiring laptops because they use ICT as part of the curriculum in their courses. The engineering students were therefore selected to be part of the study. Students in other faculties were also included. There was a very low response rate to the questionnaires. These factors therefore do not allow the findings of the study to be generalisable to the broader UCT first year, rural, black students in 2017. The findings are also not generalisable to other higher institutions because of the small sample size.

1.8 Organisation of the Thesis

Chapter 2

This chapter contains the literature review that situates the research. The review starts by detailing the background for the research. Thereafter, the relevant literature is discussed, which includes a brief reflection on the methodology. The context in which the study is located is examined, highlighting the South African Higher Education landscape, including the laptop project which UCT hopes will minimise the digital divide. The chapter then explains the narrative of rural students, particularly the factors that contribute to either computer mastery or aversion. Finally, previous research conducted with regards to first-year students'

acquisition of computer skills at tertiary institutions in South Africa, particularly that which focused on the factors linked to computer acquisition, and research previously conducted at UCT relevant to this study are discussed.

Chapter 3

The methodology used in this study, namely, a transformative research approach, using a Foucauldian lens is explained. The reasons for using a transformative approach and the requirement to follow a mixed methods approach are explained. The sequential process of conducting the quantitative data collection is described, namely, the pre- and post-test experimental design that involved a qualitative data collection through an observation and interviews. The ethical challenges involved in the research are elaborated on.

Chapter 4

The data analysis of the quantitative data, using the pre-test and post-test results are detailed, and the findings extrapolated. The data from the observation are then extrapolated under the categories of Foucault, namely Discourse, Power/Knowledge and Trust. The findings are detailed through a Foucauldian lens linked with theory. The interviews with the four students are analysed and findings detailed in the same way as the observational data.

Chapter 5

The chapter discusses findings of this study. The findings are then linked with relevant studies conducted in the past. Using a Foucauldian lens, the findings provide insights linked to the questions posed at the beginning of the research. The researcher reflects on what the findings would mean for an institution such as UCT.

Chapter 6

The final chapter concludes by highlighting key findings and their significance. It also makes recommendations for possible future research.

This chapter has given a broad overview of the study. It gives contextual insights and reasons for the study. The research questions, which this study addressed, are detailed. Limitations of

this study are briefly touched on. Finally, the layout of the study is detailed.

Chapter 2: LITERATURE REVIEW

2.1 Background

The drive towards less human labour-intensive jobs and the increased use of Technology to replace humans impacts on the global economy (Poh & Smythe, 2014; Rouse, 2016; Schlebusch, 2017). For a developing country such as South Africa, the job market demands workers who are computer proficient and able to adapt to the ever-changing technological world of work. The ICT skills shortage in South Africa means that industry is relying on higher education (HE) to provide graduates who can fill this gap (Poh & Smythe, 2014; Schlebusch, 2017).

Higher Education Institutions (HEIs) are therefore expected to produce students who are computer proficient. To address this expectation, some HEIs have adopted ICT as a large part of their learning environment by, for example, building large computer laboratories and including ICT into their teaching and assessment practices, for example, using Interactive Technology in the classroom and giving online tests (MacGregor, 2008). This implies that students are expected to have the online capability to register, apply for bursaries or financial aid, read general announcements, navigate electronic library databases for journals and books, complete assignments using multimedia programmes and upload assignments for submission (Goode, 2010; Brown & Mayisela, 2015). The importance of having a positive attitude towards computers, having high computer self-efficacy and low levels of Computer Anxiety are critical to students' acquisition of computer skills and using computers comprehensively (Kilfoil, 2015; Sam, Othman & Nordin, 2005; Schlebusch, 2017).

Students who arrive at university with little to no computer skills feel out of place in the university environment, especially when compared to their computer literate peers (Naidu & Raju, 2012). Researchers, such as Brown and Czerniewicz (2007), Aungamuthu (2010), Thinyane (2010), Naidoo and Raju (2012), and Jansen and Hoffman (2011 in Makura, 2014) note the affective crisis that first-year students, who are poorly computer competent, experience in the first few weeks at university. A particularly vulnerable group is rural students, who have more obstacles to overcome in their transition to university (Dlodlo, 2010; Dzansi & Amendzo, 2014; Gardiner, 2008). The literature reviewed reflects that very few

South African researchers have enquired about the impact of having no or limited computer skills and/or no computer access prior to coming to university has on rural, black students' ability to acquire computer skills, and how this has affected their perceptions of computers. Powell (2013) elaborates on the research conducted in the United States with regards to university students' response to using computers at university. He discusses the research that was conducted by Gressard and Loyd (1984), Glass, Knight and Baggett (1985), Herkimer (1985), Marcoulides, Rosen and Sears (1985), Gilroy and Desai (1986), Heinssen, Glass and Knight (1987), Rosen, Sears and Weil, (1987) and Hudiburg (1989) in the USA. Powell (2013) also further elaborates on similar research which was done in Europe by Beckers and Schmidt (2001) and Brosnan and Lee (1998) and Levine and Donita-Schimdt (1998) during this period. Both the American and European researchers questioned university students' responses to computers. In a recent study conducted in Romania on university students, Cazan, Cocoradă and Maican (2016) examined how self-efficacy and computer experience impacted on students' Computer Anxiety. It is critical that these issues are addressed because computer proficiency ensures that students achieve academic success at university, enter the world of work and pursue post-graduate studies.

2.2 Literature Review

The methodology advocated by Creswell (2009) for a mixed methods research approach is a sequential approach. In a sequential approach, the literature is presented in a way in which the research is conducted (Creswell, 2009; Creswell & Plano Clark, 2011). The emphasis of my research was on how first-year, rural, black students experience the process of using and acquiring the knowledge and skills of using computers.

2.2.1 Contextual Issues

Racial segregation due to apartheid has led to huge socio-economic disparities and consequently to the digital divide in South Africa. The digital divide is described as the gap between the access to ICTs because of race, socio-economic status, and physical location (Warschauer, 2003 in Czerniewicz, Williams & Brown, 2009; Ivala & Gachago, 2012). White, middle to upper class, urban students have more access to digital resources than their impoverished, rural, black counterparts (Naidoo & Raju, 2012; Brown & Mayisela, 2015).

South Africa, like many developing countries, needs graduates who are creative and skilled to enter the workplace to improve the economic situation of the country (Nayyar, 2008 in Badat, 2016). For instance, a huge drive for Mathematics, Science and Technology graduates has taken place in South Africa because there are not enough skilled people in the country, such as engineers and actuaries, to take up positions in Science and Technology (Badat, 2016; Rouse, 2016). The Fourth Industrial Revolution follows the Third Industrial Revolution, which involved the development of computers and Information Technology (IT), known as the digital age (Schwab, 2016). The Fourth Industrial Revolution is characterised by breakthroughs in Artificial Intelligence, Autonomous Vehicles, Biotechnology, increased processing power of mobile devices, storage and ICT access (Schwab, 2016).

Since the fall of apartheid, black students have gained increased access to historically white tertiary institutions. This has led to an increase in students entering the university system. The enrolment of black students increased from 27% in 1986 to 62% in 2005 (Wangenge-Ouma, 2012; Belluigi, 2014; Badat, 2016). This has resulted in large and overcrowded classes and has placed pressure on lecturers who have to teach large classes (Scott, 2008; Fisher & Scott, 2011; Yeld, 2010).

The university environment and institutional culture are not very welcoming (Norodien-Fataar, 2018; IRTC Report, 2019). Many students still face racial, gender and other forms of discrimination (Heleta, 2016). The dominant discourse is one of white, male, upper class and English (Luckett, 2016; Heleta, 2016; Molefe, 2016). The environment is therefore extremely challenging for black learners. Additionally, many black students lack financial resources, face accommodation issues and have very little or no support at the university (Pym, 2006; Fisher & Scott, 2011; Molefe, 2016). More white students graduate than their black counterparts. Only 30% of all students will complete their degrees, of which less than 15% of black students will graduate in the assigned time to complete a three-year degree (Fisher & Scott, 2011). The reason for their poor performance is their lack of preparedness for tertiary education which is the result of poorly resourced and overcrowded schools from which rural black learners come (Yeld, 2010; Pym, 2006).

Access does not only include physical access to a university but access to computer literacy,

the ability to engage with computer-based Technology, understand computer terminology, and be able to use computer skills proficiently to use academic resources to find the relevant information required for academic tasks, such as essay writing (Bosch, 2009; UCT FYE Report, 2012; Czerniewicz & Brown, 2013; Asher et al, 2010 in Brown & Mayisela, 2015). There is a group of often low income, rural students who arrive at university having never physically touched a computer before and who do not possess the computer skills required at university (Brown & Czerniewicz, 2007; Coetzee, 2013; Czerniewicz & Brown, 2013; Bozalek & Ng'ambi, 2015).

The Department of Higher Education and Training (DHET) drafted the White Paper for Post-School Education and Training which places a strong emphasis on social justice (DHET, 2013). A key point of this paper is Section 7.4 which deals with equal access to the appropriate Technology in Higher Education (DHET, 2013). It also notes in section 7 that learning can reach a wider proportion of the population by providing diverse modes of learning, one being the use of Technology (DHET, 2013). The *Horizon Report 2015* (Johnson, Adams Becker, Estrada & Freeman, 2015) predicts that learning with Technology would require an improvement in the digital literacy of academics and students (Bozalek, Ng'ambi & Gachago, 2013; Johnson et al, 2015 in Bozalek & Ng'ambi, 2015; The New Media Consortium [NMC], 2015). The report also stresses the importance of flexibility and innovation in the learning environments at HEI for these institutions to reap the benefits of learning with Technology (Johnson et al, 2013 in Bozalek & Ng'ambi, 2015; NMC, 2015).

There is a move by South African HEIs to use emerging technologies[1] and mobile devices, such as cellphones (smartphones), tablets and laptops, also known as Personal Mobile Device (PMDs), that allow students more access to Technology-mediated learning (Bozalek et al., 2013; Brown & Pallit, 2015). However, there has been a strong drive by universities, especially the historically white universities, for students to have computer skills. The university-built

[1] "Emerging technologies may or not be new technologies. Can be described as evolving organisms that exist in a state of 'coming into being'. Experience hype cycles. Satisfy the 'not yet' criteria of (a) not yet being fully understood, and (b) not being yet being fully researched or researched in a mature way. Are potentially disruptive, but their potential is mostly unfulfilled" Valetsianos (2010:17).

computer laboratories are intended to give students access to computers, to submit assignments digitally or in electronic form and be skilled enough to use the various computer programmes (Lewin & Mawayo, 2014; Kilfoil, 2015). Degree programmes, such as engineering, require students to use computers in the classroom, for example, when learning about engineering drawing or doing Maths calculations. Outside of the classroom, engineering students also use computers to access their textbooks and other learning material. Students therefore require computer access to participate and pass these courses (Chernotsky, Brown & Marquard, 2015). Bring Your Own Device (BYOD) requires students to pay for their ICT needs, for example, having to pay for data when they are not in range of the university Wi-Fi reception and the cost of updating their hardware and peripheral devices when they become outdated (Czerniewicz et al., 2009).

Another contextual issue is that students have become soft targets because they carry mobile devices to and from university and often get robbed (Mtshali, 2013; Motaung, 2015; Le Roux, 2016). Bozalek and Ng'ambi (2015) caution administrators against seeing Information Technology as the panacea to the challenges facing Higher Education in South Africa.

2.2.2 The students from rural areas

2.2.2.1 South African Rurality

In South Africa, students from rural areas are particularly vulnerable. The United Nations (UN) has requested that countries develop their own definition of the concept of "rural" when those countries do not meet the characteristics of "rural" as listed by it. The UN requires that there be a clear distinction between rural and urban areas. The name or locality must have a recognised status and the inhabitants must live in the neighbouring areas, according to the UN definition (Medani, 2016).

South Africa does not meet these criteria because of the apartheid laws, which led to the blending of areas and changing of village or town names. There were laws, such as the Black Land Act No.27 of 19 June 1913, which prevented black people from owning or renting land outside of the Bantustans; the Natives (Urban Areas) Act No 21 of 1923 which moved black people out of white urban areas to the outskirts of town, where "locations" were formed; and the Native Trusts and Land Act of 1936 which led to the development of "Homelands/

Bantustans". The aim of the act was to remove from blacks the rights they had as citizens of the Republic and make them citizens of Bantustans. They were only allowed into South Africa to work. This gave rise to "townships" in urban areas where black people would reside in hostels owned by the business owners (Couper, 2003; SA History, 2011; Simkins, 2011). The Bantustans were ruled by "chiefs" who were appointed and paid by the apartheid government. The Bantustans were grouped according to ethnic groups, for example, Transkei and Ciskei were for Xhosas. Bantustans had their own governments, capital cities, urban and rural areas (Couper, 2003; SA History, 2011). The movement of black people due to these laws have made it impossible to define "rural" as being within a defined area.

When apartheid fell in 1994, so did some of the Bantustans. Others, like Lesotho, Botswana, Swaziland and Namibia, chose to be independent countries through various legal processes prior to 1994 (Khunou, 2009; O'Malley, 2007). Venda, KwaZulu-Natal, Transkei, Gazankulu, Lebowa, Qwa-Qwa, KaNgwane and KwaNdebele were all integrated into South Africa and its nine provinces (SA History, 2011; O'Malley, 2007). This has resulted in dense urban settlements with large peri-urban towns in "traditional sectors" and highly populated rural settlements which are far from urban areas, schools, municipal services, piped water, electricity and employment (Simkins, 2011; Zuma, 2013). Most of the farming in these areas is subsistence and families are dependent on social grants and family members employed in urban areas for financial support to survive (Simkins, 2011; Zuma, 2013).

Other rural areas are located close to commercial farms, which are predominantly white owned (Zuma, 2013). Since 1994, most farmers have shed "residential farm workers" (where one member of the family works on the farm, hence allowing the rest of the family to reside on the farm in a house provided by the farmer) and employed "off-farmworkers" (Zuma, 2013). These farmworkers live on the periphery of towns or close to farming areas in densely populated informal settlements (Zuma, 2013). Some of these settlements have water and electricity because of their proximity to towns and others do not. People in these areas are poverty-stricken because of the seasonal nature of available work on farms (Zuma, 2013).

2.2.2.2 Rural Schooling

There is no access to good, formal schools and the schools that are provided are overcrowded and poorly resourced (Zuma, 2013). Schools have poor teaching aids, teachers with poor teaching methods, few brick structures, no flushing toilets, feeding schemes and no access to Technology (Couper, 2003; Medani, 2016). Most residents from both these rural areas are black (Medani, 2016).

Many of these schools have not been properly identified and there is no list of them (Couper, 2003). Identification of these schools is critical to ensuring that they are properly resourced and that students have access to quality education. The DBE has identified that the poorest and least developed rural schools in South Africa are in the Eastern Cape (1715 rural schools), KwaZulu-Natal (2956 rural schools) and Limpopo (2348 rural schools) (Diab, Flack, Mabuza & Moolman, 2015; Gardiner, 2008: 8). Many of these schools remain neglected because of the emphasis on the development of urban schools (Gardiner, 2008). Rural schools continue to have high dropout rates and low matric average passes. Black, rural students are therefore the most disadvantaged and underprepared students for university. Yet, they are the same students on whom families rely to graduate, get good jobs and take the family out of poverty. Their success at university is thus essential (DBE, 2018).

2.2.2.3 Rural students' entry to Higher Education

The number of rural students who make it to university in South Africa is extremely low due to the low completion rate of secondary school learners from rural areas. Spaul (2015) notes that only an average of 40% of learners in South Africa passes matric. He provides the example of the cohort of 2003 of whom only 49% reached matric, 37% of these passed and 14% qualified to go to university (Spaul, 2015). Spaul (2015) explains that if only 41% of grade 6 learners in South Africa are functionally literate and the gap between poor and wealthy students has grown by five years by the time they reach grade 9, the number of learners who come to university from rural areas would be substantially less than learners from urban areas. Unfortunately, there are no specific statistics for this group, because they are classed in the same group as disadvantaged students either from urban or peri-urban areas at UCT (Czerniewicz & Brown, 2014).

2.2.3 The University of Cape Town

The University of Cape Town (UCT) is one of the best resourced universities in South Africa, given its history as the first university in South Africa and was exclusively "white" and "English" during the height of apartheid (Badat & Sayed, 2014). The university is currently ranked as the best university in South Africa, according to the Centre for World University Rankings (Mabuza, 2018). The status of the university allows it to attract the best students in South Africa. In 2016, the first-time entering undergraduate cohort comprised students of whom 37% attained 80% or more in their National Senior Certificate exams, 37% obtained 70–79% and 14% achieved below 70%. The remaining 12% completed their schooling outside of South Africa (UCT CHED, 2017). The undergraduate cohort in 2016 comprised 43% South African black, coloured and Indian students. Twenty-seven percent were self-declared white students and the rest unknown (UCT CHED, 2017). According to the Department of Higher Education and Training in South Africa's Annual report of 2016/17, 7401 were African black, 3828 coloured, 1984 Indian/Asian and 8018 white (DHET, 2017). The total number of undergraduates was 4235. The success rate at university for these undergraduates was 80.8% for African black, 86.4% for coloured, 87.2% for Indian/Asian and 93% for white students. The success rate at UCT was the highest of all the public higher education institutions in South Africa (DHET, 2017). The university's language of instruction is English.

The number of students who did not meet the minimum requirements to progress to the next year in 2016 was 10%. The largest proportion of students who did not meet the minimum progression requirements at UCT was black African students (17%), followed by coloured and Indian students, which were both 11%. White students were most likely to meet the minimum progression requirements, accounting for only 5% of this group of students. As an institution, the success rate of students is therefore still along racial and class lines as black African students from low socio-economic backgrounds have a higher probability of not completing their undergraduate degrees (DHET, 2017).

2.2.3.1 UCT's attempts to bridge the digital divide

2.2.3.1.1 National Student Financial Aid Scheme (NSFAS) recipients

After the fall of Apartheid in 1991, the Tertiary Education Fund of South African (TEFSA) was

replaced by the National Student Financial Aid Scheme (NSFAS). It was formally gazetted in 1999 with the promulgation of the NSFAS Act of 1999 (SALDRU, 2014). The aim of NSFAS was to provide funding to academically deserving but financially needy students, especially black students, which allowed them to study at public universities, and technical, vocational, and training colleges (TVET) (Bronkhorst & Matukane, 2017). It also hoped to eradicate the extreme racial imbalances which was characteristic of Higher Education institutions at the time (De Villiers, 2012).

According to Sader and Gabela (2017), in 2016, National Student Financial Aid Scheme (NSFAS) recipients were students who received government funding in the form of loans or bursaries because they met the following criteria:

1. Had a household income lower than the lowest tax threshold (R0–R250 000);
2. Attended a Quintile 19 school, which are non-fee paying or public schools in previously disadvantaged areas in South Africa;
3. Come from municipalities which are considered to have very poor infrastructure and limited financial resources.

2.2.3.1.2 NSFAS at the University of Cape Town

Three thousand, four hundred and seven students in 2016, at the University of Cape Town were on NSFAS at a cost of R227.4 million to the state (Mambe, Moore, Omar & Swingler, 2017). Ninety percent of these students were black African, coloured and Indian/Asian.

In 2010, the then Vice-Chancellor at UCT, Dr Max Price, requested that a project be launched to put a laptop into the hands of every student and to create an enabling environment for Information Technology access at the university. Aspects for funding were making the university campus wireless, installing recording Technology in teaching venues, providing low cost laptops to students, and improving the ICT support for students (UCT Legacy Society, 2017). In April 2012, the Senate Executive Committee considered the positive report of the 2010 project and felt that the laptop aspect needed to be tested to see if it further enhanced teaching and learning (Chernotsky et al, 2015). Three first year courses, namely Physics

(PHY1004W), Law (RDL1008/9H) and Chemical Engineering (CHE1005W), and a second year Architecture course (APG2039W) were selected.

Only students who were on NSFAS received laptops from the university. Other students could choose to purchase their laptops via the "Student Laptop Initiative" that allowed them to purchase laptops at a reduced cost or from vendors of their choice (Swingler, 2017). The NSFAS recipients understood that these laptops would have to be returned to the university if they changed their courses or dropped out. They were also responsible for any loss or damage of the machine. On graduation, the laptops would become theirs (Swingler, 2017). In addition to the laptops, the students received free software loaded on their machines, training, learning material and a 2GB flash drive (Swingler, 2017).

The pilot ran for 2013, 2014 and 2015 and showed such positive results that the university committed itself to distributing new laptops with software and a backpack to 800 financial aid students in 2017. This initiative was co-ordinated by the university's ICTS department (Chernotsky et al, 2015). The ICTS department would also provide after care support services and training. The laptops students received were under the same conditions as stipulated during the pilot (Swingler, 2017).

2.2.4 Rural Education Access Programme (REAP)

The Catholic church in South Africa had a university student bursary known as the Catholic Education Assistance Programme (CEAP). In 2001, this bursary programme registered itself as a Non-profit Organisation (NPO) called the Rural Education Access Programme (REAP) (REAP, 2020). The purpose of the NPO was to provide partial funding to matriculants from rural areas to attend university. It provides not only partial funding but a laptop, psycho-social support, academic support programmes and campus for students on the bursary (REAP, 2020).

2.3 Mastery vs Computer Aversion

The transition from high school to tertiary education is stressful and challenging for all students (Friedlander, Reid, Shupak & Cribble, 2007). This transition is also known for the highest dropout and failure rate amongst first year students (Alexander & Gardner, 2009).

In the first few weeks at university, students go through an orientation programme to acquaint them with the university. However, a study conducted by Lewin and Mawoyo (2014) highlighted that many students found these programmes overloaded with information on academic matters and support services available for students. It was often found that these programmes were not contextualised, and students therefore could not understand how, for example, the library visit was relevant to their courses (Coetzee, 2013; Lewin & Mawoyo, 2014). Some students, especially the poorer students, missed orientation because they were dealing with their accommodation, financial aid, or registration (Jones et al, 2008; Lewin & Mawoyo, 2014). For many rural students, it was their first time away from home and the environment was very different from what they were familiar with. They felt like "interlopers" at university (Jones et al, 2008; Lewin & Mawoyo, 2014; UCT FYE Report, 2012).

Many students find the first six months at university extremely challenging. Students are expected to adjust socially, academically, and emotionally to successfully transition into the university. They are required to have a high self-esteem and competence in these areas to achieve adjustment to university (Friedlander et al, 2007; Petersen, Louw & Dumont, 2009; Sennet, Finchilescu, Gibson & Strauss, 2003).

The students who manage to adapt to this environment often draw on their innovative and adaptive skills which helped them to reach university (Bangeni & Kapp, 2007). A good example of such an adaptive behaviour is students using their cellphones to access eResources online when they do not have access to a computer (Czerniewicz & Brown, 2013).

Furthermore, mastering computer skills is essential to academic success, gainful employment, and success in the workplace (Bangeni & Kapp, 2007; Chien, 2002; Coetzee, 2013). What happens to students who do not master computer skills in the first few weeks of university? In the studies where students spoke about their responses to computer classes, they reported feeling anxious, embarrassed, depressed, socially isolated and hating computers (Brown & Czerniewicz, 2007; Aungamuthu, 2010; Thinyane, 2010; Jansen & Hoffman, 2011 in Makura, 2014; Naidoo & Raju, 2012). They also reported a lack of confidence in using computers or asking for help (Aungamuthu, 2010).

There is a phenomenon known as "Computer Anxiety", which is the "fear of impending

interaction with a computer that is disproportionate to the actual threat presented by the computer" (Howard, 1986, in Chien, 2002: 1). Computer anxiety is dependent on one's attitude towards computers, the more negative one's attitude, the greater the levels of anxiety one experiences (Breedt & Pieterse, 2012; Chien, 2002). Computer Anxiety is linked to a lack of knowledge and experience a person has had with computers. Other links include the way computer literacy was taught and the attitude of the teachers (lecturers/tutors), the confidence the student has in mastering the skill and the fear of breaking the computer (Breedt & Pieterse, 2012; Chien, 2002).

The adoption and continued use of computers has been found in numerous studies to be reliant on Computer Anxiety and Computer Self-efficacy (Barbeitte & Weis, 2004; Durndell & Haag, 2002; Osiceanu, 2015; Powell, 2013). According to Powell (2013) who reviewed 276 studies on Computer Anxiety which covered the period from 1990 to 2000, the following factors play a role in developing Computer Anxiety:

1. Gender: Generally, female children, adults and the aged tend to display higher levels of Computer Anxiety than males. College women, however, do not display high levels of Computer Anxiety. The reason provided by Powell (2013) is they may have greater educational goals or have had greater opportunities to access computers.

2. Age: Older people are more likely to show higher levels of Computer Anxiety than younger people.

3. Education: People with access to better educational learning environments tend to show lower levels of Computer Anxiety, especially those whose schools gave students access to computers. Students majoring in Computer Science, Information Technology (IT), and Technology showed lower Computer Anxiety than students majoring in Education, Psychology and Humanities (Williams & Johnson, 1990; Todman, 2000; Chou, 2003).

4. Other Anxieties: There is a relationship between depression and Computer Anxiety (Lankford, Bell & Elias, 1994). Mathematics Anxiety was positively related to Computer Anxiety for women but not for men (Parasuraman & Igbaria, 1990). No significant

research has been conducted correlating Computer Anxiety with other forms of anxiety.

5. Training on Computers: Instruction-based training was better than behaviour-modelling training, especially for students with high Computer Anxiety (Chou, 2003). When computer training was labelled as an "opportunity", it resulted in lower levels of Computer Anxiety than if it was not labelled as such (Martocchio, 1994).

6. Ownership: Access and ownership of a computer resulted in lower levels of Computer Anxiety (Orr et al 2001 in Powell, 2013).

7. Computer Self-efficacy was the best predictor of Computer Anxiety. The more people believed they had the ability to use a computer, the lower their levels of Computer Anxiety (Compeau & Higgins, 1995; Henderson, Dean & Ward, 1995; Thatcher & Perrew, 2002; Zhao, Mattila & Tao, 2008).

8. Attitude: The more positive people were towards computers, the lower their levels of Computer Anxiety (Rosen, Sears & Weil, 1993; Popovich et al, 2008 in Powel, 2013).

9. Perceived Use: The easier the users felt a computer was to master, the more they believed that it is useful and the lower their level of Computer Anxiety (Venkatesh, 2000).

As a result of all the studies conducted, especially within the field of Psychology and Mathematics, the more computer scales were developed and refined (Powell, 2013). In the 1960s and 70s, several studies were conducted on the negative psychological response to computer technology through traditional attitude measurement techniques (Glass et al, 1985; Rosen & Maguire, 1990 in Rosen & Weil, 1994). Nearly all Computer Anxiety studies were done among people in the United States (Rosen & Weil, 1994). Most of the researchers focused on undergraduate and graduate university students (Gilroy & Desai, 1986; Cohen & Waugh, 1989; Bandalos & Bensen, 1990; Chu & Spires, 1991; Glass & Knight, 1988 in Rosen & Weil, 1994). Four research studies assessed students' Computer Anxiety or Computer Attitudes in more than one country. Allwood and Wang (1990 in Rosen & Weil, 1994) studied Chinese and Swedish students. Collis and Williams (1987 in Rosen & Weil, 1994) studied

Canadian and Chinese schoolchildren. Marcoulides and Wang (1990) studied Computer Anxiety in Chinese and American students (Marcoulides, 1991 in Rosen & Weil, 1994).

A Mathematics Anxiety Rating scale was developed by Richardson and Suin (1972 in Rosen & Weil, 1994). The Mathematics Attitude Scale was developed by Fenneman and Sherman (1976 in Rosen & Weil, 1994), which was adopted by later researchers. Bandalos and Benson (1990) and Gressard and Loyd's (1984) studies compared the factor structure of Computer Anxiety. They discovered three factors in the process, namely, Computer Liking, Computer Confidence and Computer Achievement. Marcoulides and Wang (1990) administered Marcoulides, Rosen and Sear's (1985) twenty-item Computer Anxiety Rating Scale (CARS) to four hundred and thirty-seven undergraduate students from the University of Los Angeles and two hundred and twelve students from a college in Hunan, in the Republic of China (Rosen & Weil, 1994). There was criticism about these rating scales. Firstly, these studies only assessed Computer Anxiety with samples from the United States. Secondly, the factor structure of Computer Anxiety with the American sample and a sample from other countries was invariant (Rosen & Weil, 1994).

Rosen and Weil (1985) then developed the Computer Anxiety Rating Scale (CARS), which consisted of three factors, namely, Interactive Computer Learning Anxiety, Consumer Technology Anxiety and Observational Computer Learning Anxiety. A factor analysis was done on an American sample. The CARS was then translated by two psychologists at the University of Naples, two psychologists at the University of Madrid, a Hebrew version translated by a professor in psychology at the University of Tel Aviv and a Hungarian version by two psychologists at the Hungarian University (Rosen & Weil, 1985). This was done to test that the CARS was suitable for the language and cultural context in which it would be applied. The English version was used in the USA, Australia, Czechoslovakia, and Yugoslavia (Rosen & Weil, 1985). A cross cultural comparison was done and then an overall calculation was done on Computer Anxiety. In this manner, CARS and General Attitude towards Computer Rating Scale (GATC) was developed. The CARS is a self-reporting inventory of statements designed to measure Computer Anxiety (Heinssen et al, 1987). The GATC is a self-reporting inventory designed to measure the attitude the person has towards computers (Heinssen et al, 1987). Both have positive and negative statements relating to what one wants to measure (Heinssen

et al, 1987).

2.4 Previous Research

2.4.1 Computer Anxiety and attitude towards computers

Various studies have been conducted in South Africa regarding how first year students engage with, and their attitudes towards computers. In South Africa, Finnie (1987) used an attitude assessment tool developed by Lee in 1970, to establish if novice computer users in their first-year business computing course had a change in attitude towards computers after attending the course. He used a sample of three hundred and seventy-eight students. His findings were that students became more negative about using a computer after completing the business computing course.

Clarke (2000) wanted to replicate a study done by Rosen and Weil (1985) which measured the level of technophobia experienced by three thousand, three hundred and ninety-two first year students from twenty-three universities from various countries. In 1992, Rosen and Weil developed the Computer Anxiety Rating Scale (CARS), which measured the level of anxiety reported by respondents when currently using or their future use of a computer and the General Attitude Towards Computers Rating Scale (GATC), which measures the respondents' attitudes towards computers, their negative thoughts or self-critical internal views when engaging with a computer or future thoughts about using a computer. The results of the South African sample indicated that the respondents were extremely positive about computers but displayed very high levels of anxiety when using a computer or thinking about their future use of computers (Clarke, 2000). They found the dimensions, namely, the cognitive (thinking process) and attitudes towards computers, overlapped. The more negative respondents' attitudes towards computers, the more anxious they become (Anthony, Clarke & Anderson, 2000). Their work formed the foundation for further work on Computer Anxiety, which indicated that people with Computer Anxiety: 1) Are more likely to spend short periods on a computer; 2) Exhibit feelings of frustration when using a computer; 3) Feel embarrassed about themselves when using a computer; 4) Feel they let others down when they did something wrong on a computer; and 5) Generally exhibited a fear of the unknown (Clarke et al, 2000). They resist learning about new Technology, fear using computers which are not

familiar to them, become frustrated when a computer does not perform quickly and become discouraged and completely helpless and overwhelmed when using a computer (Clarke et al, 2000). Rosen and Weil (1995 in Clarke et al, 2000) also found that socio-economic factors, such as being underprivileged, impact on users' levels of Computer Anxiety.

In 2000, Clarke wanted to establish the levels of technophobia of South African students. He conducted a study at the University of Natal with one hundred and twenty-nine first year students from the Science, Commerce and Arts faculties. Rosen assisted Clarke in adapting the questionnaires for the South African context (Finnie, 1987). The questionnaires were completed in the first week of the semester by the students. Clarke found that students were generally positive about computers however, they displayed high levels of anxiety (Finnie, 1987). Older students tended to be less anxious than younger students. Male students tended to be more positive about computers than female students. Clarke's study therefore did not have the same results as Weil and Rosen's study. It showed that the more positive students' attitudes were about computers, the more anxious they became. Their positivity did not translate into confidence (Finnie, 1987).

Clarke and Finnie (1998) conducted a longitudinal study from 1985 to 1995 on the changes of first year students' attitudes towards computers. They measured the students' attitudes using Lee's Attitude towards Computer Questionnaire (Clarke & Finnie, 1998). Three-hundred and seventy-eight first year commerce students at the University of Natal completed the questionnaires in 1985, in the first week of the semester. In 1997, 368 students completed the questionnaires. A total of 746 students were surveyed (Clarke & Finnie, 1998). Their findings showed that both groups of students thought that computers were beneficial yet had a great sense of fear and awe about computers (Clarke & Finnie, 1998). First language English speakers were more positive than second language English speakers about computers. Clarke and Finnie (1998) believed that change in the demographic of the students at the university due to the changes in the political landscape, which allowed students of colour access to university, explained the difference in attitude between first and second English language speakers. Second language speakers came from school with limited access to computers and hence their fear of computers (Clarke & Finnie, 1998).

Anthony, Clarke, and Anderson (2000) replicated Weil and Rosen's research conducted in 1997. They used the Computer Anxiety Rating Scale (CARS), Computer Thoughts Survey (CTS) and General Attitude Towards Computers (GATC) to establish whether there was a relationship between personality traits and Computer Anxiety. They surveyed one hundred and seventy-nine first year students enrolled in Psychology, Computer Science and End Using Computers at the University of Natal. The study revealed that students who were more neurotic and less open to change displayed a higher level of Computer Anxiety. Zulu speakers displayed higher levels of technophobia. The researchers however noted that the sample was not representative because of its low response rate.

Smith and Oosthuizen (2004) wanted to establish whether additional teaching of computer use would improve students' attitudes towards computers. They used Lee's Attitude towards Computers Questionnaire to survey five hundred and sixty-two students who stayed in residence at the University of the North, both prior to their computer training and after their computer training. They surveyed five hundred and ten distance students from the University of South Africa (UNISA) in the same manner. They found that students had a positive attitude towards computers but were still anxious about using a computer. Their results were consistent with the findings of Finnie (1987), Clarke and Finnie (1998) and Anthony et al. (2000).

Burger and Blignaut (2004) conducted a similar study at the University of the Free State. They wanted to establish if students' attitudes changed after attending a five-month computer training course. They surveyed first year, Bachelor of Science and Bachelor of Commerce students during their first computer laboratory session and last laboratory session using Gressard and Loyd's (1986) Computer Attitude Scale. Their results indicated that the more students gained experience in using computers, the more their confidence and liking of computers decreased. Their Computer Anxiety however increased (Burger & Blignaut, 2004).

Three recent studies in South Africa were conducted by Aungamuthu (2010), Naidoo and Raju (2012), and Coetzee (2013). In 2010, Aungamuthu wanted to establish if the Foundation Programme, located in the Centre for Science Access at the University of KwaZulu-Natal, which taught ICT to students from historically disadvantaged schools or students who did not

meet the entrance requirements to the University of KwaZulu-Natal as part of their Mathematics course. Thirteen semi-structured interviews were conducted and twelve of these students also participated in the focus group. Wilson's (2004) criteria for ICTS access was used to analyse the data (Aungamuthu, 2010). The findings revealed that the ICT training did not meet the access requirements as: 1) users did not have the knowledge and skills to effectively use ICT; 2) users could not operate or engage fully with ICT; 3) users could not find meaningful engagement with ICT; 4) users could not create products, such as computer programmes required for their courses; 5) there was insufficient access to computers in the geographical and social spaces of students; and 6) users were not given a choice in the tools (computers) they were using nor encouraged to give feedback on whether they felt these computers and computer programmes met their needs. The limited access therefore meant that users once again did not engage with computers as equals to their peers who were computer proficient.

Naidoo and Raju (2012), as part of their master's programme, investigated what impact being digitally disadvantaged had on students during their Information Literacy classes. Two hundred and twenty-seven students in the Extended Curriculum at the Durban University of Technology completed a self-administered questionnaire. Their findings showed that disadvantaged students often required additional nurturing and that lecturers did not complete the syllabus. Disadvantaged students experienced anxiety and feelings of inadequacy especially when seated next to a student who was computer literate. Students from disadvantaged backgrounds did not learn the required skills as per the course outcomes. It was therefore recommended that online tutorials in addition to group work and games be utilised to accommodate disadvantaged students. The methods employed would help disadvantaged students acquire computer competencies. The researchers felt that lecturers should consider the limitations disadvantaged students have with regards to computer use and access when developing their courses and teaching them.

In 2013, as part of her master's thesis, Coetzee wanted to understand what impact the initial engagement with ICT had on students' perceptions of themselves. Eight first-year students at the University of Johannesburg were interviewed immediately after their basic computer orientation session. The researcher analysed the data using Cultural-Historical Activity

Theory. Prior to coming to the university, none of the students had had access to a computer. The findings were that these students had lost their confidence, felt embarrassed and did not acquire the computer skills expected. It also highlighted that staff teaching the course were not prepared to guide these students through their challenges. A review of the session was recommended to make the required changes to meet the needs of computer illiterate students.

Rural students need to feel comfortable with and knowledgeable of the university environment to succeed. They also need to be confident in their computer abilities to succeed both academically and in the world of work. The current research explored what challenges are faced by computer illiterate, rural students whilst adjusting to the UCT.

2.4.2 Research at UCT

Since the introduction of computers, a plethora of research has been conducted at UCT regarding students' use of ICT, their use of cell-phones as learning tools, eLearning, and Massive Open Online Courses (MOOCs). Only two research studies, however, have focused on first year students at the UCT and their computer competence. In 2008, Nash conducted a study of four thousand, one hundred and sixty-nine first-year students registered at the UCT and assessed their level of computer competency using a computer skills test (Nash, 2009). According to Nash (2009), students who obtained more than sixty percent on their computer assessment were competent enough to meet the skills level required for university computer usage. Seventy-four percent of the students were found to be computer competent. Eighty percent of the students who did not pass this benchmark were black Africans. Female students across all race groups were found to be less computer competent than their male counterparts (Nash, 2009).

In 2014, Czerniewicz and Brown did a case study of a rural student at UCT. This study formed part of a broader longitudinal study, which explored first-year students' experiences of their first year at university. The study was conducted at four universities in South Africa. In a sub-study, they did a case study of a nineteen-year-old, first-year student at UCT, who had self-identified himself as a rural student. He disclosed that he had no computer exposure prior to coming to the university. The student reported that he could not survive at UCT without a

laptop. His use of his laptop was primarily used for academics and entertainment (movies and series). He found his adjustment in the first six months at university extremely hard and he failed his first semester at university. A key point raised by the student was that his assignments had to be in a specific format. When asked how he felt about computers, he stated, “I love them” (Czerniewicz & Brown, 2014: 9). Yet, his world at university and home are different. At his home, no one owns a laptop or computer, and no one is computer proficient. He is seen as being knowledgeable because of his ICT knowledge and held in high regard in his village (Czerniewicz & Brown, 2014).

In conclusion, this chapter highlights how factors, such as previous computer experience, attitudes to computers, Computer Anxiety, poor socio-economic factors and gender influence computer skills acquisition. It explores the learning environment from which rural students come, and the learning environment they enter at historically white institutions, specifically UCT. Computer proficiency is highlighted as one of their major challenges. It reflects on prior research conducted at other South African HEIs and UCT. Finally, it briefly states what this study will focus on.

Chapter 3: METHODOLOGY

The researcher used a transformative research design to guide her work. The social challenge being the process of acquiring computer skills as experienced by black rural students. This chapter outlines how the researcher used both qualitative and quantitative research methods to collect and analyse the data. The researcher employed Critical Discourse Analysis to analyse and triangulate the data and results. This chapter outlines this process.

3.1 Research Design

3.1.1 Transformative Research Design

According to Creswell and Plano Clark (2011:73), "transformative design focuses on conducting research that identifies and challenges social injustices". This research deals with the university context, which does not recognise the challenges faced by black rural students when they acquire computer skills at the university. The institution does not recognise that these students come from the worst schooling provided to South African learners and for this reason very few qualify for university. Secondly, the university environment in South Africa is known for alienating black students and not assisting them in reaching their academic potential. The aim of transformative research is to bring about social change or address social injustices (Creswell & Plano Clarke, 2011). The change the researcher hopes to achieve it to impress upon the university the need to recognise the needs of black students, especially with regards to manner in which the are provided computer training.

Another requirement of transformative research is to collaborate with the marginalised community. Hence the researcher engaged with the students in the form of presentations to clarify the purpose of the research and participants could choose whether or not they would participate, participants willingly elected to participate in interviews and the observation conducted by the researcher. Participants reviewed the transcripts of these engagements and could change parts they felt did not accurately reflect their views. The participants also had the right to review and make any changes to the research report. The research was conducted

in a clearly defined manner, as required by a transformative framework (Cresswell & Cresswell, 2018; Mertens, 2007). Hence the researcher a mixed methods approach which links the theoretical framework to the research strategies. The researcher interacts with participants and places, with an equal emphasis on both the qualitative and quantitative methods, which must be conducted concurrently and/or sequentially (Creswell & Plano Clark, 2011). In this research, a concurrent research approach was used.

The research was captured as it occurred. First the pre-test was administered to first-year, NSFAS and Rural Education Access Programme (REAP) students, then a computer training session for first-year engineering students who elected to attend the computer training session offered by their faculty, was observed (these students also completed the pre-test during this session) and finally, individual interviews were conducted with four students. The post-test results form part of the Computer Anxiety testing process and, for this reason, the results and analysis are included with the pre-test results.

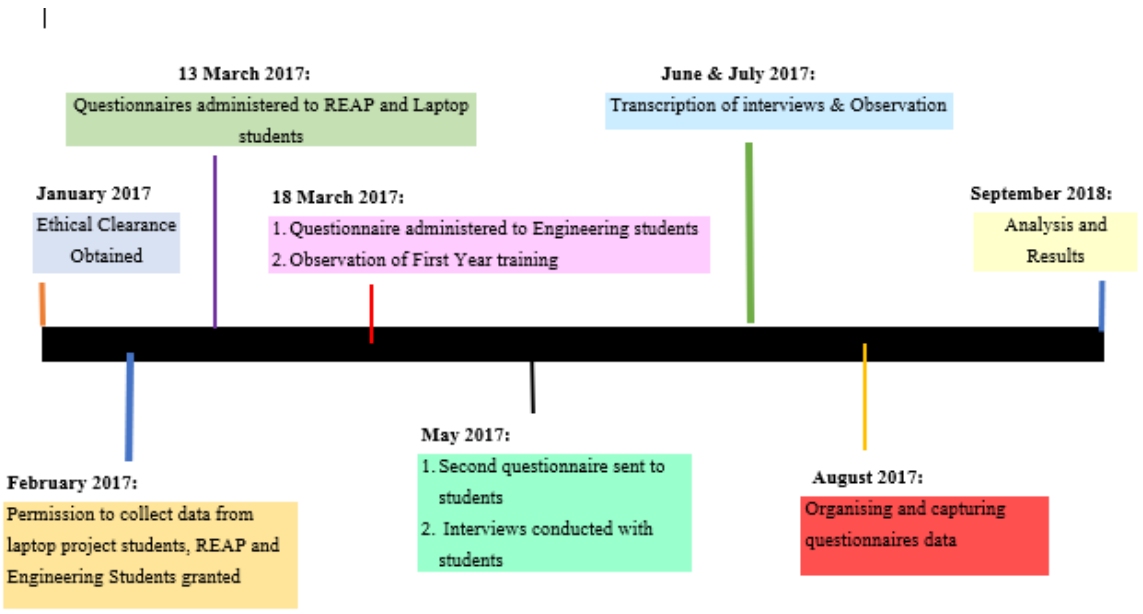


Figure 3.1: Data Collection and Analysis Timeline

3.2 Theoretical Lens

Critical discourse analysis clearly states that the researcher has a vested interest in the research (Van Dijk, 2016; Terre Blanche, Durrheim & Painter, 2008). Critical discourse analysis is therefore a suitable analytical tool to use in a transformative research design because it is embedded into the research through the data analysis, and it aims to bring about social change (Van Dijk, 2006 in Mogashoa, 2014).

The researcher chose to use Michel Foucault's views on critical theory because of his focus on discourse, power and the subject as key elements of his analysis. It also has relevance to the aim of the research, which was to understand the impact of being computer illiterate has on first-year, black, rural students at the University of Cape Town in their first six months of study, which is an issue of relevance to higher institutions in South Africa, given the digital divide that exists between students.

3.2.1 Critical Discourse Analysis

Critical discourse analysis is used as the research tool. It is a social theory orientated towards critiquing and changing society (Wodak & Meyer, 2016). It views language as a social practice, which considers the "context" in which the language is used and how the language is used in sustaining and reproducing the status quo (Fairclough & Wood, 1997 in Wodak & Meyer, 2016). Bless and Higson-Smith (in Terre Blanche et al, 2008:19) emphasise that a "theory serves as an orientation for gathering facts since it specifies the types of facts to be systematically observed". Critical discourse analysis aims to enlighten and emancipate humans from the dominant discourses in society and it requires of the researcher to be self-reflective during the research (Terre Blanche et al, 2008). Hackley (2003 in Buchanan, 2008:1) states that "Critical discourse analysis assumes social constructionist ontology in that it accepts the role of language and social interaction in the production of power relations". It primarily studies the way in which social power, dominance and inequality is enacted, reproduced and resisted by text and talk in a social and political context (Van Dijk, 2001). Van Dijk (2001) believes that the aim of Critical Discourse Analysis is to provide a different "mode" or "perspective" of theorising, analysing and applying discourse in various fields. Lucke (1996 in Mogashoa, 2014) adds that the aim of Critical Discourse Analysis is to explore the

relationships of causality, namely, what was the cause or set of conditions that gave rise to the discursive practices, events, or texts. An example of this is the #FeesMustFall movement, which was ignited by black students' frustration with the expensive tuition and associated costs of studying at higher education institutions in South Africa. Their view was that this was an exclusionary tool particularly used by historically white higher education institutions (Heleta, 2016; Langa, 2017; The Institutional Reconciliation and Transformation Commission [IRTC] Report, 2019). Critical Discourse theory looks at the wider social and cultural structures, relations and processes which gave rise to and shaped these power/knowledge situations. It further investigates how these practices, events and texts arise out of and are ideologically shaped by relations of power and struggles for power. Hence, in the example of the #FeesMustFall movement, the continued use of Eurocentric models in which South African HEIs continued to operate, often alienated black students and reinforced the notion that black students have no place in HE. The language used in HE is colonial, upper class, English and when the #FeesMustFall movement grew, the language used by students was that of the Black Consciousness movement in the United States that included terms such as "lit" and "black pain" (Langa, 2017; Heleta, 2016).

The aim of Critical Discourse is to understand social issues that are currently impacting on society, whether they be perceived as being negative or positive (Jørgensen & Phillips, 2002). This includes current issues, such as access for black students to HEIs in South Africa. It is a multi-disciplinary approach used to understand how language functions in constituting and transmitting knowledge in social institutions (Jørgensen & Phillips, 2002; Van Dijk, 2001). Critical Discourse is concerned with issues of power, justice and the way in which the economy, race, class, gender, religion and sexual orientation construct and reproduce or transform social systems (Jørgensen & Phillips, 2002; Van Dijk, 2001).

Michel Foucault

The researcher uses Michel Foucault's theory as a theoretical lens. Foucault was a French historian, philosopher and social theorist associated with the structuralist and post-structuralist movements (Gutting & Oksala, 2016). He is described as a Nietzschean theorist, who drew largely from Nietzsche's work on genealogy and its focus on trust, power and the

subject (Mahon, 1992). Nietzsche problematised the truth as being entwined with the relations of power. It sought a multiple relationship of forces at the origin of taken-for-granted values, concepts and things people experience (Mahon, 1992). Foucault stated that individuality was a historical construct which was influenced by falsifying the grammatical structure of language (Mahon, 1992).

Foucault was primarily concerned with the interaction between "Discourse", "Power/Knowledge" and the "Subject" (McHoul & Grace, 2003 in Buchanan, 2008). Foucault was not interested in the power relations but the link between power and knowledge, through which people are transformed (Smart, 1985). Foucault stated in his interview "Prison Talk" (Foucault, 1977b: 51–52) that "the exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power". The social process through which rationality is constructed and applied to human subject makes it knowledge (Smart, 1985). That is how this knowledge is used by one group to dominate another, not from a top to bottom manner, but at all levels of society (Smart, 1985). Foucault accurately sums this up when he says,

> "Between every point of a social body between a man and a woman, between the members of a family, between a master and his pupil, between everyone who knows and everyone who does not, there exists relations of power" (Foucault, 1978: 187).

Foucault believed that power emanated from all levels of society (Teo, 2000 in Buchanan, 2008). Power is therefore ubiquitous and found in every moment of any social relationship (Foucault, 1978). It is therefore everywhere and all embracing. However, power is not located in an institution, structure or possession but is the name or terminology given to the complex strategic situation unfolding in society (Foucault, 1978). Power operates through various disciplines, orders, ranks and makes things visible in society, yet it is always dependent on knowledge (Foucault, 1978). Foucault believed that power and knowledge are inseparable therefore he used power/knowledge to reflect this (Foucault, 1977a).

Foucault believed it was this two-way interaction between discourses that both shapes and is shaped by society (Teo, 2000 in Buchanan, 2008). Foucault (1976 in Davidson, 2003: 24) stated that

> "[r]elations of power are indissociable from discourse of truth, and they can neither be established nor function unless a true discourse is produced, accumulated, put into circulation, and set to work. Power cannot be exercised unless a certain economy of discourses of truth functions in, based on, and thanks to, that power".

Foucault further believed that the self or autonomous person is politically constructed (Olssen, 2005). According to Foucault, the pursuit of personal autonomy is a social construct because the person/s have been constituted by political acts (Marshall in Olsson, 2005). It is this false belief that we are free. The individual does not understand that educational institutions introduce new forms of social control and socialisation, which are normalised (Foucault, 1980). It is this insidious form of indoctrination that makes us believe that we are our own authors, yet we ignore the fact that we are bound by the conditions of our own production that constitutes an identity which makes us governable (Marshall, 1996 in Olssen, 2005). Hence, there is no true or false consciousness because all notions are structured by power (Foucault, 1978). "Truth" is therefore constructed by society, at a particular time and within a particular context (Foucault, 1978).

3.2.2 Analysis using Foucault's lens

According to Jansen (2008), Foucault uses the term "discourse" according to the standard meaning in 1930. Foucault thus believed that "discourse" is a social construct; it is created and perpetuated by those who have power and means of communication such as a lecturer who decides which theorists to teach students. Foucault believed that morality, truth and meaning are created through discourse (Pitsoe & Letseka, 2013). Foucault does not solely focus on language; he believes language is important as it plays a role in reproducing and transforming power, but it is influenced by social practices and the person/institution that conveys the words. Discourse, for Foucault, is seen from a more structuralist view (Jansen, 2008). Foucault therefore broadens it to be an activity, a practice that can be initiated by a single person or author (Foucault, 1972 in Jansen, 2008). In doing so, Foucault located discourse analysis firmly in the field of political action (Hook, 2001).

Discourse has rules, systems and procedures, which Foucault names "Discursive Practices" (Foucault, 1981 in Hook, 2001: 3). These practices are processes which are not separate from

one another but complementary and constitutive of one another. Discourse thus constrains and enables; it is formed and exists through its mutual constitution (Foucault, 1981 in Hook, 2001). These discursive rules are linked to the exercise of power; the discourse itself is both constituted by and ensures this reproduction of the system, through various forms of selection, exclusion and domination (Hook, 2001).

Foucault believes that what is said is just a reappearance of what has been said before. He labels this "discursive repetition or re-circulation" (Foucault, 1981 in Hook, 2001: 9). The author is the principle or grouping of discourse and it provides the identity or "I" of the repetition. The author is given a position of privilege as this grouping or principle is the authority or "all knowing" (Foucault, 1977 in Hook, 2001: 9). According to Foucault (1981 in Hook, 2001: 11), "what is valid is contingent on a variety of conditions such as objects, theories, rules, techniques and instruments". Foucault (1981 in Hook, 2001) notes that whilst valid disciplinary statements may be viewed as legitimate, they contain both errors and truths.

Critical Discourse Analysis has been used by other researchers in the field of ICT and education. Rajagopal (2014) explored whether ICT is viewed as a source of "Truth/Knowledge" and whether this knowledge has contributed towards disciplinary knowledge in society, in this case, experts in the field of Information Technology. Using Foucault's Archaeology of Knowledge, Rajagopal (2014) explored whether this expertise created controls within society, known as power. Rajagopal (2014) highlighted how IT knowledge is controlled by governments and corporations, who use this knowledge to influence people into behaving and thinking in a particular way. This is known as Internalised Conformity. As an example, Spyware, such as Cookies, access a consumer's personal domain and capture individual likes and dislikes. This then controls the products or goods that are advertised to the consumers when they use their computers, through advertisements or pop-ups advertising goods that the individuals like. The "self"/person is no longer in control but is controlled by unseen powers, such as corporations (Rajagopal, 2014). Rajagopal therefore concludes that ICT has become a conduit where consumers internalise their needs, which are really created by commercialised authorities.

Hope (2013) summarised six research papers which emphasise the value of Foucault's work in the field of Educational Technology. The first is by Chronaki and Matos (2003) who explored the phenomena of school surveillance and how it has been normalised within schools. They used Foucault's panopticon to elucidate how ICT within schools is used to monitor the work of teachers and learners. This invasion of their private spaces has been deemed acceptable and justified.

In the second paper, Jenson and De Castell (2004) used Foucault to examine the use of plagiarism software and intellectual property software used at schools and higher education institutions. They pose the question, "What is an author?" Their research highlights that, in earlier years of academia, it was expected and acceptable to use someone else's written work to improve your own writing style and to develop into a proficient academic. Today, it is not acceptable and can damage one's academic ambitions. However, this practice is not driven by a "noble" cause but by financial and vainglorious factors, for publishers and authors to gain financially from their work and gain academic and personal prestige within their chosen field. Foucault's work on economies of knowledge is used to unpack this phenomenon. Thirdly, Selwyn and Facer's (2013) research used Foucault's question, "What is appropriate research?" to look at the role of self and external forces in learning, especially in Educational Technology teaching. This is how discursive formations privilege certain value positions and statements in Educational Technology teaching and research. Fourthly, Biesta's (2006) research uses Foucault to unpack the social, political and economic dynamics which surround ICT provision. The social drivers that see ICT as being progressive and vital; the political drivers which drive these beliefs for their own political agenda and to score political points; and the economic drivers which result in financial gains for those providing ICT services. These drivers, however, create greater social and economic divisions between the poor and the rich. Biesta (2006) warns against ICT in education being narrow, inward-looking and interested in self gain.

Fifthly, Somekh (2001) used Foucault to explore the dynamic of power/knowledge in teaching cultures in the field of Education and Information Communication Technology. The teacher, as the "holder" of knowledge, is challenged by the learner who has access to knowledge and is sometimes more proficient in ICT than the teacher. It reflects on how this impacts on the

teacher's identity and role in the learning process. The final work reviewed was by Potter (2012) and focuses on children's use of film production as a form of "self-curation", given their input into the collecting, distributing, assembling, disassembling of media artefacts as they journey through the film-making process. He uses Foucault's notion of "hypomnemata" to challenge the educational assessment practice to include curatorship as a tool to assess learners. Potter (2012) argues that the process of curatorship provides a sound way to interpret text and the learning process that learners go through. He challenges those who hold power to align their practices to meet the changing landscape caused by the developments in Education Technology. This, he feels, has resulted in a new literacy practice.

Hope (2013) concedes that Foucault did not write any complete texts, nor did he address emerging technologies directly, which may be argued as a reason for his lack of use in Educational Technology research. However, he concludes that Foucault's work and writing would be useful in Educational Technology research, especially when using his panopticon, going beyond the "artefacts" of Educational Technology and unpacking the discursive practices, which intentionally or unintentionally expose value positions in Education Technology. Finally, it challenges the notion that the drivers of Educational Technology have altruistic intensions.

Hawisher and Selfe (1991) warned against the prevailing discourse about Technology in education which focuses on the vision of what computers can do and is one of hope and persuasion. It however does not look critically at Technology and its use in education. Using Foucault's Discipline and Punishment and Bentham's Panopticon, they argue that thinking critically will improve the use of Technology in education. It highlights the powerful influence that professionals in the classroom exert on students, using computers in the continued tradition of teacher as the expert and the holder of power. Hence, it is critical for educators to understand how Technology can impact on the social, political and educational environment (Hawisher & Selfe, 1991).

Taylor (2013) believes that Critical Discourse Analysis helps researchers obtain practical information about respondents' lives and experiences; it allows the researcher to explore people's opinions. It also aims to bring about social change.

The research prefaced highlights the value of Foucault's work in research into Educational Technology in education. It also reflects on the same themes relevant to this research study. Firstly, how ICT, which is promoted by both the South African Government and HEIs in South Africa to overcome the educational divide between the haves and the have nots, comes with its own challenges, which may create a bigger gap in education amongst the have nots. It raises the question of who benefits. Is it the haves who gain economically from ICT being a necessity for academic success? Broekman, Enslin and Pendlebury (2002: 30) echoed a similar sentiment when they when they posed the question, "Is it morally defensible to introduce online learning if doing so would disadvantage an already disadvantaged group of students?" Do academics advance their own knowledge and academic profile? What measures are being put in place to improve the proficiency of underprivileged students? These questions are often asked by Foucault in his writing: "Whose knowledge?", "Who benefits?" and "How is power and control normalised in higher education environments?" The same questions are asked in this study.

3.2.3 Relevance of this Research

The researcher draws on Foucault's understanding of discourse, power/knowledge and truth to unpack how first-year, black, rural students who are not computer literate are impacted at the UCT. Using the domains of internal and external exclusions to analyse the interviews, surveys and observations, the researcher would like to know whether the dominant discourse with regards to computer literacy has impacted on the student. Secondly, what is this impact? According to Foucault (Munro, 2001), the degree to which the primary discourse matches the dominant discourse will impact on the level of comfort or discomfort/discontent the person experiences.

As discussed in section 3.2.1, which focused on the theoretical section, the researcher uses the analytic tools employed by the theorist, Michel Foucault. The lens focuses on his concepts of discourse, power/knowledge and truth.

According to Van Dijk (2016), there is not "a" or "one" method in Critical Discourse Analysis. The only proviso is that the method gives a satisfactory answer to the questions asked in the research (Van Dijk, 2016). As per the transformative research design, the qualitative and

quantitative data collection happened concurrently, followed by the analysis (Creswell & Plano Clarke, 2011). An equal emphasis was placed on the qualitative and quantitative data results. These results were merged and analysed using Critical Discourse Analysis (Creswell & Plano Clarke, 2011). Triangulation, which is the use of multiple perspectives to check one's own position against was used. The results of the qualitative and quantitative data were studied and triangulated. The researcher looked for evidence of convergence from these results (Terre Blanche et al, 2008).

3.3 Quantitative Data

3.3.1 Sample and quantitative data collection

The researcher obtained ethical clearance from the Humanities Ethics Committee and the Department of Student Affairs to conduct her research at UCT (attached in Addendum A). The research was approved in January 2017. The researcher then approached the Director of Information and Communication Technology Services (ICTS) at UCT, who manages the laptop project at the university and asked permission to distribute her questionnaires at the laptop distribution on Saturday, 13 March 2017. Permission was granted. The researcher chose this group because all the students were either on National Student Financial Aid Scheme or a bursary and the salary range of their parents was between R0 and R250 000 per year. The probability of obtaining students who met the criteria required as a sample for the study, namely, black, rural students would increase. Five hundred students were expected to receive laptops (from the student recipient list) on this day. The researcher was given an opportunity to do a presentation to the students about her research, allow them to ask questions and to distribute the questionnaires to the students. One hundred and eighty-three students completed the questionnaires. Thirty-five students did not meet the criteria and five questionnaires were incomplete. Three students emailed the researcher and requested that their responses be removed from the research because they no longer wanted to participate. A total of one hundred and forty questionnaires remained and were therefore used in the study (copy of questionnaire is attached in the Addendum B3).

The researcher also obtained permission to conduct her research with the Rural Education Access Programme (REAP). This is a bursary programme that funds black, rural students at

tertiary institutions. The second group of students comprised ten first year REAP students. The students met the requirements for the sample group. The researcher was given a session with the students during their REAP orientation. The researcher was able to explain the purpose of the research and distribute the questionnaires. Eight students completed the questionnaire.

The researcher approached all the faculties to request permission to conduct her research with the students who signed up for the computer training provided by the university for first year students. The Faculty of Engineering and Built Environment granted the researcher permission. It had two groups of students who indicated their interest in attending the computer training session, namely, local students and students from out of town. The researcher selected the second group of students because the probability of finding suitable respondents was higher in this group. The group consisted of fifty- one students, who all resided in the university's residences, as listed on the attendance register sent to the researcher by the faculty. The register is not listed in the addenda, to keep the names of the students confidential. The researcher was able to do a presentation to the group prior to their computer training and students had an opportunity to ask the researcher questions. Forty-six students completed the questionnaire. Four students were not rural students and one questionnaire was incomplete and was discarded. A total of forty-one questionnaires remained.

Data were collected by administering Rosen and Weil's Measuring Technophobia Instruments (MTI), namely, the Computer Anxiety Rating Scale (CARS), the General Attitude Towards Computers Scale (GATCS) and the Demographic Data Questionnaire (attached in Addendum B). The CARS consists of twenty hypothetical experiences of computers and requires subjects to indicate how anxious or nervous they would feel in each situation. The response to the CARS is given by selecting one of the following: "Not at All", "A Little", "A Fair Amount", "Much" or "Very Much". The GATCS presents twenty statements of attitudes towards using computers and computerised Technology to which the subjects respond using the five-point Likert scale. Rosen and Weil's Demographic Data and Technology Experience Questionnaire was modified as it was in Finnie (1987), Clarke and Finnie (1998) and Anthony et al.'s (2000) studies, to suit South African terminology and culture. The nature of this research was

discussed in the literature review. The instrument also elicits demographic characteristics, such as age, gender and current and intended future computer ownership. The reliability of this instrument was tested by Howard and Howard (1998), Rosen and Weil (1992) and Anthony et al (2000).

The researcher used convenience sampling and one hundred and eighty-nine students completed the questionnaires (at the NSFAS laptop distribution morning, engineering training and REAP orientation). Convenience sampling was used because the students were present when the questionnaires were distributed and they were willing to participate in the study (Creswell, 2008). The quantitative data were collected through a pre-test and post-test process.

Regarding the post-test, the same questionnaire was sent to all the respondents via email and via the post (questionnaire and a return envelope), two weeks prior to their consolidation week in the first semester, May 2017. Only twenty-one students returned their questionnaires. The researcher was able to minimise selection bias by only including students in the first round of testing to answer the questionnaire again (Babbie & Mouton, 2008). However, given the small number of respondents, this sample is not representative of the total number of black, rural, first-year students at the university. The results are therefore not generalisable.

There are limitations to using this method because it impacts on the internal validity of the study. The researcher cannot say with absolute certainty that the independent variable, namely, computer literacy, affects students' adjustment to university. Other factors, such as maturity of the participants, historical events, such as the student protests, and the test participants' behaviour may be different because they are participating in the study. The participants may have given "appropriate" answers, which will impact the findings (Babbie & Mouton, 2008). A positive aspect of experimental studies is they are cost-effective and are easy to administer, capture and analyse (Babbie & Mouton, 2008). The possibility of replication of the study will increase its validity (Babbie & Mouton, 2008).

3.3.2 Data Analysis

The data were scored and recorded in Excel (attached in Addendum C). The data were then analysed using SPSS. Factor analysis was used to analyse the quantitative data, with the principle factors being derived for CARS and GATCS. Previous studies have grouped the twenty items in CARS-C into four factors: Interactive Computer Learning Anxiety (e.g. anxiety while learning about computers, dealing with computer errors, thinking about purchasing a computer); Consumer Technology Anxiety (e.g. resetting digital clocks, programming microwave ovens); Observational Computer Anxiety (e.g. looking at computer printouts, watching someone else use a computer, watching a movie about an intelligent computer); and "Computer Feedback Anxiety" that reflects anxiety when something goes wrong while interacting with a computer, getting error messages, the computer being "down" or deleting information from the computer (Anthony et al., 2000). Consumer Technology Anxiety was not included as a factor because it has no relevance to this study.

The variables regarding Computer Anxiety were: computer experience, computer availability (access) and the perceived usefulness of computers. These variables were then correlated to Foucault's notions of Discourse, Power and The Subject.

3.4 Qualitative Data

3.4.1 Observation

According to Creswell (2016), observations can yield information not divulged during discussions or in written documents and they allow the researcher to check the accuracy of the information source. They also force the researcher to become familiar with the subject (Babbie & Mouton, 2008). A negative aspect of observation studies is that the researcher will be visible to the participants, which may alter their behaviour (Babbie & Mouton, 2008).

The researcher used purposive or justified sampling. The researcher was granted permission to observe the training session for engineering students who attended the computer training and came from out of town as this group had a high probability of having black, rural, first year students. The student register of the group indicated that all the students were from this group.

Forty-six students attended the training session. One, an Indian male, left thirty minutes into the session. The forty-five students who remained were all black, from rural areas and stayed in the university's residence. The session was conducted by six senior engineering students (three males, two black males and one Indian male, and three black females) who had also been Orientation Leaders for the students' during their Orientation week.

The researcher took notes during the session, which focused on the context, the material presented, the presenters, the students and the language used. The observation notes were then transcribed by the researcher as per Figure 3.2.

The transcript was then analysed using Foucault's definitions of Discourse, Power/Knowledge and Truth (McHoul & Grace, 2003 in Buchanan, 2008). The researcher used the questions posed by Pat Thomson (2011) who is a professor of Education in the Faculty of Social Science at the University of Nottingham. The forum in which she engages with Foucault is her research blog (Thomson, 2011) where she discusses his work and answers questions post-graduate students may have on Foucault. The questions posed to analyse text using Foucault, were:

1. What is being represented as the truth or norm?
2. How is it constructed?
    2.1 What evidence is used?
    2.2 What is left out?
    2.3 What is foregrounded or backgrounded?
    2.4 What is problematic?
3. What interests are being mobilised?
    3.1 Who does it serve?
    3.2 What does it not serve?
4. How has this come to be?
5. What identity is valued?
    5.1 What practices are made possible or desirable?
    5.2 What is required by this way of thinking/talking/understanding?

5.3 What is disallowed/normalised/pathologised?

(patthomson.net, 2017)

This provided the criteria for sorting data. The text was then reviewed to seek patterns. Firstly, the researcher did a word count to see what words occurred most frequently. Secondly, using different coloured pens, the researcher grouped objects, technical jargon, environmental descriptors and made notes about these key words. These were then simplified into a table to see whether there was a pattern, as noted in Figure 3.3. The patterns and the interpretation thereof were viewed through a Foucauldian lens (Berg, 2007).

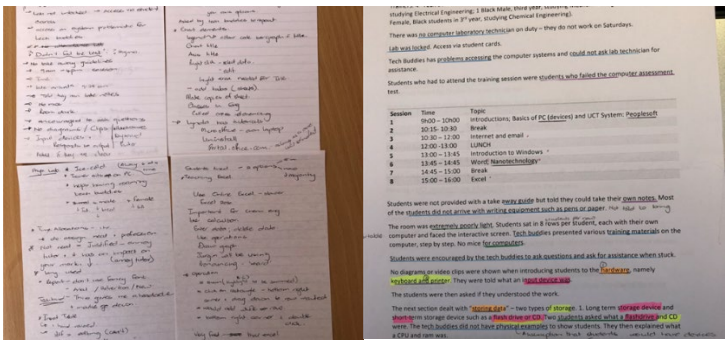


Figure 3.2: Photographic Images of Observation Analysis Process: Rough and Transcribed Observation

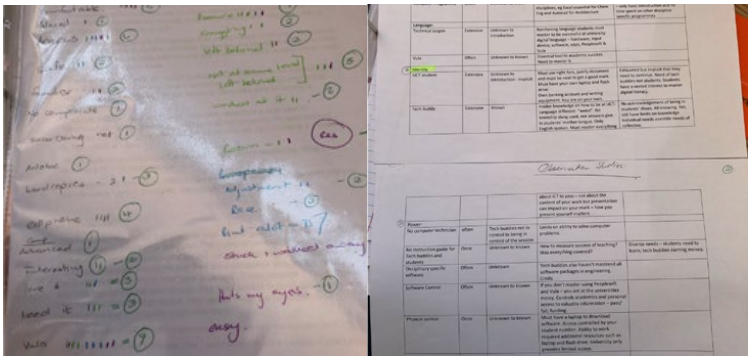


Figure 3.3: Photographic Images of Observation Analysis Process: Collated data

3.4.2 Interviews

Terre Blanche et al (2008) believe that interviews are well suited to interpretive and constructivist approaches to research. They allow researchers to get to know the subject well and fully understand how they think (Terre Blanche et al, 2008) as people are more

predisposed to disclosing their feelings or experiences in an unstructured interview (Terre Blanche et al, 2008). This also allows the researcher to see how the participant gives meaning to an experience and how they elaborate on this process (Babbie & Mouton, 2008).

The researcher applied purposive sampling. The sample was a subset of the larger cohort of first year students who completed both the pre- and post-questionnaires at the UCT. The interviewees were students who had indicated on both their questionnaires that they were willing to be interviewed by the researcher. The researcher thus contacted the twelve students who completed the second questionnaires and agreed to participate in the interviews, via email to ask if they would avail themselves for an interview. Only four students were available during the interview period, two male and two female, black, rural, first year students, who came to the university not being computer competent. Only one student was a REAP student. The students were interviewed separately in the same week. Interviews took place two weeks prior to the consolidation week for the first semester in 2017. The interviews were conducted on the university campus at the students' residences. An unstructured interview format was used by the researcher (attached in Addendum B). The interviews were recorded on a voice recorder and then transcribed by the researcher as noted in Figure 3.4. The text from the interviews was analysed using Pat Thomson's questions, in the same way that the observation study was analysed. The researcher took the analysis of each interview and collated it into a table which contained the major themes that were elicited as well as their frequency and the similarities and differences between the students (Figures 3.4, 3.5 and 3.6 show photographs of this process). The data were also analysed through a Foucauldian lens.

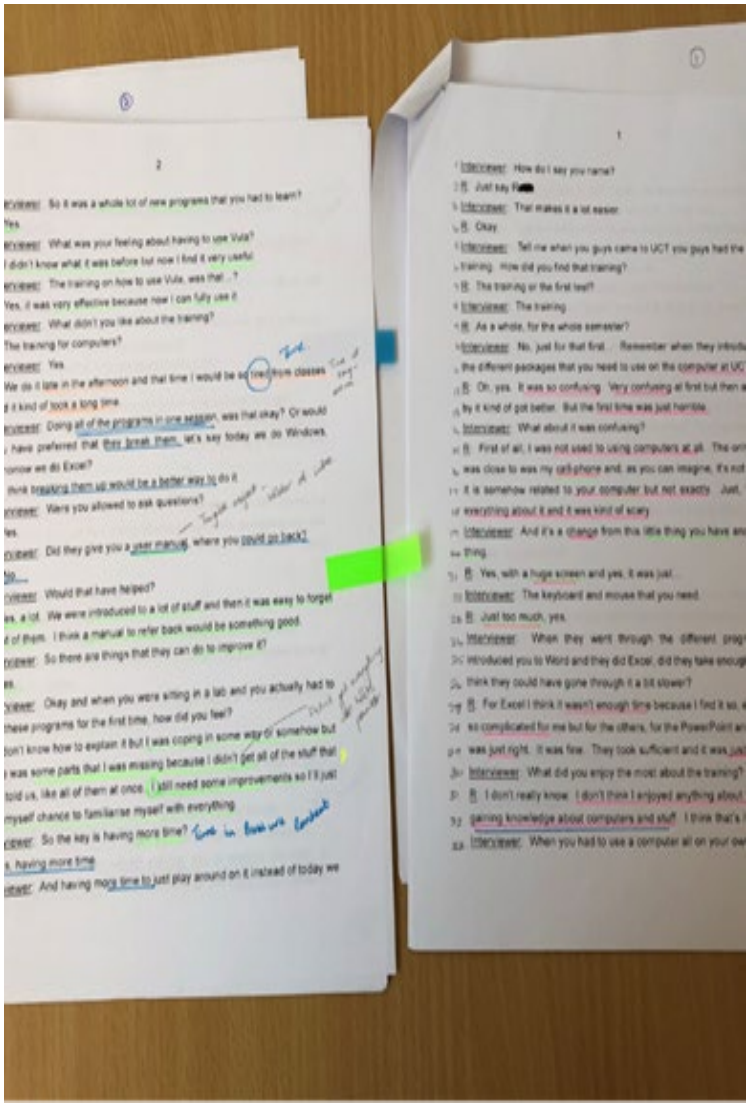


Figure 2.4: Photographic Image of the Interviews being analysed

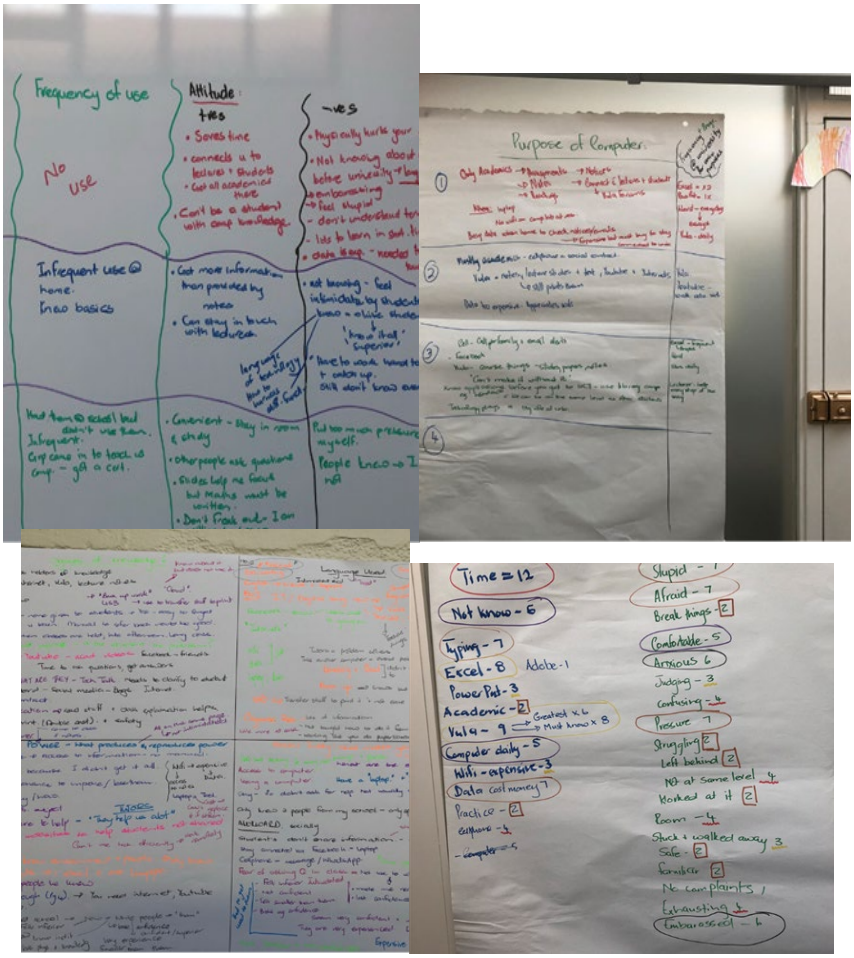


Figure 3.5: Transcribed Interviews

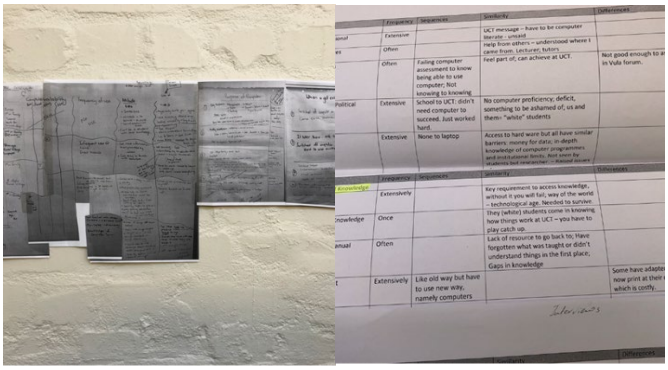


Figure 3.6: Individual Themes, Word Count and Collated Themes

3.5 Triangulation

Methodological triangulation was used to look for convergent evidence from the qualitative and quantitative data analysis which connected the results to the theoretical lens. This was

done through a graphical representation of all the data and then making linkages. These linkages will be elaborated on in the discussion of the research.

3.6 Ethical Considerations

3.6.1 Prior to the research

When recruiting respondents, the researcher had to ensure that their participation was voluntary and representative of the sample (Babbie & Mouton, 2008). The inherent nature of this research project gave respondents the choice of participating or not. The large number of students who did not participate and the low response rate from the target group is indicative of this. The low response indicates that the sample is not generalisable to the target group.

The researcher ensured that informed and written consent was obtained from the respondents (Oliver, 2010). The researcher therefore made a presentation prior to the distribution of the questionnaires that served as an information session and allowed students to ask questions about the research. The participants were thus well informed. In addition to the presentation, a description of the research was given to students. Students also signed a consent form, which indicated that they were willing to participate in the research. A copy of this is attached in Addendum B.

It is important that the respondents are not psychologically or physically harmed during the research. No part of this research posed this risk to participants. The researcher was cognisant that some of the respondents may feel “othered” and, for this reason, all the students present in the venues were asked to complete the questionnaire. It was important that the researcher showed sensitivity to any students who felt they did not belong at the university because of their socio-economic status and race. NSFAS students were highlighted as a particularly vulnerable group by an activist of the #FeesMustFall protests (IRTC Report, 2019).

The researcher also obtained the proper ethical clearance and permissions to conduct the research from the Humanities Ethics committee, the Engineering Faculty and the Department of Student Affairs. Copies of these documents are attached in Addendum A.

3.6.2 During the Research

The researcher ensured that all recorded data were stored in a safe and secure place where only she had access. This was in her office, in a locked filing drawer, and the electronic reports on two external hard drives were password-protected.

The researcher ensured that respondents remained anonymous and all information obtained was confidential. The researcher therefore used letters as identifiers for students and numbers for respondents in the questionnaires. No identifying descriptors were used in transcribing the observation notes nor were the observations recorded with a voice recorder. The researcher had access to the attendance list but only used this information to verify that students came from rural areas. Students were reminded that they could withdraw from the research and three students asked for their questionnaires to be removed and not be included in the research. These questionnaires were not included in the number of respondents.

The students were also told that the research results would be made available to them, should they want it. None of the students wanted feedback. The researcher was honest with all the participants during the interviews and encouraged them to contact her at any time with regards to the research. It was hoped that this would increase the level of transparency of the research.

The research interviews were conducted in a place where students felt safe and that allowed for privacy. All the interviews were therefore conducted in the students' residence rooms. Students were also sent a copy of the transcripts to review and let the researcher know whether they agreed with the information captured.

The researcher applied the highest technical standards when analysing the data. The data and the methods used to analyse the data are clearly explained and can therefore be replicated to verify the findings. At no point was any of the captured data changed or amended.

3.6.3 Publication and Dissemination

The research findings and reports were reviewed by the researcher's supervisors. They will also be sent to REAP because its students participated in the research and it would be of

assistance to the Non-Governmental Organisation that helps rural students in South Africa. The researcher hopes that this research will contribute to REAP's support of rural students at HEIs.

The researcher also signed a non-disclosure agreement with the university, stating that the research is not plagiarised and is the work of the researcher. It thus ensures that the researcher has acknowledged all sources, whether they are digital or authorship in a publication. The researcher will only submit this study as a minor dissertation that is part of a master's degree in Higher Education. There is therefore no obligation to funders or any official body for the copyrights of the research. The research will be made available on OpenUCT as part of the UCT's endeavour towards the free access to information. Acknowledgements of the limitations of this research are elaborated on in the methodology and conclusion of this research study.

This chapter gave an overview of the methodology employed by the researcher to generate the research results. The use of Critical Discourse Analysis was a key factor in reaching an outcome. Ethical considerations were taken in account whilst planning, collecting data and analysing the data. The results generated through these methods are displayed and explained in the following analysis and findings chapter.

Chapter 4: DATA ANALYSIS AND FINDINGS

This chapter reports on the analysis and findings of the research which followed the data collection process which started with the pre- and post-tests, observation and finally the interviews.

4.1 Quantitative Data

The pre-test data were collected at the laptop distribution session, the REAP orientation session and the first-year engineering training session. One hundred and eighty-nine students responded to the questionnaire. The post-test data were collected via a questionnaire sent to all the students who participated in the first round of testing. Twenty-one students returned their questionnaires. They were the only students included in the data analysed.

Descriptive Data

The average age of the students was 18.6 years and the majority (52%) were 18 years old.

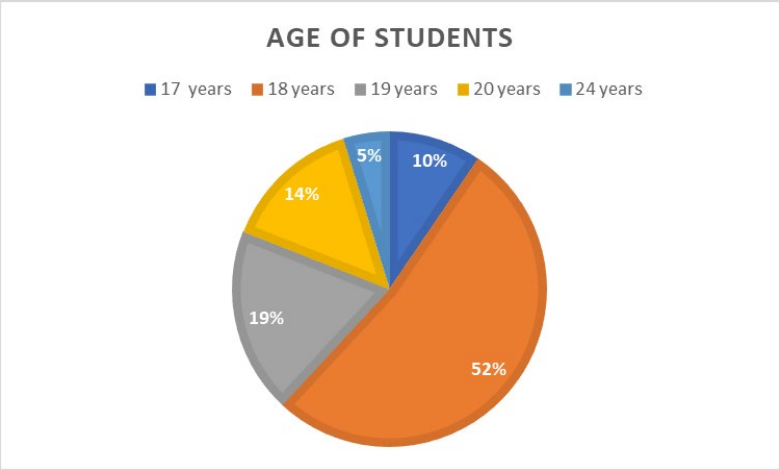


Figure 4.1: Graph representing the age of the students in the final data set

Fourteen (66.7%) males and seven (33.3%) females participated in the research. Most of the respondents came from Gauteng (19%) and KwaZulu-Natal (19%), followed by the Eastern Cape (14%), Western Cape (14%) and Lesotho (10%).

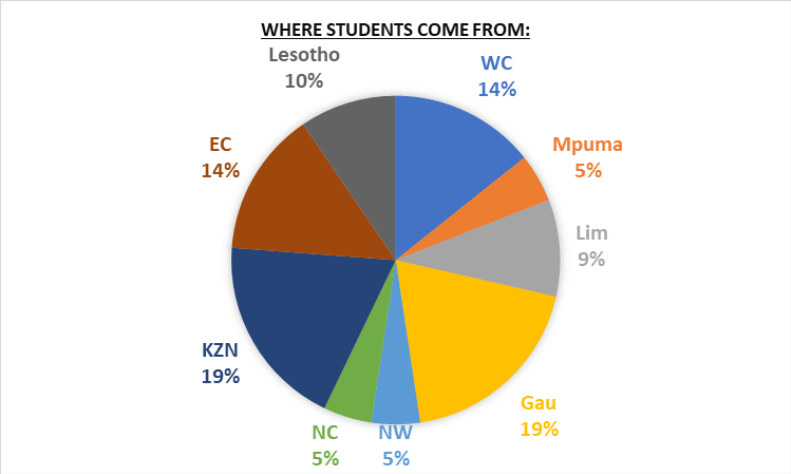


Figure 4.2: The origin of the students

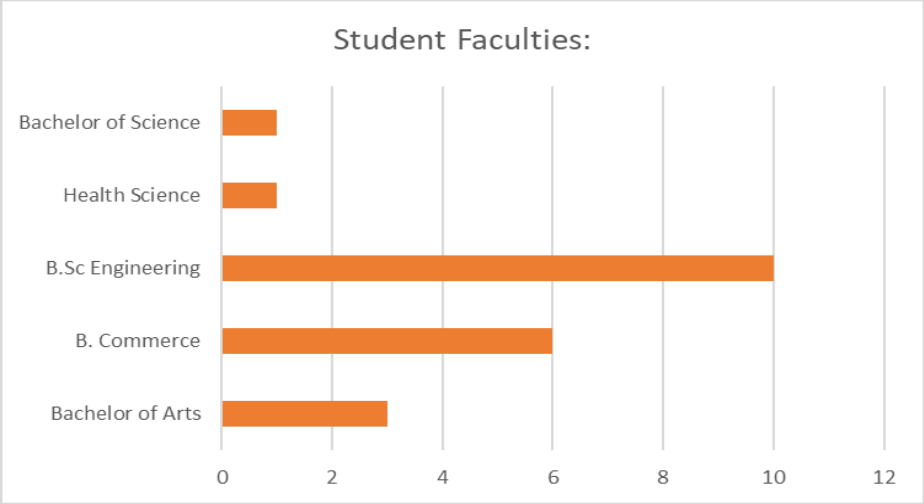
Twenty-nine percent of the students attended private schools and seventy-one percent attended government schools (no distinction was made between ex-Model C schools, No fee-paying schools and state subsidised schools).

Table 4.1: Type of schools' students attended

School Type

		Frequency	Valid Percent
Valid	Private	6	28.6
	Government	15	71.4
	Total	21	100.0

Table 4.2: The faculties in which the students were located



English (24%) was the dominant language followed by Xhosa (19%) and Zulu (14%).

Two (9.5%) of the respondents had parents who had attended university, eight (83%) had siblings who had or are currently at university and 11 (52.3%) were the first in their family to attend university.

Thirty-eight percent of the students had computer exposure prior to coming to university. Sixty-two percent had no computer exposure prior to coming to university.

Table 4.3: The percentage of students who had and did not have computer exposure

Access to Comp

		Frequency	Valid Percent
Valid	Computer Exposure	8	38.1
	No Computer Exposure	13	61.9
	Total	21	100.0

4.1.1 The SPSS Analysis Findings

CARS Pre-Test and Post-Test

Hypothesis

Null Hypothesis: There is no difference between the pre- and post-test marks.

Alternative Hypothesis: There is a difference in the mean pre- and post-test marks.

***Findings*:** There was no evidence that the interventions improved the students' scores. Computer illiteracy is therefore not the cause of the students' Computer Anxiety or fear whilst adjusting to university. There may be other factors contributing to the students' anxiety and fears.

GATCS Pre-Test and Post-Test

Hypothesis

Null Hypothesis: There is no difference in the level of anxiety between the pre- and post-test marks.

Alternative Hypothesis: There is no difference in the mean pre- and post-test marks.

Findings: There is no evidence that the intervention, namely, that prior access to computers reduces anxiety.

Pearson's correlation coefficient (r) and the Spearman correlation coefficient tests (r_s) were performed and no correlation was found. Normality p-plots were done using Shapiro-Wilks test and there is a significant p-value of 0.035. T-tests were also performed to establish whether there was a relationship between males and females' attitudes towards computers and language.

The results, as indicated in Table 4.4 below, show that there is a strong correlation between females and Computer Anxiety, with a p-value of 0.867 which is greater than 0.05, hence it is significant. There is a strong correlation between access to computers and Computer Anxiety

in females because the p-value of 0.035 is greater than 0.05.

The table below shows that there is a significant correlation or relationship between Computer Anxiety and females. P-value (Sig) is 0.867 which is greater than 0.05 hence significant.

Table 4.4: Strong correlation between female students and Computer Anxiety

P-Tests

	Value	Df	Asymp.Sig. (2-sided)
Shapiro-Wilks test	5.625à	3	.867
Likelihood Ratio	10.537	3	.015
Linear-by-Linear Ass	2.076	1	.150
N of Valid Cases	21		

à8cells (100%) have expected count less than 5. The minimum expected count is .76.
The p-value of 0.035 is greater than 0.05

Tables 4.4 and 4.5 show no significance was found between students' exposure to computers whilst studying in high school and Computer Anxiety at university.

Table 4.5: Results of the Chi-square Tests

Access to Computer Interactive Computer Learning Anxiety Cross tabulation

		Interactive Computer Learning Anxiety				Total
		1	2	3	4	
Access to Comp	Computer Exposure	0	6	2	0	8
	No Computer Exposure	2	2	5	4	13
Total		2	8	7	4	21

No significant difference was found between province of origin and Computer Anxiety.

4.2 Qualitative Data Analysis and Findings

4.2.1 Qualitative Data

The data were analysed in a sequential manner. The observation took place before the interviews; hence the data analysis and its findings are detailed first. Both the observation

and interviews were transcribed. The text was then analysed to see if the data revealed specific themes, similarities and differences (themes highlighted in Addendum C). The researcher examined the data through a Foucauldian lens therefore the analysis is reported with a strong Foucauldian stance that reflects the reoccurrence of certain words and phrases. The frequency and the context in which these words were used were also noted.

4.2.2 Observations

4.2.2.1 The Context

The venue in which the training took place was poorly lit, had no natural light and was air conditioned. The laboratory technicians were absent because it was a Saturday. All the desktop computers were in rows, with eight computers per row and facing the white projector screen. The Tech Buddies presented from the right side of the room with a clear view of every student in the room. Students did not move around, but the Tech Buddies moved around the room. A Tech Buddy would respond to students who raised their hands. Access to both the computer laboratory and computers was controlled by a student number. Those without student numbers had no access to the laboratory. The student number also determined the level of access the student had to computer programmes, for example, the Tech Buddies had access to the Learning Operating System while students did not, architecture students had access to AutoCAD and other students did not. The laboratory technicians' staff number allowed them access to all the computer programmes and the ability to monitor students' activities when they were using the computers.

The context provides the new student with an organisational hierarchy which has strict rules that must be obeyed as stipulated in UCT's ICT user policies, for example, the Appropriate Use of Computer Facilities policy provides a system which legitimises the inclusion of some groups and the exclusion of others. According to Ball (2013), classroom systems produce rules of inclusion and exclusion. Foucault (1977 in Ball, 2013) believes that what we know influences who we are and hence affects our status in the community. Our status affects whether we feel valued or not. The lab technician's status means that s/he has authority over the Tech Buddies and the first-year students, yet a Tech Buddy is seen to be more knowledgeable and holds greater sway over first-year students. The context reflects the power relations based

on knowledge, which is fundamental in setting the tone of the institutional culture. Willcocks (2006) calls this behaviour “self-subjugation practices” where the “self”, works on the person and the person bows to the power/control of the institution.

The way in which the computer laboratory is constructed, and its layout resembles, in many ways, a prison. The computer lab technician watches students’ activities from a control room located outside the computer lab with a glass window to monitor the lab. There is a turnstile which only allows students with valid student numbers to enter. The Tech Buddies move about observing the students and controlling them by getting them to follow the presentation by watching the screen in front of them. Students are only attended to when they raise their hand, like prisoners who are attended to when they raise their hands.

The lab is poorly lit and insular, just like a prison. The seats are arranged in rows and students can only face the presentation screen and monitor. There are spaces in between seats which allow limited movement and communication. Foucault (1974) stated that, as much as society believes that we have progressed and are “free”, society is just repeating history and our behaviours are controlled by structures, spaces and social norms. A classroom has become a prison in a different form. Foucault (1984) was adamant that power resides in the behaviour technologies such as the physical design of buildings or how the space is defined and used.

4.2.2.2 Discourse

Foucault stated that discourse is historically located; it has social/political significance beyond the words that are being used and it is a practice that has rules that must be obeyed. Often these rules or practices are unsaid but enacted. The paragraphs which follow highlight how the Tech Buddies demonstrated to the first-year students the language which is valued at university, the way to present oneself at university to fit in and the knowledge one must have to gain recognition or success at the university. The researcher therefore first looked at the words that reoccurred and kept a record of the number of times they appeared. These were then linked in terms of what they meant and how they were historically and socially located within the university context. These then fed into the themes which the researcher identified. Addendum C shows how the word count, meaning and themes developed.

The Tech Buddies' interactions with the new students were not at the first-year students' level. They presented themselves both physically as very "Western" in their styled, fashionable clothing and spoke English to each other throughout the session. They used university terminology (which was noted seventeen times), such as "DP", which was unfamiliar to the students and they were forced to ask for its meaning. At no point did they express that they also struggled with certain aspects of computer usage. Instead, they presented themselves as "all knowing" and confident. These older students modelled to the new students the social practices accepted and held in high regard at the university.

The Tech Buddies spoke of "Vula" and "PeopleSoft" as being important to the students' academic success. These terms were used seven and five times respectively by the Tech Buddies during the session. They stressed their value and importance to students. It was also made clear to students that if they did not use the software packages, such as Word, Excel and PowerPoint, to ensure that their work was neat and in the correct format, it would negatively impact on their marks. Some of the remarks made by Tech Buddies were:

> *"Do your assignments neat, professional and justified. Your tutor will get annoyed if it is not done this way, it will have a negative impact on your mark."*

> *"Don't use fancy font. Use Arial, Helvetica or New Times Roman. If my students use fancy font, then I get a headache and their mark goes down."*

A clear message was sent that the content was not as important as the image portrayed. The correct font, text in the right size and correct alignment was critical to success. The social practices of the university were therefore being reinforced by the senior students who stressed that the adoption of these practices was key to the students' success at the university. Foucault (1974) felt that discourse was the domain of subconscious knowledge (Ball, 2013). The first-year students were thus watching and listening to the Tech Buddies, and unconsciously learning the university discourse.

4.2.2.3 Disciplinary Discourse

The Tech Buddies used Information Technology language, such as "input device", "software" and "apps". They assumed that the first-year students understood the Information

Technology language. The Tech Buddies did not check whether the students understood these terms, given, firstly that English was not their mother tongue and, secondly, that, for some, it was their first engagement with computers. For example, “folders” could easily be understood to mean physical files and the students did not know what a flash drive was, nor did they know how to use it. The Tech Buddies’ job was to show the class what these terms meant and how to use them. The technical jargon used excluded the first-year students who were unfamiliar with computer terminology. It constrained the first years’ understanding, limited their grasp of the knowledge required and their ability to fully integrate this knowledge. Discourse, according to Foucault (1991 in Rabinow, 1991), creates conditions which promote the development of power relationships or “othering”, for example, rich and poor, the delinquent child and the good child. These differentiations also allow for a judgement to be passed. A delinquent child is bad and cannot be trusted. The judgement of first-year students who are not computer competent is that they are less bright and not of the standard expected of students entering university.

4.2.2.3.1 Power/Knowledge

The first-year students were constantly reminded that Vula and PeopleSoft were crucial to their success at university. Not accessing Vula meant the student would not be able to access his/her academic resources. PeopleSoft monitored whether the student owed the university money and if the student did not pay the fees, the student would not be able to get his/her academic results. The students were not told that their academic activity could be monitored by the site administrator or systems administrator. Willcocks (2006) believes that the comprehensive and conscious strategy employed by ICT by virtue of who holds the knowledge, who has the authority and who manages the system, is how power is maintained. The rules and supervision create new forms of knowledge/power within an organisation. According to Foucault (1972 in Thomson et al, 2013), the rules and systems create shared ways of thinking, being and doing, which is then “normal” in that community discourse.

Tech Buddies could not access AutoCAD because they were not architecture students. They therefore had limited access to the programmes on the computer. In much the same way, the Tech Buddies trained students on the Windows operating system but did not make them

aware of Open Software, which they could also use. The access to knowledge creates a power dynamic that determines what will be known (information provided, access allowed or denied) versus what the individual would want to know (Ball, 2013).

4.2.2.3.2 Objects of Knowledge

The first-year students who attended the training session felt that they did not have the necessary computer knowledge as required by the university to be computer proficient. During the session, they went from having no or very limited knowledge of computers to a higher level of computer proficiency. They were taught about the physical components of a computer as well as the various computer programmes.

Throughout the session, the Tech Buddies repeatedly stated that knowing how to use a computer and the various programmes was required to pass. The terms “Vula” and “PeopleSoft” were used repeatedly. Foucault (1977 in Ball, 2013) called this phenomenon “Episteme”. It is the codes and frameworks that establish the conditions for something to be true. These rules organise how we think, know and write. Students therefore think that if they know how to navigate the required programmes and submit their work in a certain way and in a certain writing style, they will be successful at university. In their minds, mastering the objects of power equates with success. Hence, power can operate at different levels and determines what can be done, as in this case, improve our status in the structure.

The session also highlighted how different disciplines required different programmes, for example, architectural students need to be proficient in AutoCAD and Chemical Engineering students proficient in Excel. The students were also told to download programmes onto their laptops and to use a flash drive to save their work because students are not allowed to save their work on the university computers. Those who possess these artefacts of knowledge/power, such as the right computer programmes, laptops and other Technology resources, are held in high esteem. Power creates new forms of social divisions between the haves and the have nots (Willcocks, 2006). It also creates new ways of circulating information and wealth. In this way, capitalism continues (Willcocks, 2006).

At no time was a test done to check whether the students had acquired the knowledge taught

in the class. An assumption by the Tech Buddies and the university is that the session would be enough for the students to be computer proficient. Foucault (1977 cited in Ball, 2013) explains that a person is then objectified as a holder of possible knowledge which runs parallel to the specific power practices therefore those students who master ICT skills will command greater respect and success at university.

4.2.2.3.3 The Subject

Foucault believed that the "author" is considered the activity or practice initiated by the dominant discourse (Foucault, 1983 in Ball, 2013). The manner in which the person behaves or, in this case, the way he/she train, someone, is the embodiment of the dominant discourse. The description of a "good and successful" UCT student was modelled by the Tech Buddies during the training session. A "good and successful" UCT student speaks English, knows how to use Technology, owns a laptop and flash drive, is self-reliant/independent, has a bank account and dresses smartly. How the student presents his/her work and the unsaid "how you present yourself" will lead to acceptance or rejection at the university and the student's ability to succeed. None of the Tech Buddies used township slang or an African language during the session. They did not share their own personal stories of struggling to adapt at the university with the new students. What they did talk about was their ability to use the software proficiently, that they were more than "social" buddies and that they had academic credibility because they were tutors at the university.

Students would ask the Tech Buddies questions one-on-one when they needed information rather than ask the question in front of the whole class. The first-year students did not challenge the Tech Buddies. An example of this was when the Tech Buddies wanted to work through lunch so they could finish early, and they rushed through the Excel section of the work. None of the first-year students objected to working through their break, finishing early and learning Excel in an extremely short time. Most of the first-year students looked exhausted two hours into the session but no one asked for a comfort break or rest. No refreshments were offered to the students, no training notes were provided, and they had to use their own stationery (which ninety-five percent of them did not have).

4.3. Interviews

4.3.1 Background of Interviewees

The interviewees were 19, 18, 18 and 18 years old, respectively. They came from rural towns in South Africa, namely, Mpumalanga, Limpopo, North West Province and the Eastern Cape. The Eastern Cape is the poorest province with a Gross Domestic Product (GDP) of 3.651, Limpopo the second poorest with a GDP of 4.259 per capita, Mpumalanga is ranked fifth with a GDP of 6.251 and the North West in sixth place with a GDP of 6.688 (Statistics South Africa, 2016). All the interviewees felt they were not computer proficient enough to use the computers at the university. They therefore all attended the computer training provided by the university for first-year students at various faculties.

R was a 19-year-old Tswana student who came from a rural village in the North West Province. She was the first in her family to attend university. She was studying physiotherapy and was a NSFAS funded student. She had never used a computer prior to coming to the university. She used the NSFAS issued laptop, residence computer and faculty computer lab.

I was an 18-year-old Tsonga male from a rural village in Limpopo. He was the second person in his family to attend university. His brother was studying at another university. He was studying Medicine and was a NSFAS funded student. Prior to coming to university, his only access to a computer was when his brother came home on vacation from university. He used the NSFAS issued laptop for his studies and the computer laboratories.

M was an 18-year-old Xhosa female from a rural town in the Eastern Cape. She was the first in her family to come to university. She was studying Mechanical Engineering. She had a computer course in primary school and one in high school. She had no other exposure to computers. She used the NSFAS laptop and the computer laboratories.

L was an 18-year-old Sepedi male who came from a rural town in Mpumalanga. He was the first in his family to attend university. He was studying Business Science. He had access to a computer at high school, prior to coming to university. He was a NSFAS-funded student. He did not take the free laptop offered to him because he had a laptop. He did however also use the computer laboratories.

4.3.2.1 Discourse

Foucault (1972) believed that discourse is a social construct, which exists in writing, talking and other practices. Discourse is perpetuated by those who have power and dominance through communication (Pitsoe & Letseka, 2013). The initial accounts by students about their engagement with computers ranged from positive to negative:

> ***R:*** *"I don't think I enjoyed anything about the training … it was too much."*
>
> ***I:*** *"We were introduced to a lot of stuff and then it was easy to forget most of it … there was some parts I was missing because I didn't get all the stuff they told us."*
>
> ***L:*** *"I would have preferred a few days. It wasn't enough … they would have allowed me to know them in depth, those things that were tough and a lot more."*
>
> ***M****: "I was under pressure … I was struggling."*

They all believed that "Vula" was the most important programme to master. They believed that, without knowing Vula, they would not pass at university. The students reported that accessing Vula daily helped them to stay up to date with their studies. According to the students, Vula helped them by providing lecture recordings, slides from lectures, question papers, readings and facilitated online group discussions about their work. Vula was mentioned nine times by each of the interviewees in their respective interviews. Vula was described as "the greatest thing", "must know" and "must use".

All the interviewees believed that a student must be computer proficient to succeed at university. They even recommended that the university train students before they come to the university or that the students should use their local library to become computer proficient during their vacation, before coming to university.

Foucault (1983 in Ball, 2013) notes that subjects know why they are doing something (in this case using a computer) but in this research, it is not clear how this knowledge (therefore power) impacts on their own discourse. Will they adopt the university discourse or challenge the university discourse? While the interviewees benefit from computer training (which Foucault conceded knowledge can do), the subjects are controlled by the same knowledge

and the conditions under which it operates, namely, the university.

All the students interviewed reported that they printed their readings and slides. They enjoy the access to online resources but still used "old fashioned" prints for studying. They mostly used word processing applications (they referenced MS Word seven times in their respective interviews), Excel (which was mentioned twice by each interviewee) for graphs and one student used PowerPoint for a presentation. The interviews highlight that both female interviewees only used the computer programmes taught in their training and required for their course work, namely, MS Word, Excel, PowerPoint, Vula and Peoplesoft. The male interviewees ventured beyond these programmes. They used YouTube, TEDx and Adobe. Related to this, both females had the least exposure to computers prior to coming to university. For instance, M only did a computer course at primary school and one in high school. On the other hand, participant I had access to his brother's computer when he came home from university for vacations. L had access to a computer at high school, which he used on a regular basis, and had his own laptop when he came to university.

Both male and female students interviewed used their laptops and university computers mainly for academic purposes and to watch series or movies. Their cellphones were used to socialise with their peers and family through calls, WhatsApp, Facebook and Twitter. When asked if there was a distinction, each interviewee said yes. Computers are for academic work and cellphones for socialising. As can be noted by the dialogue between the interviewer and L:

> ***Interviewer:*** *"And what would you be using on cell-phone?"*
>
> ***L:*** *"On my cell-phone I'll be using the same, Facebook, Instagram, and Twitter. "*
>
> ***Interviewer:*** *"Okay, so you can still use that."*
>
> ***L:*** *"Yes."*
>
> ***Interviewer:*** *"But you use more of the processing stuff, like typing and whatever for academic stuff?"*
>
> ***L:*** *"Yes."*

Interviewer: *"Okay so there's a difference?"*

L: *"There's a difference, definitely."*

4.3.2.2 Power and Knowledge

Participants R, I and M expressed that their lack of knowledge about computers during their computer training made them feel inferior, "stupid" and put undue pressure on them. The words most frequently used by these students to express their emotions were: "afraid", "pressure", "don't know" and "stupid", which occurred seven times in total. "Anxious" occurred six times. L felt confident when using a computer. He stated that his friends were not computer proficient and felt anxious and afraid when using a computer. Below are excerpts about students' emotional status during their respective training sessions:

R: *"A person knowing stuff and just looking at you doing it – it's too much! ... you just feel stupid!"*

I: *"I felt inferior … my confidence was broken in some way."*

M: *"To be honest, I was under pressure because when I was sharing with other students, they were far ahead of me because I was struggling."*

L: *"Actually, I liked everything. I liked everything they taught us."*

L about his friends: *"I do think so because they're afraid, they might break or do something stupid."*

The above quotes represent what Foucault (1986 in Wang, 2011) would call "subjugated knowledge". It is constituted by previous knowledge, which is hidden or masked, in this case, institutional knowledge. The students referred to the context which gave rise to these feelings:

R: "It feels so weird when you're the only one not knowing something … other people just look at you and be like 'that is so easy'."

I: "In my first days, I wasn't completely comfortable because I felt inferior … I didn't know but they (white students) seemed to be very confident and very superior. Like they are very

experienced, and I felt I was someone smaller than them."

M: "Not exactly equal, you can't be equal because obviously they (white students) they just know better."

L: "Having a laptop makes you feel more comfortable."

Participant I summed up the difference in the context when he said,

"At high school, I was used to most of the students and we used to help each other. We were like family."

Participant L displayed this behaviour by helping his friends who were not computer proficient. Foucault (1986) notes that indigenous knowledges are marginalised or denied in the dominant context (Wang, 2011). The unspoken knowledge is not something which is shared by white students with their black counterparts.

4.3.2.3 Objects of Knowledge

Foucault believed that discourse goes beyond the textual representation of knowledge. He included material objects within the context. He believed that these objects had the ability to exercise power (Hardy & Thomas, 2015). Foucault therefore focuses on what the discursive practices are which surround the object (Hardy & Thomas, 2015). A material object that interacts with a human being is constituted by relevant bodies of knowledge as components of its own condition (Hardy & Thomas, 2015). It raises the question: "What does this object have which creates this power?"

All the interviewees believed that owning and knowing how to use a computer is critical to success at university. Their laptops, they believed, saved them time, were convenient and connected them to their studies. Laptops were a precious commodity that, if stolen or lost, would be catastrophic. The students therefore kept their laptops locked in their residence rooms. They also believed that "Vula" was the most important computer programme to master.

They valued data provision and their access to free Wi-Fi at the university. Wi-Fi allows them to access their academic and social lives. But, when they went home, R, I and M had no access

to Wi-Fi while L had access to a modem. They all stated that data were expensive and hence had to be used sparingly. They therefore only used data at home to check on their UCT emails for notices. Prior to leaving the university on vacation, males download all their academic work to their laptops. Both males and females downloaded social entertainment, such as movies and series, before they left for home.

> ***R:*** *"Yes, I should. I have to use data very sparingly because I have to check my emails from here, and yes, well I have to buy data. Even if I don't like it, I just have to."*
>
> ***I:*** *"I don't have to spend my cash on data bundles so, the Wi-Fi is very helpful."*
>
> ***M:*** *"They send me emails from UCT, that's when I use my cellphone."*
>
> ***L:*** *"I don't have Wi-Fi I used to use a modem but it's too expensive so, when I get Wi-Fi, I download whatever I need, and I use it for free at home."*

However, all the students printed their learning material provided on Vula, such as lecture slides and question papers and take these hardcopies with them to campus. Students referred to paper-based material at least three times on average when talking about their use of academic material. When they spoke of computer usage, it was always in terms of work processing actions for assignments (seven times), lecture notes, recordings (referenced twice) and finding learning material (three times). A preference was shown for lecturers writing on the blackboard while teaching subjects, especially subjects like Mathematics. They felt that the lecturers went into greater detail when they did not use lecture slides. They believed that lecture slides were useful to add notes or to catch up with a lecture that was missed.

> ***R:*** *"I always misplace my notes and again … I use the slides to follow lectures."*
>
> ***I:*** *"I can say 75% of the work they put there, I print them out."*
>
> ***M****: "I'm very into learning new things. It helps me focus even more better when they use the slides and stuff but, in terms of Maths, then there must be some writing and things."*
>
> ***L:*** *"It helped me in understanding because, even like when they move too fast during teaching, I go back to the computer and I watch lecture videos and what they said, and then I understand."*

4.3.2.4 Truth

Foucault described Epistome as the regime of truth and the politics of trust which provides unconscious codes, rules or conceptual frameworks to qualify what is being said as true, having scientific validity and credibility. These truths have legitimacy and power because they are considered "proven" (Besley, 2001 in Lazaroiu, 2013). It is this system and its rules which give rise to disciplinary knowledge. Foucault believed that the person speaking was less important than the position that person held because what is valid and normal is decided from this. An example of this is that a professor of law, lecturing to students on their area of expertise, is more credible than a lecturer who is new to that field of study. However, as with all practices, these practices are located within a historical context, which changes, hence they are reflexive and transient (Lazaroiu, 2013).

Participant R was the only student who felt that computers were necessary to succeed, yet still felt uncomfortable using them. M, L and I had more positive views of computers and have thus engaged better with them. R's reaction when something went wrong was to walk away. This demonstrates her level of engagement with computers.

> ***R:*** *"Even now it's still so complicated … I remember this one time. I don't know what I was stuck with but I literally, well I was on my own, I switched it off and walked away."*

M, L and I however continue to work at their computer skills, even when things got difficult because they are focused on succeeding:

> ***M:*** *"They make me more willing to know how to work on computers and stuff. Them bringing the new Technology and stuff, it's quite a nice experience and makes me to focus more and see what is going on … It is important, it's really important and you can't live without it. You cannot run away from it. Like I said, 'embrace it'".*
>
> ***L:*** *"I found it interesting because it made me more aware of things I wasn't before … I find these ones of computers more advanced, interesting, and I love it, I love it, that's all. I like the world of Technology."*
>
> ***I:*** *"Computer, how can I say, it is part of my body. I feel comfortable and relaxed … I still need some improvements, so I'll just have to give myself a chance to familiarise myself*

with everything."

Participants M and I both had the support of a mentor and lecturer when they were struggling. R had no one-on-one support. L was always comfortable with computers because he had computer experience that he gained at high school.

In conclusion, this chapter reported on the process of collecting the quantitative and qualitative data, the capturing of the quantitative data on Excel and then the analysis using SPSS. The results of the quantitative analysis were then summarised. Whilst doing the transcription and analysis of the data, a Foucauldian lens was used. The results were then presented under the reoccurring themes which were linked to Foucauldian theory. The next chapter will discuss these findings in detail.

Chapter 5: DISCUSSION

This chapter addresses the research questions posed in Chapter 1. It begins by addressing the two sub-questions, namely, 1) Does the lack of computer proficiency impact on black, rural students' perceptions of themselves and other students? 2) What factors impact on first year, black, rural students' acquisition of computer skills at UCT? This chapter concludes by addressing the primary research question: How do first year, black, rural students with no to little computer proficiency experience the acquisition of computer skills at UCT?

5.1. Implications

5.1.1 Computer proficiency

Does not being computer proficient have an impact on black, rural students' perceptions of their peers and themselves? In short, yes, it does. It is hard for a rural, black student entering UCT, not to observe the dominant discourse of the institution that having computer skills and the added supportive Technology, such as owning a computer or laptop, is critical to success. Firstly, they are expected to do a computer test set by the university before they have even had time to settle in at the university. Once they realise that they do not possess the required skills, they are encouraged to attend computer training. The training does not consider their skills level and their learning needs. The orientation programmes of the various faculties reflect that the training programme is a one-size-fits-all approach (UCT CHED, 2015). There are however some streams that require students to learn a computer programme which is part of their course, such as AutoCAD for architectural students. They have one day or sessions which equate to the same number of hours as a day, to master the prerequisite programmes and to navigate the ICT environment of UCT, with senior students (Tech Buddies) as their guides (UCT Humanities Faculty, 2012; UCT CHED, 2017). The findings therefore corroborate previous research, such as Aungamuthu (2010), Brown (2012), Naidoo and Raju (2011), and Coetzee (2013), who found that computer training should acknowledge the needs of students without computer skills. These researchers believed that computer skills training should be imbedded in the students' courses so that they understand its relevance to their studies. HEIs should acknowledge that the provision of computer training will not be the only solution to the computer knowledge gap that is a result of poor schooling.

The senior students reinforce the dominant discourse in their use of only English even though it is not their mother tongue. They also use computer jargon. Together, these language practices made it difficult for students to fully understand what they are being taught. All the resources at the university, academic or ICT, are in English. What was significant was that five students in the questionnaires reported being first language English speakers, which did not correspond with their places of origin where African languages are spoken. The first-year students therefore learnt the dominant discourse that they need to be English proficient and know both computer terminology and academic language to be valued at UCT. It was also what was not said that reinforced the dominant discourse – that "white" students knew all these things and belonged at UCT. It was the "unsaid" (behaviours displayed, language used and the perception of first-year student that white students were superior) that made students feel "stupid" and not capable. The students in their interviews stated that they felt that white students knew everything, they were comfortable and confident in the environment and therefore were superior to them.

5.1.2 Access to Technology

The black students are provided with a laptop and access to free Wi-Fi on campus, which the institution feels will limit the divisions between the haves and have nots. However, access is confined to certain spaces, such as having to work on their laptops in their rooms because of the high risk of them being stolen, working in a computer lab which requires the right level of access to use certain programmes, where they are monitored without their knowledge and have access to free Wi-Fi limited to the confines of the university environment. Students from rural areas do not have access to online resources at home. When they need to access these resources from home, data are used quickly and begrudgingly because of the high cost. Some rural areas do not have internet connectivity or poor internet reception. Access is therefore confined to the structure of the university, which has rules and a hierarchy which students need to conform to. Many rural, black students, given their limited financial and ICT resources, are not likely to bridge the ICT chasm. Goode (2010), in her research, felt that having access went beyond just having physical access or access to physical resources but included prior knowledge, confidence levels, socio-economic resources, such as the ability to purchase hardware and data to be able to keep up with the rapid changes in Technology.

The physical spaces also reinforce the discourse. Foucault believed that physical spaces maintain and sustain the dominant discourse. At the university, many of the computer laboratories are poorly lit, do not allow for group work because students sit in rows with a computer each or have individual seating with wooden dividers and significant spaces between students. Access is controlled by a turnstile and the computer technician and a student number dictate the level of access they have, and their activities are monitored by the lab technician and the computer system itself through the Learning Management System (LMS). The space is reminiscent of a prison where actions are monitored, and movement is restricted. It is not an environment that engenders creativity or going beyond the limits of what they are taught. Privileged students can move beyond the confines of the university and hence are free to push the boundaries of knowledge and to explore programmes other than those provided by the university. They have access to better computers, some have programming skills acquired at school, money to purchase the latest software and peers who engage with ICTs in a similar manner. These students are therefore more likely to find the engagement more positive and fulfilling. Bebetsos and Antoniou (2008 in Monyemange, 2012) stressed that the educational setting was one of the key factors to students engaging with computers and working on them for longer.

5.2 Challenges faced by students

The Tech Buddies who presented themselves to the first-year, engineering students attending the Saturday training session as having all the knowledge pertaining to the learning tool, Vula, did not really understand its purpose nor did they convey to the students how to use it effectively to improve their academic performance. They therefore provided the students with incorrect and limited information on Vula. Firstly, Vula is a student tracking tool to monitor how much a student engages with the learning material. It houses information which will enhance a student's learning experience (by having the course readings, lecture slides and an online platform to chat with both their lecturer and peers about the course content). However, none of these features were clearly explained to the students. The first-year students believed that they fully understood and knew how to use Vula after the training, believing that, if they mastered Vula, as one does MS Word for example, that they would succeed academically. They did not know the purpose of Vula, the full list of features and how

to use them to enhance their learning experiences. The Tech Buddies therefore passed on their limited understanding of Vula to the students. It highlights the limited knowledge of the Tech Buddies and their knowledge of ICTS at UCT. Similarly, the first-year students interviewed by the researcher used ICT terminology incorrectly. They understood the internet to be a programme which one uses on a computer in the same way one does any other preloaded software. They did not realise that it is not a programme but a knowledge repository, not housed on the hard drive but housed elsewhere and contained numerous websites which provide the user with programmes, information and a multitude of resources to access. The computer competency that the first years thought they possessed was not truly the competencies and knowledge required to be computer proficient at UCT. Their lack of perspective on their knowledge gaps means that the first-year students and Tech Buddies are not accessing or using the multitude of functions ICTS has to offer, which could be beneficial for academic and personal development (Czerniewicz & Brown, 2008; Monyemangene, 2012). Foucault (1977 in Ball, 2013) believed that the knowledge people have and perceive as being enough often limits their ability to challenge or resist the status quo. They therefore subjugate themselves to the rules of the dominant groups, often to their own detriment. If they were aware of the purpose of Vula and how it could improve their academics if they used all the features, this would benefit them. However, not knowing that they are limited in Vula allows the dominant group to remain computer proficient by gaining from this access to knowledge. They therefore remain dominant and unchallenged in the practice.

Key indicators which will show both students and lecturers what is required to be computer proficient is lacking; benchmarking the level of proficiency required by a student to be considered computer proficient and to benefit fully from the ICTS resources at UCT is non-existent; and there is no monitoring and evaluation system to check the efficacy of the computer training provided to first year students who are not computer proficient. These factors contribute to the lack of growth and development of the course and the university's ability to provide students with feedback on their growth needs to become computer proficient. This is evident when students who do not meet the minimum test scores on the computer test in orientation are not provided with feedback on which areas they do have enough computer knowledge and the ability to apply this practically to be computer

proficient. Students are encouraged to attend the additional training in orientation to improve their computer proficiency. However, after the training, students are not assessed again to see if their computer proficiency is enough to meet the university demands or not. The students then falsely believe that they are computer proficient after the training. Secondly, the fact that the training is not monitored and evaluated to ensure that students benefit from it and how to address the shortcomings of the training, results in the same training being offered every year to a different group of first year students. The effectiveness of this training is never guaranteed. The students who need to gain computer skills are those most likely to never fully enjoy the benefits that ICTS can have on advancing their knowledge, improving their learning experience and use of ICTS beyond their course requirements and entertainment purposes. The research conducted by Schlebusch in 2017 shows, however, that privileged students would go beyond their course requirements and do coding or use multi-media programmes. Mpofu (2016) and Queiros and De Villiers (2016) reveal that even black students, having greater opportunities to use computers at university, did not use this access to computers beyond their academics and entertainment.

Students from rural, African communities prize community cohesion and collaboration above everything, because it ensures their survival and increases the chances of success for everyone. The notion of “Ubuntu”, which means, “I am because you are”, is at the foundation of this thinking. Student I reported that he worked with his friends and they always worked together and helped one another. He indicated that he would share his knowledge about computers with them. This way of being is at odds with the university’s discourse – that the success of the individual is what matters. The message conveyed to students is that an individual needs to work hard to achieve academic success. You must have your own funding, equipment and innate ability to achieve academic success. Individuals who achieve the highest marks are those who are deemed to be successful. They are put on the Dean’s merit list and are rewarded with prizes and funding opportunities. There is no recognition or reward given to a group of students or class who has passed as a collective. The Teaching and Learning report (UCT CHED, 2017) reported that the top percentile of students who performed well remain white. Black, rural students’ way of being, namely, working as a collective to succeed, is not valued or part of the dominant discourse; it is at odds with the university’s (dominant)

discourse. The conflict between the discourses results in black students feeling as if they do not belong at UCT and they are not good enough to be at the institution. These feelings result in a loss of self-esteem and self-worth with which black students enter the university. Friedlander et al (2007) reflected on this behaviour in their research.

The quantitative data found that there was no correlation between students' prior access and use of computers to computer anxiety. It was found that students, who come into the university with little or no knowledge of computers, often find that they are continuously playing "catch-up" with other students. This group of students resist using computers beyond their academic and personal needs because they believe that this is the only place where computers are useful. It is this negative and self-limiting attitude which will make them unlikely to be open to learning about other computer programmes or uses. Participants R and I, who had very little computer exposure, are good examples of such behaviours. They only used the computers for rudimentary academic purposes, such as writing an essay or doing a presentation. In the Fourth Industrial Revolution and at institutions, such as UCT which uses ICTS extensively, the ICTS environment changes rapidly and students must learn new or different computer programmes just as quickly. Students with negative computer attitudes will be less likely to attempt different computer programmes or seek careers involving extensive computer use.

Students on NSFAS and some bursary students, such as REAP students, are provided with laptops and computer training. When their laptops break and cannot be repaired, these students do not have the financial resources to buy new laptops nor do their families of origin have the resources to insure or replace them. The students cannot afford the peripheral devices, such as external hard drives or flash drives. They cannot take these devices to class or to work in the library because they fear they may be stolen. Their computer skills become outdated once the university adopts a new ICT system. The limits on what they can achieve are thus determined by their socio-economic circumstances, which are extremely impoverished. They are ashamed because they do not know or have what privileged students have. The institution does not provide continued support, besides online support. Online learning is not the learning style which these students are comfortable with and this may lead to further anxiety about having to work on a computer on their own with no physical support,

as was revealed by the students in this study. Students who had personal support, in the form of a mentor and/or lecturer, had a better attitude to computers and were more optimistic about learning about computers. Participant M even stated that it made her feel like her education had just started.

5.3 Predictors of successful computer skills acquisition

As shown in previous studies, issues such as gender, socio-economic circumstances and support play a huge role in the successful acquisition of computer skills. This and previous research highlights that computer efficacy plays a huge role in students' acquisition of computer skills and their desire to learn more about computers and related ICT matters. Those who believed they could master computers and persevered, even when they did poorly, were able to acquire computer skills. It is their self-belief which keeps them going and eventually leads to computer mastery.

Having access to computers and good training when starting to learn about computers made students feel positive about their computer skills. Owning a laptop and having computers in the computer laboratories increased their access to computers, which, in turn, allowed students to engage more with computers. This was further enhanced when there was continuous personal support, such as a mentor and/or a lecturer who took the time to sit with these students and help them acquire the computer skills. Support, particularly in discipline specific computer skills, is essential to the student, not only in acquiring the skills but being willing to learn new technologies as the ICT environment changes.

Having support, which fits with their learning styles, such as having students from similar backgrounds, will help them. One student helped and encouraged his friends when they became computer anxious. Working in groups, as opposed to individually, may be more comfortable for many students, because it is their "normal" way of doing things. It also means that they do not have to act as if they have acquired the computer skills, a behaviour displayed by the Tech Buddies. Three of the four students, when introduced to computers, described feeling isolated and one of these students (a female) who did not know how to use a computer, felt overwhelmed, self-conscious and anxious when using a computer for the first time. These types of feelings can lead to negative computer acquisition by students and the

female student was the only student who did not become proficient in using a computer. This student also reported that she had no peer support or lecturer support and she remained the most negative about computer use.

5.4 The experience for first-year, black, rural students

This research highlighted that those students who had little computer exposure and few computer skills struggled when they were introduced to computers. One student, who came to university with no computer skills and had no support at university, struggled to acquire computer skills. It resulted in her giving up easily when she struggled with a programme and she was less likely to ask for help. Her resistance to the adoption of ICT, beyond the course ICT requirements, and high levels of frustration when using a computer highlight this. This student would be the type of rural student who would need the most support. However, the students who had support and persevered were able to overcome their initial computer anxiety and acquire some computer skills. They also felt excited about broadening their horizons with regards to computer use and ICT. The student who felt confident about his computer use kept using computers and helped other students. However, he did not show a desire to go beyond what was needed for academic purposes. He did not want to use the access to computers to learn other computing skills, such as coding. He believed he has what it takes to be successful academically because he felt adequately skilled and was better than his peers. The findings therefore correspond to the findings of previous research conducted which showed that students who entered university with low levels of computer ability would find it difficult to acquire the necessary computer proficiency required at university (Aungamuthu, 2010; Coetzee, 2013; Naidoo & Raju, 2012). A level of computer ability and having support and computer self-efficacy makes the journey more positive for those who come in without computer skills. However, those who possessed computer skills, but are not fully computer proficient, have a false belief that they have enough skills to succeed at university. Research conducted by Czerniewicz and Brown (2008) and Monyemangene (2012) shows that students who had access to computers and Wi-Fi did not fully use the resources available to them. This is often a barrier to wanting to go beyond the computer skills taught at university. These students are also limited by their ability to buy computer equipment and data because they do not have the money.

This chapter discussed the findings of the study. It highlighted that rural, black students are not a homogenous group, however, the lack of prior access to and experience with ICT limits their levels of success in an ICT-intensive course at university. Their varied computer exposure and proficiency also impacts on whether they acquire the required skills or not. Those with no prior computer exposure are more likely to acquire the required skills and less likely to want to engage with computers beyond the bare academic requirements. It is difficult for them to adapt because of the fast pace of learning and having to be with peers who are computer proficient and have access to the latest computer hardware.

Chapter 6: CONCLUSION

6.1 Conclusion

Industry demands that HEIs in South Africa produce graduates who are computer proficient to meet the skills demand for the Fourth Industrial Revolution. HEIs are struggling to meet these needs because the apartheid era has left huge chasms in the sector, such as a lack of access and use of computers, due to poorly resourced schools that impact on students' levels of computer proficiency. A group identified as being particularly vulnerable is black, rural students. This research has found that rural students at the UCT are not a homogenous group. There are some who are more privileged in terms of having more financial resources, better education and access to computers. There is a bigger group that is substantially less prepared due to poor school environments, access to physical and financial resources, and access to computers. Both groups are less prepared than their urban counterparts. The stratified structure of rural communities, which ranges from families with access to good resources, such as schools, and families who have limited to no access to resources, plays a key role in the type of computer support students need. The biggest factor is the environment at the university which needs to be more welcoming and accepting of students to help those with low levels of computer self-efficacy to succeed. This would increase their chances of acquiring the necessary computer skills to be fully confident at university.

6.2 Recommendations

The university should find an accurate way of identifying rural students prior to them arriving at university. These students should be offered a week of computer training prior to starting at UCT with staff who have good computer teaching skills. Their computer proficiency should be tested prior and post the computer training to show whether students have acquired the skills. Those who do not do well should be given individual attention by staff members to acquire the right computer skills, especially in disciplines such as engineering where computers are used extensively in teaching, learning and assessment.

Changing the way in which support is provided should also be reviewed. Buddying up a computer proficient student and a student who is not computer proficient will allow the

student who is not as proficient to be exposed to computer programmes which are not limited to their academic work. It will also change the individualist approach and reward for individualism which is currently the dominant discourse at UCT.

Sharing of knowledge and the success of the class rather than the success of the individual should be a discourse which should be encouraged. Studies have shown that universities that use group work modalities in teaching, learning and assessment, and where collaboration between staff and students is the norm have increased pass rates (Cabrera, Crissman, Bernal, Amaury, Terenzini & Pascarella, 2002; Loes, An, Saicaie & Pascarella, 2017; Murawski & Dieker, 2013). Group work that involves the collaboration of all the students in the project, requires students to document the process, where tasks are not divided between individual group members but must be done together, and peer assessment is used, has resulted in a better integration of knowledge (Bernal et al, 2017; Cabrera et al, 2002; Loes et al, 2017; Murawski & Dieker, 2013). For example, ICT systems could ensure that students work in groups, by checking that all students participated in the task online and are able to track each other's input through their digital footprint. Alternatively, as part of the assessment process, students can digitally record their group working together and submit this with the assignment. The submitted recording would form part of the grade which is dependent on the level of group work, as digitally documented. Further benefits include improved performance, embedded learning, confidence building, improved psychological health and inclusivity. All these factors increase the chances of success for rural, black students coming to university (ResourceEd, 2016; DeLozier & Rhodes, 2017; Cabrera et al, 2002).

6.3 Further Research

The small size of this study means that the results are not generalisable. It has, however revealed areas which require further investigation. Firstly, who are rural students? Are they the same or different from rural students at other institutions of higher education in South Africa? Secondly, how effective is the computer training offered at UCT? How can the training and the trainers improve? Does UCT keep up with the continuous developments in ICT and keep underprivileged students' skills updated? What can be done to ensure the sustainability and continued access to ICT hardware for disadvantaged students that includes peripherals

such as flash drives? Finally, what factors make the adjustment to UCT difficult for black students and have things changed since the fall of apartheid?

This chapter highlights the need for rural, black students to get the right computer training to ensure that they cultivate a positive attitude towards computers and ICT use, which gives them confidence and increases their computer self-efficacy. Barriers to achieving this are UCT's teaching and learning practices which are individualistic and top-down, the rewarding of the individual and not recognising a cohort for its success rather than the individual. The rural student at UCT needs to be better understood and supported to ensure a better chance of success for him/her. There is therefore a need for a change in teaching and learning practice and further research with regards to rural students.

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Addenda:

A. Consent and Administrative Documents:

1. Ethics
2. UCT Data storage report 2019
3. Turnitin Report

B. Student:

1. Covering letter for questionnaire
2. Letter of consent
3. Questionnaire:

1.3.1 Basic Information

1.3.2 Computer Anxiety Rating Scale (CARS)

1.3.3 General Attitude Towards Computers (GATS)

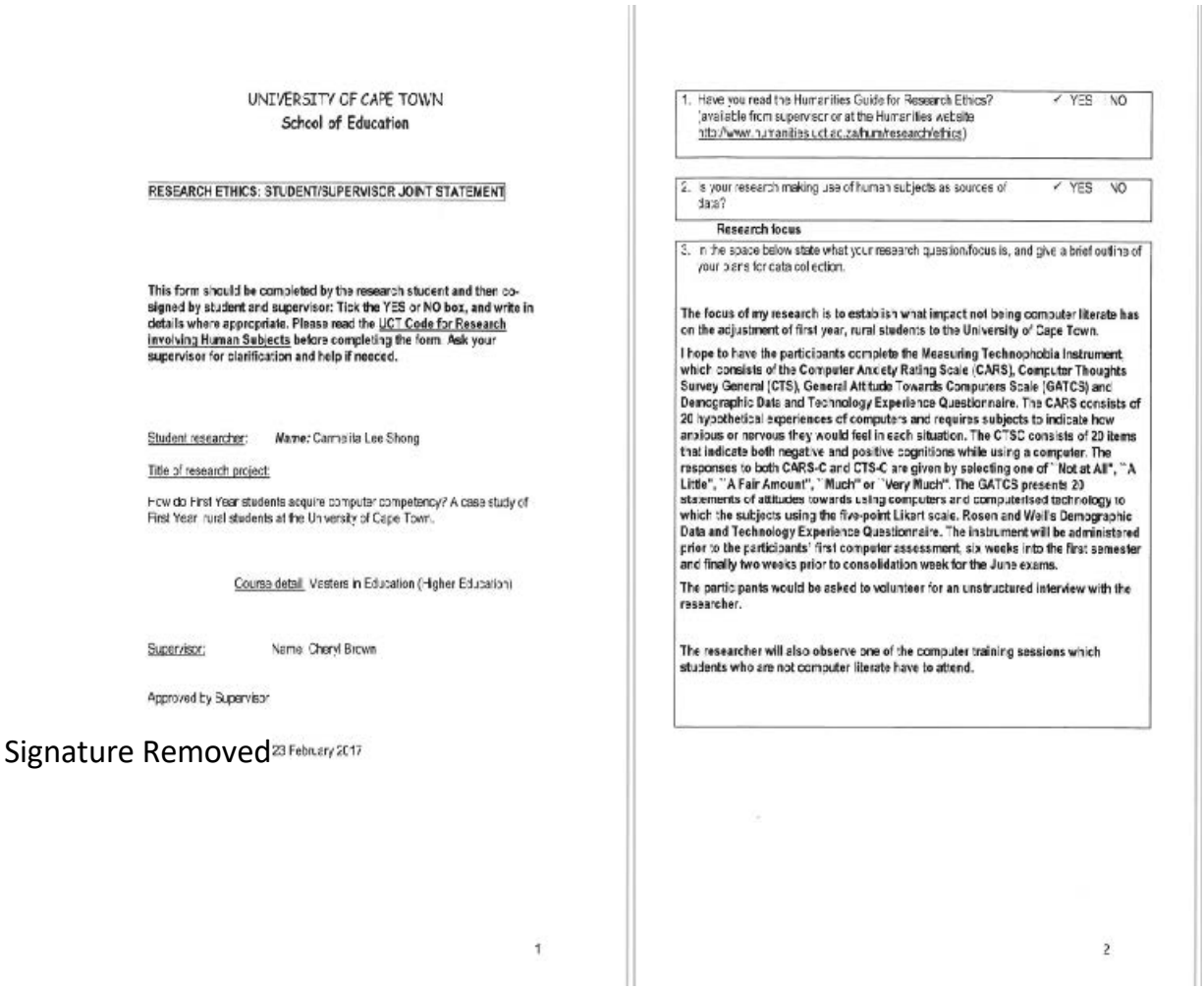
Unstructured interview question guide

C. Data:

1. Raw data collected from questionnaires
2. SPSS codes
3. Qualitative data analysis

Addendum A: CONSENT AND ADMINISTRATIVE FORMS

A1. Ethical Clearance



UNIVERSITY OF CAPE TOWN
School of Education

RESEARCH ETHICS: STUDENT/SUPERVISOR JOINT STATEMENT

This form should be completed by the research student and then co-signed by student and supervisor: Tick the YES or NO box, and write in details where appropriate. Please read the UCT Code for Research involving Human Subjects before completing the form. Ask your supervisor for clarification and help if needed.

Student researcher: Name: Carmelita Lee Shong

Title of research project:

How do First Year students acquire computer competency? A case study of First Year rural students at the University of Cape Town.

Course detail: Masters in Education (Higher Education)

Supervisor: Name: Cheryl Brown

Approved by Supervisor

Signature Removed 23 February 2017

1

1. Have you read the Humanities Guide for Research Ethics? (available from supervisor or at the Humanities website http://www.humanities.uct.ac.za/hums/research/ethics) ✓ YES NO

2. Is your research making use of human subjects as sources of data? ✓ YES NO

Research focus

3. In the space below state what your research question/focus is, and give a brief outline of your plans for data collection.

The focus of my research is to establish what impact not being computer literate has on the adjustment of first year, rural students to the University of Cape Town.

I hope to have the participants complete the Measuring Technophobia Instrument which consists of the Computer Anxiety Rating Scale (CARS), Computer Thoughts Survey General (CTS), General Attitude Towards Computers Scale (GATCS) and Demographic Data and Technology Experience Questionnaire. The CARS consists of 20 hypothetical experiences of computers and requires subjects to indicate how anxious or nervous they would feel in each situation. The CTSC consists of 20 items that indicate both negative and positive cognitions while using a computer. The responses to both CARS-C and CTS-C are given by selecting one of "Not at All", "A Little", "A Fair Amount", "Much" or "Very Much". The GATCS presents 20 statements of attitudes towards using computers and computerised technology to which the subjects using the five-point Likert scale. Rosen and Weil's Demographic Data and Technology Experience Questionnaire. The instrument will be administered prior to the participants' first computer assessment, six weeks into the first semester and finally two weeks prior to consolidation week for the June exams.

The participants would be asked to volunteer for an unstructured interview with the researcher.

The researcher will also observe one of the computer training sessions which students who are not computer literate have to attend.

2

Information

4. Will participants (research subjects) in the research have reasonable and sufficient knowledge about you, your background and location, and your research intentions? Describe briefly below how such information will be given to them. If there is any reason for withholding any information from participants about your identity and your research purpose, explain this in detail below.	✓ YES	NO

The researcher will request permission to conduct the research at the University of Cape Town through the Education Department's Ethics committee. Approval will be sought by submitting the completed research ethics document, the research proposal, the student consent form, the Measuring Technophobia Instrument, the outline of the unstructured interview questions and the memorandum of understanding between the student and her supervisor.

The Executive Director for Student Affairs, will also be asked for permission to conduct the research with the University of Cape Town's students prior to the research commencing. The request would be a letter of request attached would be the Ethics approval from the Education Department, the research proposal, the student consent form, the Measuring Technophobia Instrument and an outline for the unstructured interview. Should the Executive Director need clarification on the research, the researcher will arrange to meet with the executive Director to clarify any issues.

The researcher will present to both the units conducting the training and the Rural Foundation, the researcher's background, location and the motivation for the research. The researcher will also disclose how the research will be conducted and how the findings will be used. The researcher will assure both the units and the Rural Foundation that they will receive a copy of the research findings. Any concerns or questions about the research will be answered by the researcher. The researcher will also provide them with the Education Department's ethics clearance notice.

The researcher will give students an information session prior to commencing with the research. It will inform them who the researcher is, the researcher's location and the motivation for the research. Student will be informed that participation in the research is voluntary and they can withdraw at any time. The students will also be given an opportunity to ask the researcher any clarifying questions.

3

Consent

5. Will you secure the informed consent of all participants in the research? Will the consent be given in writing? Describe how you will do this in the space below. If your answer is NO to both or either of these questions, give reasons below. *Attach copies of your draft consent forms that you will use to get written consent*	✓ YES	NO

The researcher will ask students who want to participate in the research to complete a consent form. The form is attached.

6. In the case of research involving children, will you have the consent of their guardians, parents or caretakers? If your answer is NO, give reasons below. If your answer is YES, describe briefly how this consent will be got from the participants. Will the consent be given in writing? *Attach copies of your draft consent forms that you will use to get written consent.*	YES	NO

No children will be required for the research.

4

7. In the case of research involving children, will you have the consent of the children as much as that is possible? If your answer is YES, describe briefly how this consent will be got from the children. If your answer is NO, give reasons below.	YES	NO

Not applicable.

Confidentiality

8. Are you able to offer privacy and confidentiality to participants if they wish to remain anonymous? If you answer YES then give details below as to what steps you will take to ensure participants' confidentiality. If there are any aspects of your research where there might be difficulties or problems with regard to protecting the confidentiality and rights of participants and honouring their trust, explain this in detail below,	✓ YES	NO

No identifying data will be collected, such as the student's names, contact details or student numbers. All the data collected will be given a number in the Measuring Technophobia Instrument.

During the observation students, the researcher will give written comment of the environment and behaviour. No names or other descriptors' of students will be used.

The students who volunteer to be interviewed will be only be identified by a pseudonym and biographical detail of the student.

5

Potential for harm to participants

9. Are there any foreseeable risks of physical, psychological or social harm to participants that might result from or occur in the course of the research? If your answer is YES, outline below what these risks might be and what preventative steps you plan to take to prevent such harm from being suffered.	YES	✓ NO

Potential for harm to UCT or other institutions

10. Are there any foreseeable risks of harm to UCT or to other institutions that might result from or occur in the course of the research? e.g., legal action resulting from the research, the image of the university being affected by association with the research project, or a school being compromised in the eyes of the Education Ministry. If your answer is YES, give details and state below why you think the research is nonetheless worthwhile.	YES	✓ NO

11. Are there any other ethical issues that you think might arise during the course of the research? (e.g., with regard to conflicts of interests amongst participants and/or institutions) If your answer is YES, give details and say what you plan to do about it.	YES	✓ NO

6

The student	
The supervisor	
The PI of the project (specify)	
Other members of the research team (specify)	
A sponsor (specify)	
Someone else (specify)	

6. **OBSERVATIONS BY THE HOD**
I have reviewed this completed MoU am satisfied that it reflects the shared understanding of supervisor and candidate and that the department is able to meet the obligations to candidates set out in this MoU:

Name	Signed	Date

7. **OBSERVATIONS BY THE DEAN/DEAN'S NOMINEE**
I have seen this completed MoU and I have the following comments:

.....
.....

Name	Signed	Date

IMPORTANT NOTES – NOTIFICATION OF SUBMISSION:

- On receipt of "Receipt of submission", the Fees Office, IAPO, Postgraduate Funding Office and Student Housing will be informed that you have handed-in.
  - Fees will re-calculate your fees and dependant on the date of submission and year of 1st registration, you might be entitled to a rebate. Please refer to Rule 7 in the Fees Booklet.
  - Dependant on the terms of any award you might hold and the date of submission, this could have an impact on advances you have received or are expecting to receive in this academic year. Following submission and reversal of fees candidates are ineligible for any further scholarship/bursary funding
- Candidates for graduation in June and December may expect to receive notification of the outcome of the examination of the dissertation not later than 1st week in June and last week in November, respectively, provided the dissertation was submitted by the due date. Where a dissertation has been submitted well in advance of the due date, earlier notification will be given, if possible. However, the Graduate School in Humanities does not undertake to reach a decision by any specific date.
- Candidates who are required to revise and re-submit for re-examination are required to register in order to receive supervision during the revision phase. Fees will be calculated according to the date of notification of your result and the date of re-submission. (Faculty to send copy of letter advising candidate of R&R result to Fees.)
- Candidates are asked to note that the University will not permit degree/diploma qualifiers to graduate if they have any outstanding fees, fines, interest or dues. **The final date for payment of outstanding amounts is 31 May in the case of qualifiers for June graduation and 31 October in the case of qualifiers for December graduation.**
- Please note that should your examination process run into the following year, you will have to re-register in order to be considered for graduation.

Research Master's in Education Proposal

Student: Carmelita Lee Shong
Student Number: WLLCAR012
Supervisor: Cheryl Brown
Year: 2017

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This formmust be **FULLY** completed by all applicants who want to access UCT students for the purpose of research or surveys.
2. Return the fully completed **(a) DSA 100** application form **by email,** in **the same word format,** together with **your: (b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter** to: Moonira.khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is **approximately 10 working days.**
4. NB: It is the responsibility of the researcher/s to apply for and to obtain **ethics approval and to comply with amendments that may be requested; as well as to obtain** approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) **Ethics:** Chairperson, Faculty Research Ethics Committee*(FREC) for ethics approval, (b) **Staff access:** Executive Director: HR for approval to access UCT staff, and (c) **Student access:** Executive Director: Student Affairs for approval to access UCT students.
5. **Note:** UCT Senate Research Protocols requires compliance to the above, **even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to all persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.**
6. **Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.**
7. **The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.**

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	WLLCAR012	Mrs Carmelita Lee Shong	Carmelita.Leeshong@uct.ac.za 021 650 1017
A.2 Academic /PASS Staff No.	01418076	Mrs Carmelita Lee Shong	Carmelita.Leeshong@uct.ac.za / 021 6501017
A.3 Visitor/ Researcher ID No.			
A.4 University at which a student or employee	UCT	Address if *not* UCT:	
A.5 Faculty/ Department/School	Humanities – School of Education		
A.6 APPLICANTS DETAILS if different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Dr Cheryl Brown	021 650 5035	Cheryl.Brown@uct.ac.za
B.2 Co-Supervisor/s	Tebisa Mayisela	021 650 1744	Tembisa.mayisela@uctac.za

SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	Master's in Higher Education Studies
C.2 Research Project Title	How do First Year students acquire computer competency? A case study of First Year, rural students at the University of Cape Town.
C.3 Research Proposal	Attached: Yes ■ No ☐
C.4 Target population	First year, rural students
C.5 Lead Researcher details	If different from applicant:
C6. Will use research assistant/s	Yes ☐ No ■ yes- provide a list of names, contact details and ID no.
C.7 Research Methodology and Informed consent:	Research methodology: Questionnaires, Observation and interviews Informed consent: Written consent from student participants.
C.8 Ethics clearance status from UCT's Faculty Ethics in Research Committee /Chair (EIRC)	Approved by the UCT EIRC: Yes ■ With amendments: Yes ☐ No ■ (a) Attach copy of your UCT ethics approval. Attached: Yes ■ No ☐ (b) State date/Ref. No/Faculty of your UCT ethics approval: 8/03/2017 Ref. /Faculty: EDNREC2017-03-08

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE

(To be completed by the UCT - ED, DSA or Nominee)

	Approved / With Terms / Not	* Conditional approval with terms	Applicant\ Ref. No.:
D.1 APPROVAL STATUS	i) Approved ■ ~~ii) With terms~~ ~~iii) Not approved~~	(a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. (b) In event any ethics conditions are attached, these must be complied with before access to students.	WLLCAR012 / 01418076 / Mrs Carmelita Lee Shong

D.2 APPROVED BY:	Designation	Name	Signature	Date of Approval
	Executive Director Department of Student Affairs	*Dr Moonira Khan*	Signature Removed	14 March 2017

A2. UCT Data storage report 2019

DMP title

Project Name My plan (UCT Template) - DMP title
Project Identifier WLLCAR012
Principal Investigator / Researcher Carmelita Lee Shong
Project Data Contact Carmelita.Leeshong@uct.ac.za
Description Masters Thesis in Higher Education Studies: How first year, rural students react to there computer training at the University of Cape Town. Case study.
Institution University of Cape Town (UCT-Generic)

1. Project Name

PROPOSAL/PROJECT NAME - Replicate exactly as in the proposal or project that the DMP accompanies.

A case study of how First Year, rural students respond to computers in their first six months at the University of Cape Town.

2. Introduction/Type of Study

STUDY INTRODUCTION - Summarise the type of study (or studies) for which the data are being collected. Include the study's objectives, design, and methods.

Masters Thesis in Higher Eduation - mini thesis

Objective: To explore the impact of computer training on first year, rural students.

Design: Mixed Methods

Methods: Quantitative: Anxiety Rating scale and General Attitude to Computer Survey - questionnaire

Qualitative: Interviews and Observation

3. Description of the Data

EXISTING DATA - Provide if possible a survey of previously existing data relevant to the project; the nature and scale of such data; and a brief discussion of whether and how these data will be integrated into your study or the gaps in these datasets the new study will fill.

No previous studies conducted.

Small data set of 51 respondents in survey and 4 interviews.

The data will be used to explore what impact computers have on these students. No one has studied the impact of computers on rural first years at UCT.

DATA DESCRIPTION - Describe the data you will gather for your study. Briefly describe the nature, scope and scale of the data you will produce.

A3. Turnitin Report

Turnitin Originality Report

Processed on: 12-Mar-2019 11:46 SAST
ID: 1091959817
Word Count: 29632
Submitted: 1

wllcar012:Turnitin_Thesis_1.docx By Carmelita Lee Shong

Similarity Index	Similarity by Source	
11%	Internet Sources:	8%
	Publications:	6%
	Student Papers:	2%

1% match (publications)
Anthony, L.M.. "Technophobia and personality subtypes in a sample of South African university students", Computers in Human Behavior, 20000131

1% match (publications)
Rosen, L.D.. "Computer anxiety: A cross-cultural comparison of university students in ten countries", Computers in Human Behavior, 199521

< 1% match (Internet from 02-Mar-2019)
https://e-space.mmu.ac.uk/580121/1/For%20Online%20publication-RACHEL%20DUBSKY%20DOCTORAL%20THESIS.pdf

< 1% match (Internet from 26-Nov-2014)
http://uir.unisa.ac.za/bitstream/handle/10500/13283/thesis_sommer_mm.pdf?sequen

< 1% match (Internet from 05-Jul-2012)
http://learningspaces.edu.au/arts-ed/efi/visiting-scholars/forthcoming.php

< 1% match (Internet from 31-Jul-2016)
https://es.scribd.com/doc/314886807/Curricum-Design-and-Classroom-Management

< 1% match (student papers from 17-Feb-2011)
Submitted to University of Adelaide on 2011-02-17

< 1% match (Internet from 02-Feb-2017)
http://www.journals.ac.za/index.php/jsaa/article/download/1210/432

< 1% match (Internet from 30-Aug-2017)
http://open.uct.ac.za/bitstream/handle/11427/16601/thesis_ebe_2015_mogashana_disaapele_gleopadra.pdf?sequence=1

< 1% match (Internet from 02-Feb-2017)
http://www.journals.ac.za/index.php/jsaa/article/download/1210/432

< 1% match (Internet from 30-Aug-2017)
http://open.uct.ac.za/bitstream/handle/11427/16601/thesis_ebe_2015_mogashana_disaapele_gleopadra.pdf?sequence=1

< 1% match (student papers from 10-May-2011)
Submitted to University of Birmingham on 2011-05-10

< 1% match (student papers from 15-Jan-2015)
Submitted to Goldsmiths' College on 2015-01-15

< 1% match (publications)
Andrew Hope. "Foucault's toolbox: critical insights for education and technology researchers", Learning, Media and Technology, 2014

< 1% match (publications)
Michael Peters. "Nietzsche, poststructuralism and education: After the subject?1", Educational Philosophy and Theory, 03/1997

< 1% match (student papers from 14-Jan-2019)
Submitted to University of Durham on 2019-01-14

< 1% match (Internet from 29-Aug-2017)
http://open.uct.ac.za/bitstream/handle/11427/11315/thesis_hum_2011_swanepoel_h.pdf?sequence=1

< 1% match (Internet from 02-Feb-2017)
http://eprints.ugd.edu.mk/7170/1/ietc2011-1%2C%20zbornik.pdf

< 1% match (student papers from 15-Dec-2017)
Submitted to Aston University on 2017-12-15

< 1% match (publications)
Powell, Anne L.. "Computer anxiety: Comparison of research from the 1990s and 2000s", Computers in Human Behavior, 2013.

< 1% match (Internet from 11-Sep-2014)
http://www.ejournalofscience.org/archive/vol2si2/ICSTE2012.pdf

< 1% match (Internet from 05-Nov-2017)
https://research-management.mq.edu.au/ws/portalfiles/portal/17439645

Addendum B: STUDENT

B1. Covering letter for questionnaire

Dear Student

You are being invited to participate in a research study which aims to find out how computer training impacts on a student who has not used a computer before, specifically a first year student.

It is part of my, ***Carmelita Lee Shong***'s research for my Masters in Education.

If you choose to participate, you will be asked to complete a questionnaire after your first computer training session during First Year Orientation at the University of Cape Town and six weeks after your stay at university. I would also like students, who feel comfortable, to have an interview with after six weeks with me to relate to me how their experience has been.

Although taking part in this study may not benefit you directly, it will provide information which may assist me in identifying ways which could help first year students with their adjustment to university.

The questionnaires will take approximately 20 minutes to complete. Participation in this research is voluntary and should you wish to withdraw, you can do so at any stage, please email me at Carmelita.Leeshong@uct.ac.za and I will remove you from the study. All the information you provide during the participation of this research study will be confidential. There is no identifying information such as your name or student number on the questionnaire. All materials will be stored in a secure location within the Student Wellness Services and access to files will be restricted to me and my supervisor, Dr Cheryl Brown.

The University of Cape Town, Humanities Faculty, in the Department of Education has granted me permission to conduct this research.

Should you at any time have queries or have issues with any part of the process, please feel free to contact either myself or my supervisor, ***Dr Cheryl Brown***.

Carmelita.Leeshong@uct.ac.za or Cheryl.Brown@uct.ac.za

Thank you,

Signature Removed

Carmelita Lee Shong

B2. Consent Form

Participant Information and Consent Form

You are being invited to participate in a research study which aims to find out how computer training impacts on a student who has not used a computer before, specifically a first year student.

It is part of my, Carmelita Lee Shong's research for my Masters in Education.

If you choose to participate, you will be asked to complete a questionnaire after your first computer training session during First Year Orientation at the University of Cape Town and six weeks after your stay at university. I would also like students, who feel comfortable, to have an interview with after six weeks with me to relate to me how their experience has been.

Although taking part in this study may not benefit you directly, it will provide information which may assist me in identifying ways which could help first year students with their adjustment to university.

The questionnaires will take approximately 20 minutes to complete. Participation in this research is voluntary and should you wish to withdraw, you can do so at any stage by emailing me at Carmelita.Leeshong@uct.ac.za and I will immediately remove you from the study. All the information you provide during the participation of this research study will be confidential. There is no identifying information such as your name or student number on the questionnaire. All materials will be stored in a secure location within the Student Wellness Services and access to files will be restricted to me and my supervisor, Dr Cheryl Brown.

The University of Cape Town, Humanities Faculty, in the Department of Education has granted me permission to conduct this research.

Consent:

By signing this consent form, you are indicating that you fully understand the above information and agree to participate, by completing the attached questionnaire.

Participant's signature: _____

Printed name: _____

Date: _____

If you have any questions or concerns about this study, please contact Carmelita Lee Shong at 021 650 1017 / email: Carmelita.Leeshong@uct.ac.za

Should you wish to participate in my research interview, please provide me with your contact details?

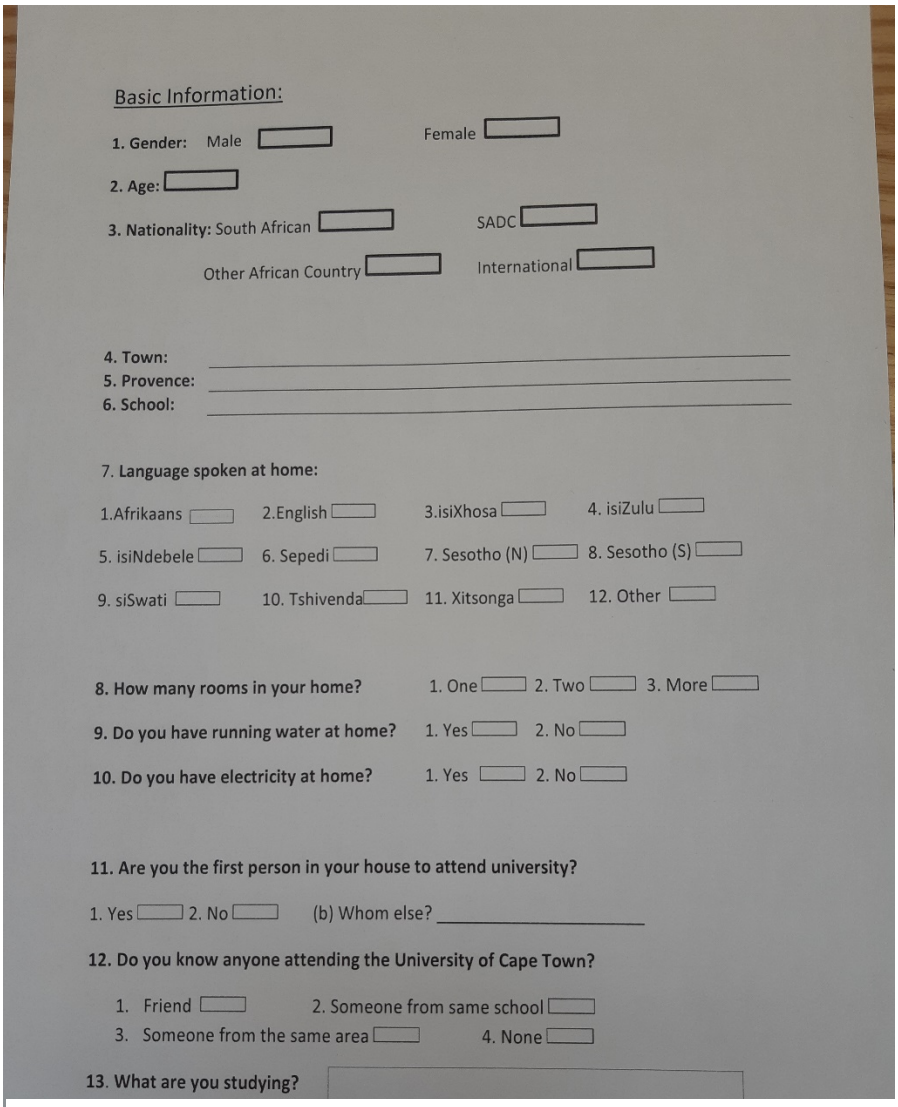
Name: _____

Contact Number: _____

Student Number: _____

B3. Questionnaire

B3.1 Basic Information



Basic Information:

1. Gender: Male ☐ Female ☐

2. Age: ☐

3. Nationality: South African ☐ SADC ☐

Other African Country ☐ International ☐

4. Town: _____

5. Provence: _____

6. School: _____

7. Language spoken at home:

1.Afrikaans ☐ 2.English ☐ 3.isiXhosa ☐ 4. isiZulu ☐

5. isiNdebele ☐ 6. Sepedi ☐ 7. Sesotho (N) ☐ 8. Sesotho (S) ☐

9. siSwati ☐ 10. Tshivenda ☐ 11. Xitsonga ☐ 12. Other ☐

8. How many rooms in your home? 1. One ☐ 2. Two ☐ 3. More ☐

9. Do you have running water at home? 1. Yes ☐ 2. No ☐

10. Do you have electricity at home? 1. Yes ☐ 2. No ☐

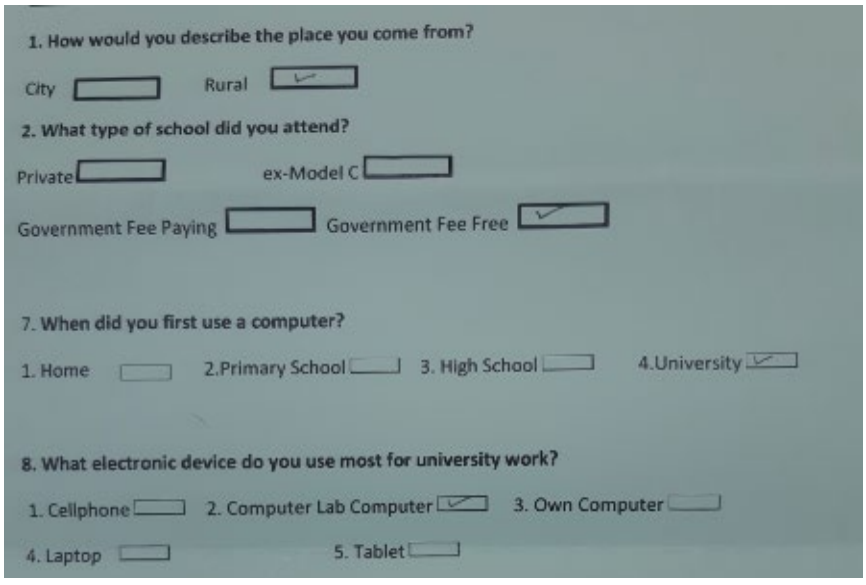
11. Are you the first person in your house to attend university?

1. Yes ☐ 2. No ☐ (b) Whom else? _____

12. Do you know anyone attending the University of Cape Town?

1. Friend ☐ 2. Someone from same school ☐
3. Someone from the same area ☐ 4. None ☐

13. What are you studying? ☐



1. How would you describe the place you come from?

City ☐ Rural ☑

2. What type of school did you attend?

Private ☐ ex-Model C ☐

Government Fee Paying ☐ Government Fee Free ☑

7. When did you first use a computer?

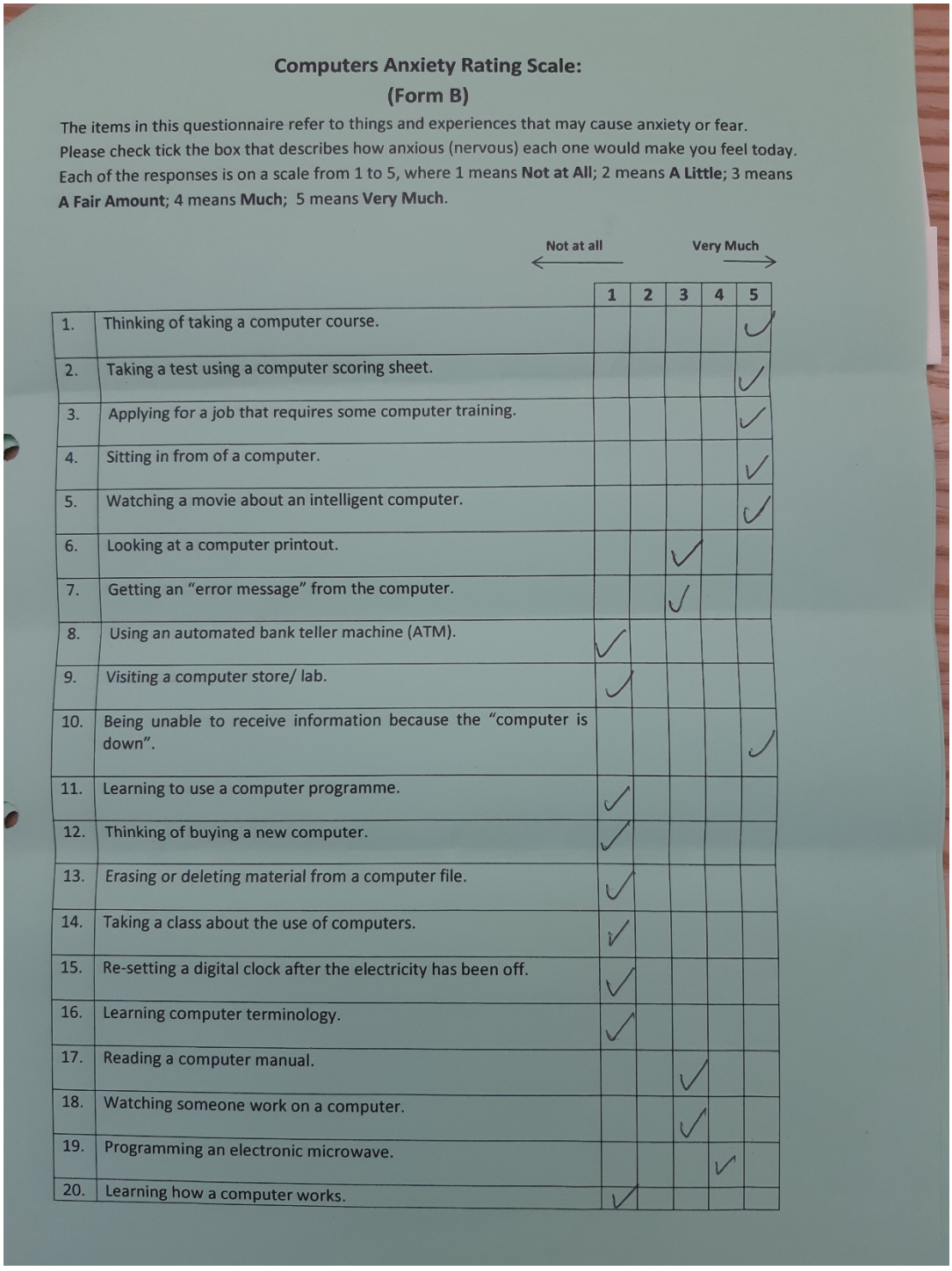
1. Home ☐ 2.Primary School ☐ 3. High School ☐ 4.University ☑

8. What electronic device do you use most for university work?

1. Cellphone ☐ 2. Computer Lab Computer ☑ 3. Own Computer ☐

4. Laptop ☐ 5. Tablet ☐

B3.2 Computer Anxiety Rating Scale (CARS)



Computers Anxiety Rating Scale:
(Form B)

The items in this questionnaire refer to things and experiences that may cause anxiety or fear. Please check tick the box that describes how anxious (nervous) each one would make you feel today. Each of the responses is on a scale from 1 to 5, where 1 means **Not at All**; 2 means **A Little**; 3 means **A Fair Amount**; 4 means **Much**; 5 means **Very Much**.

		Not at all ←				→ Very Much
		1	2	3	4	5
1.	Thinking of taking a computer course.					✓
2.	Taking a test using a computer scoring sheet.					✓
3.	Applying for a job that requires some computer training.					✓
4.	Sitting in from of a computer.					✓
5.	Watching a movie about an intelligent computer.					✓
6.	Looking at a computer printout.			✓		
7.	Getting an "error message" from the computer.			✓		
8.	Using an automated bank teller machine (ATM).	✓				
9.	Visiting a computer store/ lab.	✓				
10.	Being unable to receive information because the "computer is down".					✓
11.	Learning to use a computer programme.	✓				
12.	Thinking of buying a new computer.	✓				
13.	Erasing or deleting material from a computer file.	✓				
14.	Taking a class about the use of computers.	✓				
15.	Re-setting a digital clock after the electricity has been off.	✓				
16.	Learning computer terminology.	✓				
17.	Reading a computer manual.			✓		
18.	Watching someone work on a computer.			✓		
19.	Programming an electronic microwave.				✓	
20.	Learning how a computer works.	✓				

B3.3 General Attitude Towards Computers (GATS):

Attitude to Computers:

(Form A)

Please check tick the box that indicates how often you currently have each of the following thoughts when you use a computer or think about using a computer. Each of the responses are on a scale from 1 to 6, where 1 means **Strongly Disagree**; 2 **means Moderately Disagree**; 3 means **Disagree**; 4 means **Agree**; 5 means **Moderately Agree** and 6 means **Strongly Agree**.

Strongly Disagree ← → Strongly Agree

		1	2	3	4	5	6
1.	Computers do not scare me at all.						
2.	Computers make me feel comfortable.						
3.	I am glad there are more computers these days.						
4.	I do not like talking with others about computers.						
5.	Using computers is enjoyable.						
6.	I dislike computers in class.						
7.	Computers save time and effort.						
8.	Universities would be a better place without computers.						
9.	Students must use computers in all subject matters.						
10.	Learning about computers is a waste of time.						
11.	Computers would motivate students to do more.						
12.	Computers are a fast and efficient means of getting information.						
13.	I do not think I would ever need a computer to study.						
14.	Computers can enhance a students' learning.						
15.	Computers do more harm than good.						
16.	I would rather do things by hand than with a computer.						
17.	If I had money, I would buy a computer.						
18.	I would avoid computers as much as possible.						
19.	I would like to learn more about computers.						
20.	I have no intention to use computers in the near future.						

B3.4 Unstructured interview question guide:

Unstructured Interview:

1. How did you experience your first computer training session?
2. What did you enjoy the most?
3. What did you not like?
4. What did you think the first time you had to use the computer on your own?
5. Where did you use it?
6. How did you feel in that first few weeks having to use a computer?
7. Did it connect more or less with other students?
8. Is it easy asking for help when you get stuck on the computer?
9. What do you use the computer for today?
10. Academic work: Which programmes? Purpose?
11. Social contact: Which programmes/ sites? Purpose?
12. What is your view on using computers at university?
13. How do you feel about computers now?
14. How often do you use them?
15. Where?
16. How do you feel when you use a computer?
17. What method of learning do your prefer, one where you need to use a computer or one where you don't need to?

B3.5 Example of transcribed interview of a student

if someone asks a question, which I haven't done then I can relate too, and say wow, there was something which I didn't do. Then I get back to it. Yes, it's useful.

Interviewer: So it is useful?

M: Yes, it is.

Interviewer: What do you use your cell-phone for?

M: My cell-phone I don't use it much except for when my family call.

Interviewer: So it's mostly for calling and not for doing work on?

M: For calling, yes, and for reading my emails. It's much more easy. When I'm at campus and they send me emails from UCT that's when I use my cell-phone.

Interviewer: So, you get alerts on your phone when you must go and check your things on the laptop?

M: Yes.

Interviewer: So it is useful.

M: Yes.

Interviewer: How often would you say in a day would you use a computer?

M: Often. Can I give it in terms of hours?

Interviewer: Yes, or even numbers, like 3 or 4 times a day.

M: I use it every day pretty like roughly 5-hours per day.

Interviewer: We're incorporating more and more technology into teaching and learning at UCT. What do you prefer – a lecturer coming there with lecture slides and using the computer or someone standing there at the board explaining things?

M: For me, my personal self, I'm someone who likes experiencing new things. Them bringing the new technology and stuff it's quite a nice experience and it makes me to focus more and see what's going on. I'm very into learning new things. It helps me focus even more better when they use the slides and stuff but in terms of maths then there must be some writing and things. I can adjust to all of it.

Interviewer: So it's subject dependent as well?

M: Yes, it is.

Interviewer: So maths you prefer them working out the things there?

M: Yes.

Interviewer: If you had to give us any advice on preparing people, who come to the university with no computer knowledge. What do you think we need to think of to help them get up to speed?

M: If people like that are coming from high school and they don't have the knowledge and they want to get to UCT?

Interviewer: Yes.

M: My advice isn't like they will do some applications and they will know. You can just email them before they come so during their holidays because they have huge holidays before they come so they can try and maybe go to the libraries because they will have access to the computers. And try to do some of the things there like using Windows and stuff. They can do that, yes.

Interviewer: Do you think there would be any merit in separating out students who don't know work with students who do know and teach them the basics before we do the whole training with the other students?

M: Yes, it will make them be on the same level so, that's the only way we can be like and it will be fair to other students as well.

Interviewer: You wouldn't feel as awkward and like you don't know anything?

M: Yes, it's not something to be shameful of because it is what it is.

Interviewer: But it is a little bit embarrassing though to ask.

M: Yes, it is. I remember when we wrote the test we were supposed to give marks about what you know and stuff and people were getting high marks to say they know this. My mark was very low. To be honest I was embarrassed so, when it was it a skid break I kind of covered it a bit and I gave it back so that people won't see my mark. It was embarrassing.

Interview: Yes, it seems like technology plays a big role.

M: It does and there's no way we can run from it.

Interviewer: So, to be successful at university you need to know that?

M: You need to know that.

Interviewer: How comfortable are you now?

M: I can say I'm 100% comfy. Like when they come up with something new I'm not the person who will be like 'help' and freak out and stuff. I'll be like okay

Addendum C: DATA

C1. Raw data collected from questionnaires

February

Studying	GATC1	GACT2	GACT3	GACT4	GATC5	GATC6	GACT7	GACT8	GACT9	GACT10	GACT11	GACT12	GACT13	GACT14	GACT15	GACT16	GACT17	GACT18	GACT19
BA	5	1	2	5	2	2	5	3	5	3	3	1	1	1	3	5	1	1	3
B Com	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
B Com	5	1	1	2	1	2	5	5	4	1	5	1	1	1	4	1	1	1	5
Eng	5	3	1	1	4	1	5	5	3	1	1	1	1	1	5	5	1	1	5
Eng	4	2	4	4	2	3	4	3	2	1	2	1	2	1	4	4	1	1	5
B Sc	5	2	2	3	2	3	5	5	3	2	3	1	4	2	2	1	3	3	4
B Com	4	2	1	1	5	3	3	5	3	1	1	1	1	1	5	2	1	1	5
B Com	4	1	1	1	1	1	4	5	5	1	2	1	1	1	1	5	1	1	5
Eng	4	4	2	4	3	3	2	5	5	3	1	1	1	1	1	4	4	1	2
Eng	5	1	3	4	3	3	4	5	2	3	2	2	3	2	3	3	2	3	4
Eng	4	2	1	2	1	1	5	5	1	1	1	1	1	2	4	5	1	1	5
B Com	4	1	3	5	3	1	4	3	3	1	4	1	1	1	5	3	1	3	5
Eng	5	1	1	1	1	4	5	5	2	1	2	2	1	1	3	3	1	3	5
BA	1	2	1	1	1	3	4	2	1	2	2	2	3	5	5	5	1	1	4
Bcom	5	1	1	5	1	5	5	1	1	5	1	1	4	3	1	1	2	5	4
BA	5	2	1	1	1	1	5	5	1	2	1	1	1	1	4	2	1	1	5
Eng	3	2	2	1	3	1	4	5	3	1	1	1	1	2	5	5	2	1	4
Eng	5	1	1	1	1	1	5	5	1	1	1	1	1	1	5	5	1	1	5
H Sci	1	5	3	5	3	1	5	5	5	1	1	1	1	1	5	5	1	1	5
Eng	5	1	1	1	1	1	4	5	2	1	4	1	1	1	4	2	2	1	5

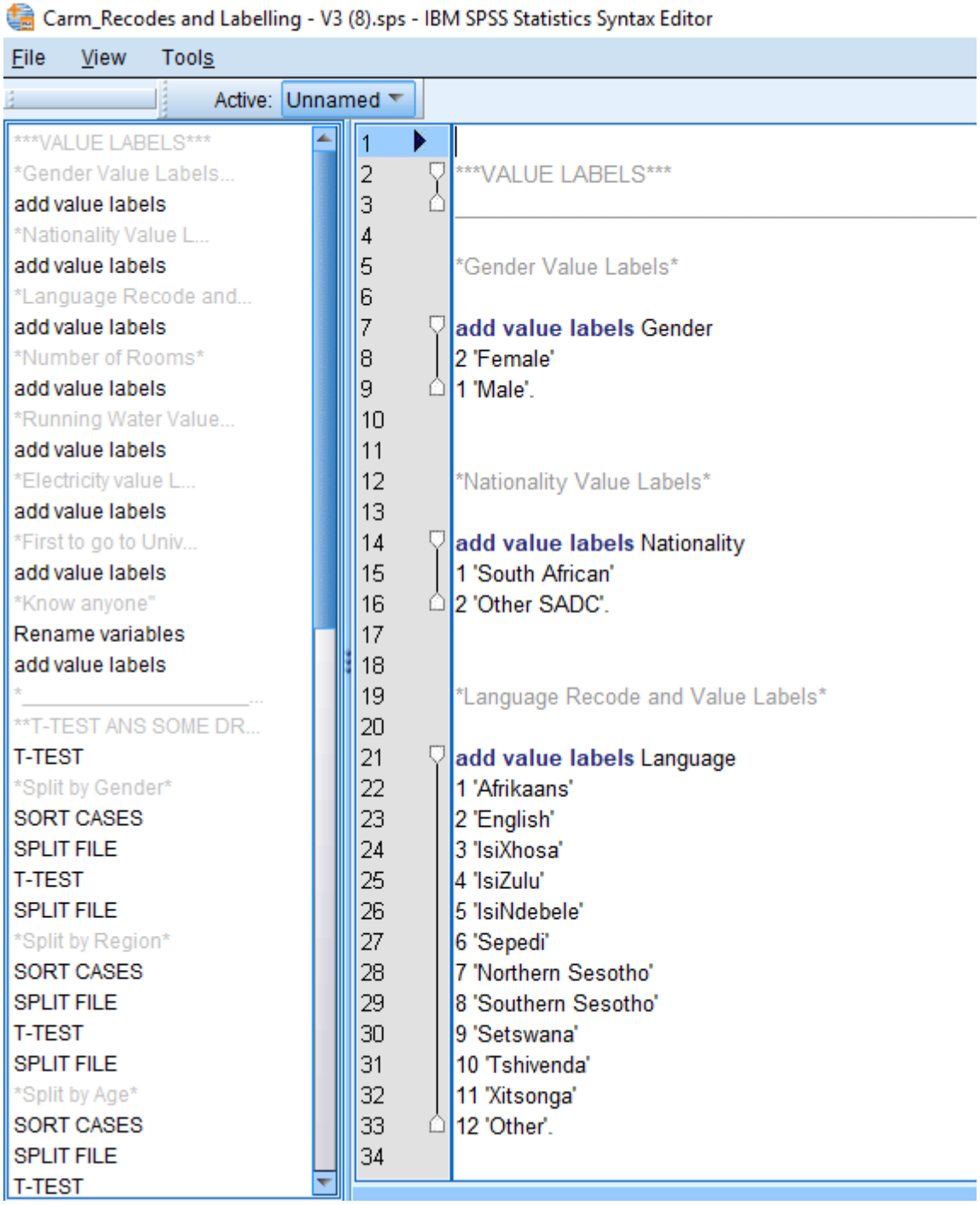
June Set | Feb Set

June:

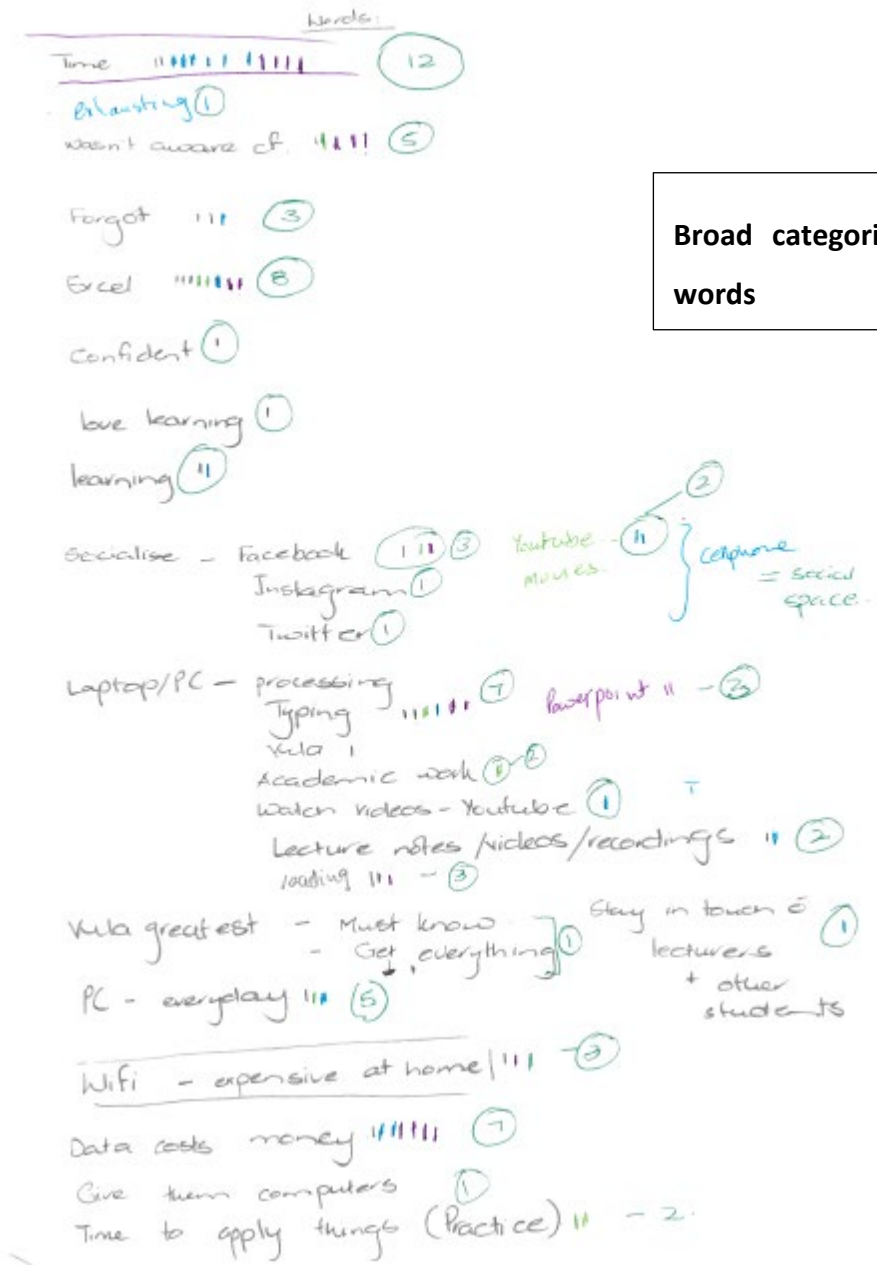
Capturing of Students Second Round June 2017.xlsx

I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
School Type	Access to	Language	Rooms at home	Running water	Electricity	First in Family	Other	Other	Device	Studying	GATC1	GACT2	GACT3	GACT4	GATC5	GATC6	GACT7	GACT8	GACT9	GACT10	GACT11
2	2	3	2	1	1	2	Sister	4	4	BA	5	2	3	2	2	4	5	2	2	2	1
4	4	9	3	1	1	2	Brother	4	2	B Com	4	3	1	5	1	3	5	3	5	1	5
4	2	10	2	1	1	1		1	2	B Com	5	1	1	1	1	1	3	5	1	1	2
3	2	4	2	1	1	2	Brother	3	4	Eng	5	1	1	1	1	1	5	5	2	1	5
3	4	4	1	1	1	2	Sister	3	4	Eng	2	3	3	3	2	2	4	3	5	3	2
3	2	1	3	1	1	1		4	4	B Sc	3	3	3	4	2	3	4	2	3	2	2
3	1	2	3	1	1	2	Brother	2	1	B Com	5	1	1	1	1	1	5	5	2	1	1
4	2	3	3	1	1	1		3	1	B Com	4	3	1	1	1	1	4	5	1	1	2
3	2	2	3	1	1	1		2	1	Eng	4	2	1	3	2	2	5	5	2	1	2
2	1	10	3	1	1	2	Parents	2	4	Eng	5	2	1	3	2	2	4	5	2	1	1
3	1	8	3	2	1	2	Sister	1	4	Eng	5	2	1	1	1	1	5	5	2	1	1
2	2	6	3	2	2	2	Siblings	3	4	B Com	4	2	4	5	3	5	5	5	3	3	3
3	3	8	3	2	1	1		1	4	Eng	5	1	1	3	1	1	5	5	3	3	2
3	1	3	3	1	1	1		2	4	BA	5	5	1	1	1	3	5	5	3	1	2
2	1	2	1	1	1	2	Mother	2	4	Bcom	1	4	1	2	5	1	5	5	2	1	1
1	3	3	3	1	1	2	Sister	1	4	BA	5	5	1	1	1	3	5	5	3	1	2
3	1	1	3	1	1	1		2	4	Eng	5	1	1	1	1	1	4	5	3	3	3
3	1	2	2	1	1	1		4	4	Eng	5	1	1	1	1	1	5	5	1	1	1
4	4	12	3	2	1	1		1	4	H Sci	1	5	3	5	4	5	5	5	5	1	1
4	1	2	3	2	2	1		1	1	Eng	4	2	1	1	1	1	5	1	5	5	1
1	2	4	3	2	2	1		4	4	Eng	4	1	1	5	1	1	5	5	3	1	1

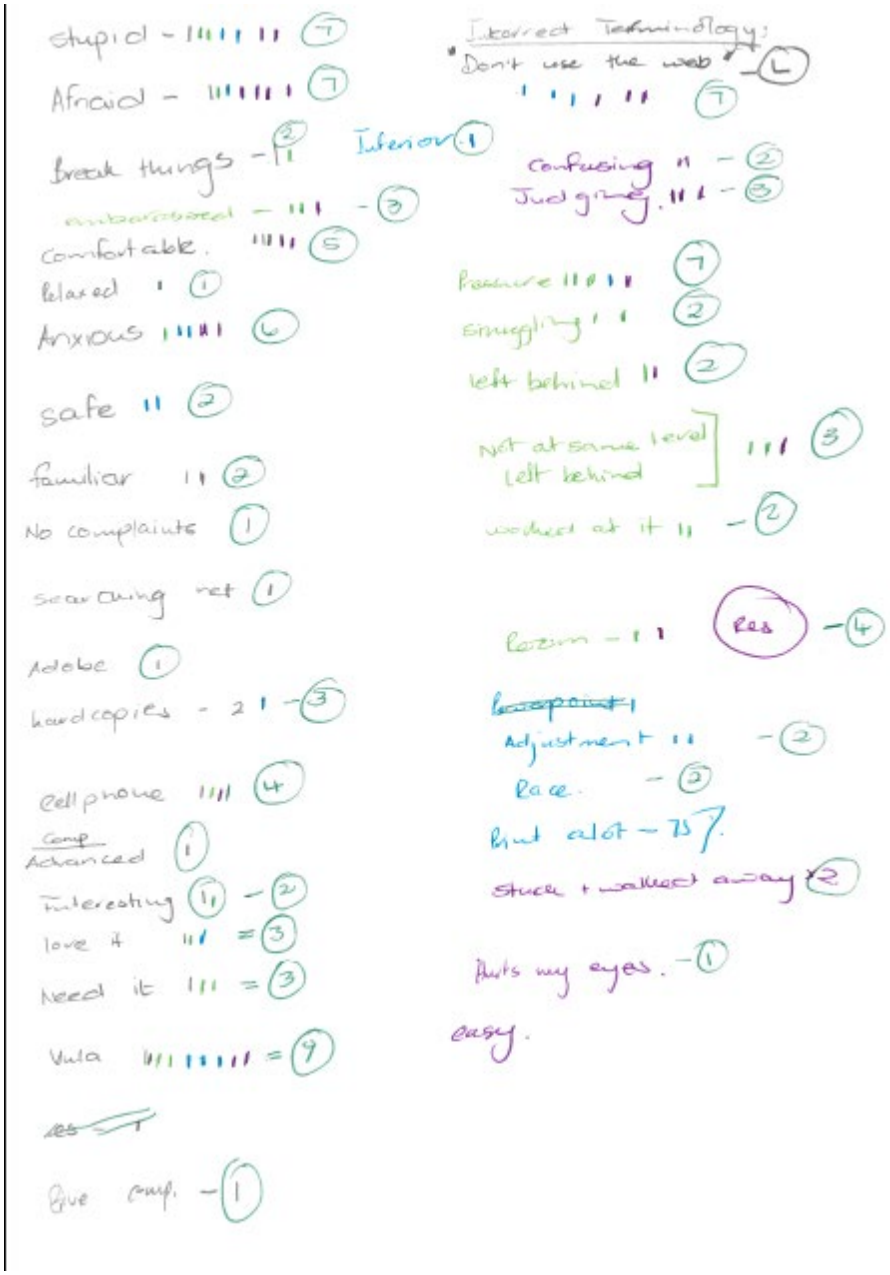
C2. SPSS codes



C3. Quantitative data analysis



Broad categories and quantification of words


stupid - 7
Afraid - 7
break things - 2
Interior 1
embarrassed - 3
comfortable. 5
Relaxed 1
Anxious 6
safe 2
familiar 2
No complaints 1
searching net 1
Adobe 1
hard copies - 2 - 3
cell phone 4
Comp Advanced 1
Interesting 2
love it = 3
Need it = 3
Vula = 9
Give empl. - 1
Incorrect Terminology:
Don't use the web - 7
Confusing - 2
Judging - 3
Pressure 7
Struggling 2
left behind 2
Not at same level left behind 3
worked at it - 2
Racism - Res - 4
Adjustment - 2
Race. - 2
Find alot - 7
stuck + walked away 2
Hurts my eyes. - 1
easy.

Themes and associations:

Interviews

Collapsing Codes:

→ Discourse - What is students'? What is institutional?

→ Disciplinary Discourse

Code	Frequency	Sequences	Similarity	Differences
Language Use:				
Vula	Extensive	Unknown to known	Can't do without	
Time	Extensive	Not enough- playing catch up.	Too little; tired	
Body Language: stares	Extensive	Confident, self-assured to self-doubt	Anxious, Embarrassed; Scary	
Computer Jargon:	Extensive	Unknow to basic knowledge	Wi-Fi – cost of data; not always good in res.	
Excel, Program, Upload	Extensive	Unknown to basic knowledge.		Some not confident using it; only know one well; competent
Use	Often	No use to absolute necessity	Academic; key to success; Valued	Researcher – only basic knowledge, which creates the divide. Typing speed; access to quicker ways of working such as other computer packages or short cuts known by experienced users.
Academic	Frequently		The use of computers is strongly associated with students' academic work, such writing essays, doing readings, completing projects. Cellphones are used for social connections such as Instagram, Whatsapp and Facebook.	

Interviews

Code	Frequency	Sequences	Similarity	Differences
Identity:				
Emotions	Often		Shy, less than, Catch up; Fear; Intimidated	Now at same level
Individual vs Group	Often	Community to Individual		Different from home – community; ethos of helping one another – now in competition.
View of self	Often	Outgroup	What is needed to get in; Aspire to	
Determination	Often		Resilience – keep at it	

Code	Frequency	Sequences	Similarity	Differences
Identity:				
Emotions	Often		Shy, less than, Catch up; Fear; Intimidated	Now at same level
Individual vs Group		Community to Individual		Different from home - community
View of self	Often	Outgroup	What is needed to get in; Aspire to	
Determination	Often		Resilience – keep at it	

Observation notes:

			about ICT to pass – not about the content of your work but presentation can impact on your mark = how you present yourself matters	
Power:				
No computer technician	often	Tech buddies not in control to being in control of the session	Limits on ability to solve computer problems.	
No instruction guide for Tech buddies and students	Once	Unknown to known	How to measure success of teaching? Was everything covered?	Diverse needs – students need to learn; tech buddies earning money.
Disciplinary specific software	Often	Unknown	Tech buddies also haven't mastered all software packages in engineering. Limits	
Software Control	Often	Unknown to known	If you don't master using Peoplesoft and Vula – you are at the universities mercy. Controls academics and personal access to valuable information – pass/ fail; funding.	
Physical control	Once	Unknown to known	Must have a laptop to download software. Access controlled by your student number. Ability to work required additional resources such as laptop and flash drive. University only provides limited access.	

Code	Frequency	Sequences	Similarity	Differences
Power				
Institutional	Extensive		UCT message – have to be computer literate - unsaid	
Structures	Often		Help from others – understood where I came from. Lecturer; tutors	
Practices	Often	Failing computer assessment to know being able to use computer; Not knowing to knowing	Feel part of; can achieve at UCT.	Not good enough to ask questions in Vula forum.
Historical Political	Extensive	School to UCT: didn't need computer to succeed. Just worked hard.	No computer proficiency; deficit, something to be ashamed of; us and them= "white" students	
Access	Extensive	None to laptop	Access to hard ware but all have similar barriers: money for data; in-depth knowledge of computer programmes and institutional limits. Not seen by students but researcher. – Raised issues	

Code	Frequency	Sequences	Similarity	Differences
Objects of Knowledge				
Computer	Extensively		Key requirement to access knowledge, without it you will fail; way of the world – technological age. Needed to survive.	
Institution Knowledge	Once		They (white) students come in knowing how things work at UCT – you have to play catch up.	
Computer Manual	Often		Lack of resource to go back to; Have forgotten what was taught or didn't understand things in the first place; Gaps in knowledge	
Old ways: Print	Extensively	Like old way but have to use new way, namely computers		Some have adapted but others now print at their own expense, which is costly.

Observation studies

Code	Frequency	Sequences	Similarity	Differences
1 Objects of knowledge				
Computer lab	often	No access to access		Importance of computer literacy underscored by poor learning environment: poorly lit, cold computer lab with no computer lab technician to help tech buddies. Different tool to be used: laptop vs computer
Computer Programme	Often	Unknown to known	Need to master to achieve in specific disciplines, eg Excel essential for Chem Eng and Autocad for Architecture	Yet not a lot of time spent on Excel – only basic introduction and no time spent on other discipline specific programmes
Language:				
Technical Jargon	Extensive	Unknown to introduction	Reinforcing language students must master to be successful at university: digital language – hardware; input device, software, apps, Peoplesoft & Vula	
Vula	Often	Unknown to known	Essential tool to academic success. Need to master it.	
2 Identity				
UCT student	Extensive	Unknown to introduction - implicit	Must use right font, justify document and must be neat to get a good mark. Must have your own laptop and flash drive. Own banking account and writing equipment. You are on your own.	Exhausted but implicit that they need to continue. Need of tech buddies not students. Students have a vested interest to master digital literacy.
Tech Buddy	Extensive	Known	Insider knowledge on how to be at UCT: Language different- "weird". No township slang used, nor answers give in students' mother tongue. Only English spoken. Must master everything	No acknowledgement of being in students' shoes. All knowing. Yet, still have limits on knowledge. Individual needs override needs of collective.

Engineering Computer Training Session

Date: 11 March 2017

Time: 9am to 4pm

Venue: Red Computer Lab in ... Building

Trainers: 4 "Tech Buddies" – 4 Orientation Leaders who are 1 Male (Black, Africa, in fourth year, studying Electrical Engineering; 1 Black Male, third year, studying Mechanical Engineering; 2 x Female, Black students in 3rd year, studying Chemical Engineering).

There was no computer laboratory technician on duty – they do not work on Saturdays.

Lab was locked. Access via student cards.

Tech Buddies has problems accessing the computer systems and could not ask lab technician for assistance.

Students who had to attend the training session were students who failed the computer assessment test.

Session	Time	Topic
1	9h00 – 10h00	Introductions; Basics of PC (devices) and UCT System: Peoplesoft
2	10:15- 10:30	Break
3	10:30 – 12:00	Internet and email
4	12:00 -13:00	LUNCH
5	13:00 – 13:45	Introduction to Windows
6	13:45 – 14:45	Word; Nanotechnology
7	14:45 – 15:00	Break
8	15:00 – 16:00	Excel

Students were not provided with a take away guide but told they could take their own notes. Most of the students did not arrive with writing equipment such as pens or paper.

The room was extremely poorly light. Students sat in 8 rows per student, each with their own computer and faced the interactive screen. Tech buddies presented various training materials on the computer, step by step. No mice for computers.

Students were encouraged by the tech buddies to ask questions and ask for assistance when stuck.

No diagrams or video clips were shown when introducing students to the hardware, namely keyboard and printer. They were told what an input device was.

The students were then asked if they understood the work.

The next section dealt with "storing data" – two types of storage. 1. Long term storage device and short-term storage device such as a flash drive or CD. Two students asked what a flashdrive and CD were. The tech buddies did not have physical examples to show students. They then explained what a CPU and ram was.

When asked if they knew what "software" was, there was silence in the room.

A group of late arrivals arrived at 9:45 am because they had transport problems.

Vula: submission of assignments. Students struggle to get the concepts being explained. Tech buddies elaborates that there is a period when the gate is open and when it closes, you can't submit your essay.

- Course evaluation – online. Sometimes a DO requirement and could pass the course.
- DPR – not able to write exams.
- Good information with regards to academics added on Vula.
- Don't write test or exam if you have not prepared for it.
- Tool to learn online.

ICTs at UCT is your friend.

Library – not the physical library. Place where files are stored. Tech buddy explains to students the difference between a physical library and an online library.

Peer review things – tech buddies advise students to learn things via Lynda.com. It has videos which teaches you how to do things.

Log on via Vula – it will recognise your UCT student account. You then need to create a profile. It will ask you for your details and then you get an account on Lynda.

Tech buddies walk around to assist students when they are stuck.

Physically: Lab is extremely cold. Trainer sits on the PC whilst students are being instructed. It did help having tech buddies walking around the room to help students. 4 males and 4 females.

Time allocation of 1 hour per programme.

Word Training:

Students told that their assignments need to be neat, if not, it has an impact on your mark. Tutors do not like assignments which are not justified or not neat.

Students to use good academic language because this too impacts on your mark.

When writing a report, don't use a fancy font. Stick to Arial/ Helvetica/ New Times Roman.

Tech buddy states when people use fancy Fonts, it gives him a headache which negatively impacts on the way he marks scripts.

Students shown how to insert a table into a Word document. One student raises hand to ask a question. Needs help to do table.

Students told what a Pdf is and that they can't edit on the document.

They are told on a Word document, you can edit the document.

Students told never to save to the desktop of a university PC. They must have their own flashdrive to save work on.

Students are given two options – either take a 15 minute break or continue. Majority vote to work on, even though most of them look physical exhausted and some have their heads on the desk.

Excel:

None of the students had problems logging on. Some students needed help with their passwords and assistance to change their passwords.

The tech buddies then went on to explain "third party software", Solidworks, Code and interface.

Three students asked how these words were spelt. (row3).

Chrome apps were then explained.

Students were then taught how to use "Peoplesoft" and told that this would be key to managing their information at the university.

Autocad required for Architecture 2017.

Eagle layout editor 7.70.

Free CAD 0.16

IBM SPSS Stats

The image projected onto the screen for students to view was very small. It was a representation of a progress report for Physics for a certain period.

Students were told about a list of terms they need to know for Peoplesoft.*

FEC

Finances – Account Banking

Financial Aid

Students told they must have their own banking accounts.

Hold – stops you from getting your degree.

Pending – UCT requires more information to complete the process.

Exam Time Tables – up 5 weeks before the exams on Peoplesoft.

Class search – gives you our class time table.

Browse Catalogue – what you are enrolled for.

Grades: 12 credits earned for 120 hours spent on a course. Credits could differ for different courses.

Another group of students arrived at 10h30. Struggled to find venue.*

Students then were explained the difference between Vula and Peoplesoft.

Vula – learning site. All your learning materials would be loaded on there. Considered the social media for UCT.

Peoplesoft – has your student profile on it.

"Dowloads" on Vula – how do you send it to your computer at home?

Some of the students did not know what a flashdrive is. (laughter in class when a flashdrive is sent around).

Students shown Excel. They are told if they use Excel online, it is slower than using it directly. They will use Excel 2016 at UCT.

Excel is extremely important for Chemical Engineers. Works like a calculator.

Can enter date, delete date, use various operations and draw graphs.

Various jargon is used.

Tech buddies often use the word "weird". UCT lang

Operation:

=sum (Highlight to be summed)

= click on rectangle – bottom right corner and drag down to row wanted.

= would add whole row

= bottom right hand corner and double click.

Tech buddies went through the Excel training extremely fast. Apparent that they were tired and wanted to finish the training.

Managed to finish the session in 10 minutes.

Showed students how to do bar graph.

"series" name.

Erase all signs and always start from a blank space,

+ on side of the box

Click on left corner – gives you axis options.

Asked by Tech buddies to repeat the explanation.

Chart elements

Legend – colour code bar graph with title.

Chart title

Axis title

Right click – select date – edit.

Light area needed for title.

-add tabs (sheets)

Make copies of sheet. Classes are in English.

Called cross referencing.

Lynda had tutorials.

UCT requirement.

Microsoft Office – on own laptop. Unistall – portal.office.com – allows you access to Microsoft whilst you are a UCT student.

Training session ended at 14:30.