

**DOMESTICATION OF FREE WI-FI AMONGST HIGH SCHOOL LEARNERS IN DISADVANTAGED
COMMUNITIES IN THE WESTERN CAPE, SOUTH AFRICA**

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Department of Information Systems



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By

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Table of Contents

Declaration	ii
List of Tables	vii
List of Figures	viii
Acronyms and Abbreviations	ix
Acknowledgements	x
Dedication	xi
Abstract	xii
Chapter 1: Introduction	13
1.1. Background	13
1.2. Research Questions	16
1.3. Purpose of the Research	17
1.4. Research Aims and Objectives	17
1.5. Summary Of Research Approach	17
1.6. Contributions and Summary of Findings	18
1.7. Expected Research Outcomes	18
1.8. Assumption and Limitations of the Study	19
1.9. Overview of Chapters	19
Chapter 2: Literature Review	21
2.1. What Is Free Wi-Fi?	21
2.2. Different Types of Wireless Networks	23
2.3. Municipalities Offering Free Wi-Fi	25
2.4. Digital Divide	26
2.4.1. DATA COSTS	26
2.4.2. SUCCESS AND ULTIMATE FAILURE OF FREE WI-FI	27
2.5. Disadvantaged Communities in South Africa	28
2.5.1. ICTS AND DISADVANTAGED COMMUNITIES	28



- 2.5.2. SCHOOLS IN DISADVANTAGED COMMUNITIES 29
- 2.5.3. PERFORMANCE INDICATORS FOR SCHOOLS 30
- 2.6. The Research Gap 31**
- 2.7. Summary of the Chapter 31**
- Chapter 3: Theoretical Framework 33**
- 3.1. Adoption Theories 33**
- 3.2. Choice Of Domestication Theory 35**
 - 3.2.1. PREVIOUS STUDIES AND DOMESTICATION THEORY 35
 - 3.2.2. APPLICATION OF THEORY 37
- 3.3. Domestication Theory Explained 37**
- 3.4. Summary of the Chapter 38**
- Chapter 4: Research Design 39**
- 4.1. Overview of the Design 39**
- 4.2. Ontology and Epistemology..... 39**
- 4.3. Case Research Strategy and Design 40**
 - 4.3.1. NUMBER OF CASES IN THE STUDY 41
 - 4.3.2. CASE SAMPLING TECHNIQUE 41
- 4.4. Research Sample 41**
- 4.5. Negotiating Access 42**
- 4.6. Data Collection Techniques 42**
 - 4.6.1. FOCUS GROUP INTERVIEWS 43
 - 4.6.2. WRITTEN ESSAYS 45
 - 4.6.3. QUESTIONNAIRE AND INTERVIEW ADMINISTRATOR 45
 - 4.6.4. EXPERIMENTATION 46
 - 4.6.5. FIELD NOTES AND OBSERVATIONS 46
 - 4.6.6. E-MAIL CONVERSATIONS 46
- 4.7. Data Analysis 47**



4.8. Research Validity and Reliability	48
4.9. Ethical Considerations and Procedures	50
4.10. Summary of the Chapter	51
Chapter 5: Case Description	52
5.1. Delft Township, Cape Town	52
5.2. The School	53
5.3. The Smart Cape Initiative	54
5.4. Wi-Fi Networks	56
5.5. Summary of the Chapter	58
Chapter 6: Research Findings (Results)	59
6.1. Demographic Information of Learners	59
6.2. Commodification of Free Wi-Fi by Learners	61
6.2.1. WORD OF MOUTH	61
6.2.2. PIN UP POSTERS	62
6.2.3. OBSERVATION	63
6.2.4. MASS MEDIA	63
6.3. Appropriation of Free Wi-Fi by Learners	63
6.3.1. OBJECTIFICATION AND INCORPORATION	64
6.3.2. SCHOOL POLICY	64
6.3.3. USABILITY OF THE FREE WI-FI	64
6.3.4. USES AND BENEFITS OF FREE WI-FI	66
6.3.5. FRUSTRATIONS OF USE	67
6.3.6. ANTICIPATED USES	67
6.3.7. SELF-EFFICACY	68
6.4. Conversion of Free Wi-Fi By High School Learners	69
6.4.1. CONVERSION WITH JUDGEMENTS AND CAUTION	69
6.4.2. CONVERSION WITH POSITIVE RESULTS	69



6.5. Summary Of Chapter	70
Chapter 7: Discussions	71
7.1. Assumptions	71
7.2. Commodification of Wi-Fi.....	71
7.3. Appropriation of Wi-Fi in Schools	73
7.4. Conversion	74
7.5. Review Of Research Question and Objective	75
7.6. Summary Of Chapter	75
Chapter 8: Conclusions and Recommendations	76
References.....	78
Appendix A: Adoption and Use Theories.....	89
Appendix B: Demographic Information of Learners	91
Appendix C: Interview Guide for Focus Groups.....	92
Appendix D: Questionnaire to School Administrator	95
Appendix E: Consent Letter to Parents	99
Appendix F: Response Leaflet From Parents	100
Appendix G: Consent Letter to School Administrator.....	101
Appendix H: Ethics Approval -UCT	102
Appendix I: Ethics Approval – Western Cape Government.....	103
Appendix J: Research Deliverables.....	104
Appendix K: Word Map from Written Essays	105
Appendix L: Initial Codes.....	105



LIST OF TABLES

Table 1.1: The researcher's assumption on learner's engagement with the free Wi-Fi	19
Table 2.1: Different types of networks (Deng, Chen & Cheng, 2014)	24
Table 2.2: Cost of prepaid & bundle rates in African countries (Mochiko, 2016)	27
Table 2.3: The provincial breakdown of the quintiles (Western Cape Government, 2014)	30
Table 3.1: ICT Adoption Theories	33
Table 3.2: Authors that used the domestication theory	37
Table 4.1: Data collection techniques employed	45
Table 4.2: One on one interview versus groups (Breen, 2006)	46
Table 4.3: Case study tactics (Yin, 2003)	50
Table 5.1: Networks and Owners available at the school	59
Table 7.1: Assumptions and findings of the study	74



LIST OF FIGURES

Figure 2.1: Connection Scenario via WLAN Hotspot (Pitkanen et al., 2010)	22
Figure 2.2: WMA with municipality built (Sirbu et al., 2006)	23
Figure 3.1: ICT Adoption and use processes (Kim & Crowston, 2011)	33
Figure 3.1: Domestication framework (Silverstone, Hirsch & Morley, 1992)	38
Figure 4.1: Data Triangulation	52
Figure 5.1: Map of Delft (Google, n.d)	54
Figure 5.2: Population of Delft (Frith, 2011)	55
Figure 5.3: Smart Cape logging landing pages screen shot	57
Figure 5.4: Neotel hotspot landing pages screen shot	57
Figure 5.5: Networks available at the school, screen shot	58
Figure 6.1: Age range of learners	61
Figure 6.2: Learners race group	62
Figure 6.3: Location of access	62
Figure 6.4: Posters of advertised networks at Alpha school	64



ACRONYMS AND ABBREVIATIONS

AP	Access Point
BSS	Basic Service Sets
ESS	Extended Service Sets
ICT	Information Communication Technology
IOTs	Internet of Things
IS	Information Systems
ISP	Internet Service Providers
LAN	Local Area Network
PPP	Public-Private Partnership
StatSA	Statistics South Africa
SSI	Service Set Identifier
R	South African Rand
RIA	Research ICT Africa
WCG	Western Cape Government
WCED	Western Cape Education Department
Wi-Fi	Wireless Local Area Network
WPA2	Wi-Fi Protected Access 2
WPAN	Wireless Protected Area Network
WMAN	Wireless Metropolitan Area Networks
WMN	Wireless Mesh Networks
WWAN	Wireless Wide Area Networks
USA	United States of America
US\$	United States Dollar



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HOLY TO THE LORD

A big thank you to my supervisor, Professor Wallace Chigona for being a rock throughout this journey, you supported me through it all.

To Jerry O.E., I embarked on this journey for you and with you. We bit the elephant one bite at a time. Thank you my love.

To my biggest cheerleader Mrs N. Pilime, thank you and all my family.

To the learners at the school in Delft, it was a pleasure meeting all of you, giving your valuable time and sharing your experiences. The future doctors, botanists, lawyers, models, chartered accountants and social workers; keep shining. The world is at the palm of your hands; own it. The principal, deputy principal and the staff, thank you for your kindness.



DEDICATION

I dedicate this work to my grandfather. The man who defined love.

On the 14th of May 2017, you rested. Ulale ngokuthula Qhawe.



ABSTRACT

The provision of free Wi-Fi has dominated the African continent by providing Internet access to citizens. In 2014, South Africa was ahead of the rest of the African continent with more than 2,000 hotspots located in 60 local and district municipalities. Municipalities prioritised disadvantaged communities in an effort to bridge the digital divide for the citizens. It was anticipated that learners from disadvantaged communities in high schools would potentially benefit from this highly publicised project.

Using the domestication framework, this interpretive study sought to understand how learners were adopting free Wi-Fi within their school environment in a disadvantaged community set-up.

Key findings reveal that while access points are available to serve in disadvantaged communities some learners are able to connect whilst others are unable or struggle to connect with ease. This is due to poor signals and or disruption by multiple APs that are either malfunctioning or privately owned. Learners view the lack to connect and ease of use of the free Wi-Fi as an unfortunate disservice in a digitally competitive world.



CHAPTER 1: INTRODUCTION

This chapter presents the background, purpose of the research, research questions, research aims, and objectives, summary of research approach, contributions, and summary of findings and concludes by summarising the overview of chapters.

1.1. BACKGROUND

South Africa is listed amongst the emerging economies of the world. Information Communication and Technology (ICT) has been identified as one the key factors in contributing to the growth (Hart & Laher, 2015; van der Merwe & Buhler-muller, 2013). With this ICT strength; South Africa, a country that attained its democracy in 1994 has continued to struggle under the apartheid stigma. Social inequalities centred on race and ethnic groups have continued, with rising poverty levels, unemployment, and high crime levels especially in communities with mostly groups of Black Africans and Coloureds (Christopher, 2005; Musterd & Ostendorf, 2013).

This is despite the fact that the government has launched various policies and projects to balance the scales amongst different groups especially to assist the youth (Deegan, 2014). In 2009, the national spatial development perspective (NSDP) showed that 84.46% of the national population and 77.31% of the population live below minimum living wage (Pieterse, 2009). Economist are still optimistic on ICT playing its crucial role of improving services, developing skills and improving productivity and economic growth (Kyobe, 2011).

A disadvantaged community in South Africa means lack of access to resources, socio- economic challenges, and historic legacies of the apartheid era (van der Berg, 2014). Schools in disadvantaged communities have similar hindrances. Schools have been bedevilled with lack of teaching and learning resources, shortage of qualified teachers and poor infrastructures. This leads to poor academic performance and a high rate of dropouts (Badat & Sayed, 2014).

Learners are placed in a category referred to as the youth or young people. The South Africa's National Policy, defines a youth as a person between the 15-34 years (Blum, 2007; UNFPA South Africa, 2014). In 2014, the youth constituted about 77.6% of the total population of 51 million people. 18.5% were between the ages of 10-19 and 24% were aged between; 15-24, 13-20 year olds are considered the high school going age (UNFPA South Africa, 2014).



Although South Africa now operates as a democratic society, there are two types of school systems that cater for the youth. These are divided by the history of the country and socio-economic status (Spaull, 2013a). Schools which catered for White learners only; continue to cater for Whites and a few Black African learners. These learners are considered to be from middle class or wealthy families. Whilst schools that served Black Africans and Coloureds before democracy still cater for the same groups (Badat & Sayed, 2014; Spaull, 2013b). These learners are considered to be disadvantaged or poor and recipients of government grants (Sayed, 2016).

Education researcher Spaull (2013a) in a study to determine the quality of school, split schools into four wealth groups, with one representing poorest to four being the wealthiest. The results proved that learners in wealthy school outperform the learners from schools in disadvantaged communities. This is reflection of the poor quality of school serving mostly Black Africans and located in disadvantaged communities (Badat & Sayed, 2014). Most of the learners who are from these disadvantaged schools either drop out from school at Grade 11 to Grade 12 and those who proceed to attain a Matric certificate are not able to gain entrance into tertiary institutions (van der Berg, 2014).

The department of education has continued to dismiss these claims, explaining that there is improvement and challenges like in any system will always exist. Timæus, Simelane & Letsoalo (2013) shift the blame and explain that household poverty and parents' limited education background affect learners. There is limited support of Black African learners at home compared to the White and Indian/Asian learners. This therefore becomes a permanent poverty trap for learners in disadvantaged schools (Anderson, 2008). Further, there have been reports of learners being violent against their teachers in disadvantaged community schools. This has left teachers psychologically traumatised and under-performing (Shields, Nadasen, & Hanneke, 2014).

ICTs have been identified and used in the past as means of addressing some inequalities within schools (du Toit, 2012; Hodgkinson, Sieborger, & Terzoli, 2007). Government and donor agencies belief in the success of ICT interventions has facilitated the influx of such projects in disadvantaged communities (du Toit, 2012). It is however, important that deliberate measures are taken to integrate ICT intervention in these environments (Chigona, Chigona, Kayongo, & Kausa, 2010). This is due to the continuous debates and research work that seeks to understand the factors that conducive for ICT projects to be successful and adoption (Cantrell & Visser,



2011; Hodgkinson et al., 2007; Miller, Naidoo, & van Belle, 2006; Miller, Naidoo, van Belle, & Chigona, 2006).

The Khanya project was established in 2001, was set at integrating technologies into Western Cape school's curriculum delivery (Chigona & Chigona, 2010). Working with mainly schools in disadvantaged communities the aim was set at improving teaching and learning of computer skills and ultimately remove the digital divide amongst learners (Western Cape Government, 2006). Khanya project was applauded for improving literacy scores on standardised tests. Snyder and Prinsloo (2007) argued that improved tests scores used as a measure did not translate to skills that equip learners in an evolving digital world. Further, an intensive research conducted in the early phases of the launch showed that some teachers did not have the skills and resources to implement ICT in their teaching (Miller et al., 2006). This could affect the adoption and transfer of skills learning to learners who are the recipients of the project.

Increasingly, many municipalities are providing free Wi-Fi for their citizens (Sirbu, Lehr, & Gillett, 2006). South Africa has the highest access to mobile services compared to other African countries (Gillwald, Moyo & Stork, 2012). With 24.9 million users with access to the Internet, South Africa is the third largest consumer of the Internet in Africa (Gillwald et al., 2012). Free Wi-Fi is argued to be an intermediary in disadvantaged communities in a quest for poverty alleviation and bridging digital divide through reduction of Internet costs (Weiss & Huang, 2007).

Numerous projects intended to provide free Internet services have been launched in the past by the Western Cape Government either as an entity or as public-private partnerships (PPPs). These have been named the Cape Access projects. The projects aim at establishing ICT projects that communities can access for free or at a subsidised rate. The most popular and recent has been the free Wi-Fi projects. In 2015 the Western Cape Government in partnership with Neotel launched free Wi-Fi hotspots in disadvantaged communities prioritizing high schools for the reason of keeping learners connected in this era of technology-based economy (Western Cape Government, 2015).

The inception of free Internet however begun earlier in 2001, and named the Smart Cape public Wi-Fi. Registration was required and done in community libraries and progressed to be both in libraries and online (Valentine, 2004). These projects intend on meeting important objectives which include “closing the ever-widening digital divide, advancing digital literacy, creating opportunities for economic growth, increase in quality education” and to simply send emails and

apply for jobs online (Government, 2017; Valentine, 2004). Bridging the poverty gaps is crucial, especially for a country such as South Africa particularly in Cape Town that Lemanski (2017), describes as fertile ground for perpetuating inequalities that are supported through processes of participatory governance.

Free Internet projects have been criticised as a waste of tax-payers money and campaign strategies by politicians (Heer et al., 2010; Urbina, 2008). Merwe & Bohler-muller (2013), explains that offering Internet access for free is uncommon, as the service should be paid for like subway lines, sewers and road services. Further, the projects have failed in other cities and are usually forgotten and become a mere financial liability (Frazer, 2009; Hudson, 2010; van der Merwe & Buhler-muller, 2013).

Arguments on the failure of free Internet projects have not been researched on in depth in high schools located in disadvantaged communities. This is due to limited qualitative research on learners' adoption and use of free Wi-Fi. Research discusses the success and failures of free Wi-Fi in affluent schools, communities and open spaces; using quantitative methods (Bulchand-Gidumal, Melián-González, & González, 2011; Mehta, 2013; Raghavendra, Padhye, Mahajan, & Belding, 2008; Talla et al., 2015).

1.2. RESEARCH QUESTIONS

Learners from disadvantaged communities in high schools have been identified as the potential beneficiaries of the free Wi-Fi in a bid to bridge the digital divide in South Africa (Western Cape Government, 2015). This study applies to the domestication framework as a theoretical lens to understand how and why learners in the Western Cape, South Africa integrate free Wi-Fi in their school environment. This study asked the question, “*How do high school learners from disadvantaged communities in Cape Town, South Africa use free Wi-Fi in a school environment?*”

The sub-question being:

What influence do disadvantaged communities have on high school learners' use of the free Wi-Fi in a school environment?



1.3. PURPOSE OF THE RESEARCH

The purpose of the study is to understand why and how learners engage with the free Wi-Fi in their school environment. Numerous researches have attempted to understand the factors that are conducive for the adoption and of ICTs in school environments (Hart & Laher, 2015; Miller, Naidoo, & van Belle, 2006; Miller et al., 2006). These researches have yielded interesting results. Some of which includes teacher skills, time invested, and infrastructure. However, most of the results have been teacher centred and not on the learners. The purpose of this research is to understand the adoption and use from the learner's perspective.

1.4. RESEARCH AIMS AND OBJECTIVES

The primary aim of this research is to investigate how and why high school learners adopt and use free Wi-Fi in disadvantaged communities. The focus is on how they engage with the Wi-Fi in the school environment.

The main research objective for this study was; *to gain an understanding of the adoption and use of free Wi-Fi in the learning environment amongst high school learners from disadvantaged communities in Cape Town, South Africa*

The sub-objective for this study:

To explore the reasons for engaging with the free Wi-Fi by high school learners from disadvantaged communities in the Cape Town, South Africa.

1.5. SUMMARY OF RESEARCH APPROACH

The research aims to understand and interpret the experiences of high school learners' adoption and ultimate use of free Wi-Fi within their disadvantaged communities. A case study approach using qualitative research methodology was used. Delft in Cape Town was selected for the study. The motivation for the choice Delft is the popularly known for the high crime rate, lack of good quality schools with such conditions Delft would benefit from the adoption and the use of technology in education. Delft was established in the late 1980s as a way for government to provide low cost housing for "coloureds" and "African Blacks". Delft is recorded as Cape

Town's first township of mixed race. The 2011 census recorded the population of Delft as 51% coloureds, 46% African Black and 3% other.

1.6. CONTRIBUTIONS AND SUMMARY OF FINDINGS

The research findings yielded unexpected results. Learners faced numerous challenges in using Wi-Fi; however, they never gave up on it. Some learners were confused with the numerous hotspots that appeared on their phones and constantly tried to log in to most of them. An even fascinating finding is that they wanted the password to the Wi-Fi which was locked and carried the school's name although there were other networks that appear on a user's phone and do not require passwords. Importantly, one of these was Neotel. Neotel in partnership with the Western Cape Government had posters advertising how to connect and use the network, but still learners insisted on connecting to the password protected network

Learners from different grades had different views on the accessing of free Wi-Fi. Grade 8s say they were lured to the school by the principal, claiming the school had access to free Wi-Fi for all students. This has however not been the case as learners are not allowed carrying any electronic gadgets which connect to the Wi-Fi. Grades 10s have limited knowledge of the free Wi-Fi. Although they bring different gadgets to school learners only access the Internet through the use of data bundles.

Grades 12s were confident users of the free Wi-Fi and switched between free "unreliable" Wi-Fi and "affordable Cell C" data bundles. Learners, who wrote the essays, directed their work to the government. They appealed for assistance to fix and offer reliable service as they were young, desperate learners wishing to connect to the Internet to do research and find out what was happening in Africa and around the world.

1.7. EXPECTED RESEARCH OUTCOMES

This study contributes to the body of knowledge by providing empirical evidence on adoption of free Wi-Fi in disadvantaged communities in a school set up. It provides a contribution to theory. The study sought to understand how learners were engaging with free Wi-Fi in disadvantaged communities within the school environment. The key findings reveal frustrations of use from learners, dissatisfaction of the service from the school administrator but high usage statistics from the implementers of the Free Wi-Fi. The quest to understand how learners adopt and use the free Wi-Fi was done by selecting a unique case in a disadvantaged community. To understand the enquiry the domestication theory was used as lens.

implementers to identify discourse amongst free Wi-Fi project objectives, Free Wi-Fi set up and adoption and usage by potential users.

1.8. ASSUMPTION AND LIMITATIONS OF THE STUDY

At the start of data collection assumptions held were that learners had successfully domesticated the Free Wi-Fi and the responses from the learners would have been mainly on how they engage with the service. However, findings yielded different results. Other assumptions are summarised in Table 1.1.

Table 1.1: The researcher's assumption on learner's engagement with the free Wi-Fi.

Assumptions
Learners use the free Wi-Fi in the classrooms for learning.
Learners receive support from the teachers on the adoption and use of the free Wi-Fi.
There is a continuous use of free Wi-Fi from the school to the home environment.

The most significant limitation to the study was the focus on interviews with learners only. Although other data sources such as questionnaire and archival data were used, interviewing the implementers and other stakeholders would have given clearer perspectives on the “frustrations” that the learners had cleared highlighted as their biggest obstacle to adoption and use.

1.9. OVERVIEW OF CHAPTERS

The rest of the dissertation is structured as follows:

Chapter 2 provides the literature review. This chapter begins by defining the concepts of the topic. Schools in Delft suburb in the Western Cape are the locations under study. The socio-economic status of the suburb and quintile status of the schools in these neighbourhoods is discussed. Studies have been conducted on the adoption of free Wi-Fi in disadvantaged communities. The work of previous researches is analysed, focusing on the reasons for awareness, accepting and finally successes and failures of the free Wi-Fi are discussed.

Chapter 3 presents the theoretical framework used to analyse the adoption of free Wi-Fi. The theoretical framework chosen has been employed by other researchers in analysing ICT.



Chapter 4 presents the method that was used in conducting the research. The research paradigm, research strategy used and research instrument is discussed. Data collection and the analysis used in the research are discussed. The timeframe and the confidentiality of the research are also presented.

Chapter 5 describes the case of Delft. Its policies and ICT projects that have been launched at the school in the past are explained.

Chapter 6 discusses the findings mainly answering the research questions and objectives highlighted earlier. The study used thematic analysis and themes that emerged will also be further discussed in this chapter.

Chapter 7 discusses the findings in relation to literature.

Chapter 8 concludes the research and offers recommendations.

CHAPTER 2: LITERATURE REVIEW

This chapter outlines the literature review. The chapter starts by defining what free Wi-Fi is and the different types of Wi-Fi. The chapter continues to outline the reasons for municipalities providing the service in the communities. Success and ultimate factors are discussed. The gaps identified in the literature of understanding the need of free Wi-Fi in disadvantaged communities.

2.1. WHAT IS FREE WI-FI?

Wi-Fi also known as wireless networking is defined as a technology that uses radio waves to connect devices to each other to wireless high speed Internet within a particular location. The connection protocol are based on the Institute of Electrical and Electronic Engineers (IEEE) 802.11 standards registered and trademarked by an organisation called Wi-Fi Alliance (Penttinen, 2015). The organisation is on a quest to endorse the term “Wi-Fi” globally as brand name for any products that are 802.11 Wireless Local Area Network (WLAN) certified (Penttinen, 2015).

The term Wi-Fi has constantly been mistaken as an acronym for “wireless fidelity”. This is a misconception; the term “Wi-Fi” was coined by the founders of the brand. For the purpose of this research the endorsed term will be used. City-wide Wi-Fi under study is based on the 802.11 standards. Wi-Fi will be defined as any device that has the ability to connect as (WLAN) and a wireless access point for free or low cost to provide high-speed Internet access.

Connecting to the Wi-Fi enables a two way communication among devices (Pitkanen, Karkkainen, & Ott, 2010). This connecting does not require physical wired connection but rely on access point (AP).

Figure 2.1 illustrates opportunistically devices communicating among each other when they come into a radio range. Performance of a network is determined by distance of travel of a wireless signal, radius of an area (Zhang, Zhao, Wang, & Liu, 2017) that is inclusive of the number of buildings, large number of electronic gadgets, or a misconfigured network (Akyildiz, Wang, & Wang, 2005).

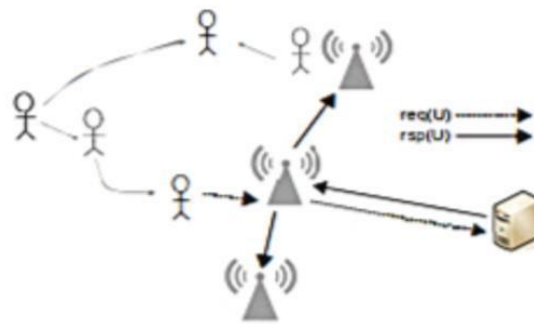


Figure 2.1: Connection Scenario via WLAN Hotspot (Pitkanen et al., 2010).

With reliance of mobile WLANs hotspots in urban environments users are constantly faced with interference from fixed mobile networks APs and within multiple WLANs whilst on the go (Sagari et al., 2013). It is estimated that 70% of the time users are exposed to multiple APs in one location (Zhang et al., 2017). A user could struggle to connect from point A to point B through a dense spectrum and through intra mobile WLAN and mobile WLAN fixed WLAN interference (Dekleva, Shim, Varshney, & Knoerzer, 2007).

Once in the WLAN hotspot coverage, nodes connect via the access points which provide DTN routing. APs holding the required content reply to the requests, these return a DTN messaging overlay for nodes, hotspots and the Internet for devices to select when to use delay-tolerant (Pitkanen et al., 2010).

A blindside is expressed with APs constantly being mistaken for hotspots; the two are different but rely on each other (Jones & Liu, 2007). A hotspot is an actual physical location or hardware that enables Wi-Fi enabled devices to connect via a WLAN to the Internet with use of a router connected to a preferred Internet Service Provider (ISP) (Jobin, Faloutsos, Tripathi & Krishnmurthy, 2004). Through the use of mobile hotspots cellular users are able to use Wi-Fi enabled devices whilst on the move, with the connection enabled by high speed Internet speeds of 3-6 Megabytes per second (Mbps) uplink and 10 – 20 Mbps downlink available on 4G, LTE cellular services (Hiertz et al., 2010; Sagari et al., 2013).

However, with reliance of mobile WLANs hotspots in urban environments users are constantly faced with interference from fixed mobile networks APs and within multiple WLANs (Sagari et al., 2013). A user can move from point A to point B through a dense spectrum and the intra mobile WLAN and mobile WLAN fixed WLAN interference (Hiertz et al., 2010).

The reliance and quality for users is compromised with the interference depicted. APs are deployed in congested and economically viable areas and this allows users firstly, in the same

area to connect to different Wi-Fi networks. Secondly to establish device to device communications with other users (Zhang et al., 2017).

Connecting follows steps which require a device to identify to the nearest hotspot. After identifying the hotspot can require access through means of a password. Connecting through this path requires either Wi-Fi Protected Access (WPA) or Wi-Fi Protected Access 2 (WPA2) which offer security for the data sent through this route (Jones & Liu, 2007). However, most hotspots are not secure and users can access the Internet without means of a password and data sent through this route is not unencrypted. The steps to connecting according to the Western Cape Government (2017) are:

- On the device settings, Wi-Fi needs to be enabled
- Search for Wi-Fi networks
- Select the desired network hotspot
- Click connect
- then browsing begins

2.2. DIFFERENT TYPES OF WIRELESS NETWORKS

The different types of wireless networks are Wireless Local Area Network (WLAN), Personal Area Networks (PAN), Metropolitan Area Networks (MAN), and Wide Area Networks (WAN). WLAN is used to describe Wi-Fi. Table 2.1 summaries of the different networks. The networks are able to work interdependently (Dekleva et al., 2007).

The design Wi-Fi networks afford open access so as to rely on radio waves to transport data (Gunasekaran & Harmantzis, 2007). Waves then indicate their presence within an area by announcing through beaconing a Service Set Identifier (SSID), SSID then identifies the name of the network (Barken, 2004). Finally, a compliant gadget can request an IP address to connect to a network with a good strength signal (Barken, 2004; Torrens, 2008).

Table 2.1: Different types of networks (Deng, Chen & Cheng, 2014).

	Personal Area Network (PAN)	Local Area Network (LAN)	Metropolitan Area Network (MAN)	Wide Area Network (WAN)
Technology	Bluetooth Ultra-wideband (UWB)	802.11b 802.11a 802.11g a.k.a. Wi-Fi	802.16 802.16a 802.16e a.k.a. WiMAX	GSM GPRS CDMA 2.5G 3.5G
Data rates	Medium data rates 1Mbps to 2Mbps	High data rates 11Mbps to 54Mbps	Very high data rates Quality of service up to 268Mbps	Low to medium data rates 10Kbps to 2.4Mbps
Range	Very short range 3m (~10 feet)	Short range 100m (~300 feet)	Medium range 50km (~31 miles)	Long range Global
Connectivity	Notebook to PC to peripherals Devices to systems	Computer to computer and the Internet	LAN or computer to high-speed wire line Internet	Smart phones and PDAs to WANs and the Internet

WLAN uses low cost hardware that offers flexibility, efficiency, and mobility for end user connectivity. Users allow local area to form a network to access the Internet. WLAN continues to evolve. There is advanced research work that explains efforts in design systems that enhances the network performance (Deng, Chen, & Cheng, 2014; Phung et al., 2015). The WLAN system has a Basic Service Sets (BSSs) which is the basic building block with each covering; in infrastructure mode one AP. An Extended Service Sets (ESSs) consists of two or more or more BSS with limited mobility and sharing the same service set identifier (SSI / network name) (Krishan & Laxmi, 2015). These are popular in university campuses or close knit communities. A network can be locked which means it is privately owned or open that means anyone can access it (Penttinen, 2015; Torrens, 2008).

Not to be confused with one of the networks explained, a Wireless Mesh Architecture (WMN) is emerging communication architecture. Figure 2.2 illustrates a WMN which consists of services layer Municipal Wireless Networks (MWN) which carries data to the core layer MWN over long distances (Sirbu et al., 2006) WMN provide low cost connections which allow users to connect stationary or mobile or form a mesh amongst themselves (Akyildiz et al., 2005).

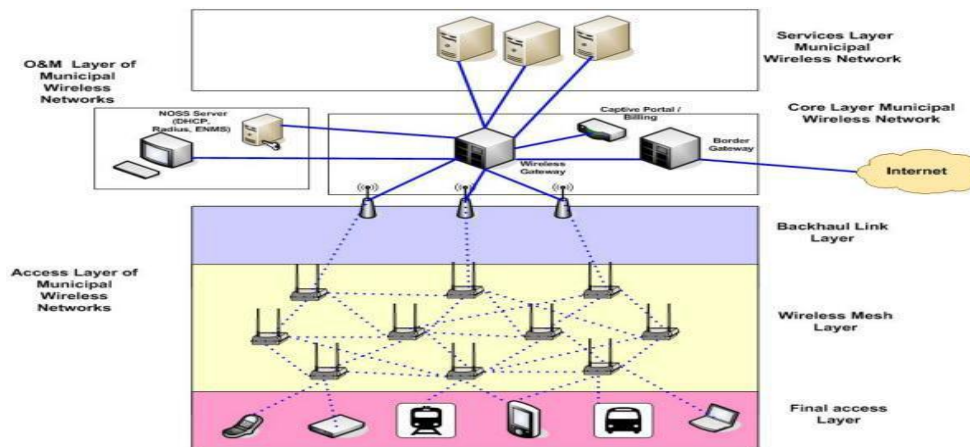


Figure 2.2: WMA with municipality built (Sirbu et al., 2006).

Municipality Wi-Fi services are built on WMNs because they have the ability to cover a large metropolitan area. WMN have three approaches, i) use of a single base to cover an area, ii) use of multiple cells with each interconnected to a wired network iii) wireless end points are linked to each other then again to the wired network (Akyildiz et al., 2005; Sirbu et al., 2006).

2.3. MUNICIPALITIES OFFERING FREE WI-FI

Metro-wide, Citywide or Muni-Fi is the usage of wireless technology through wireless networks to provide broadband coverage over specified municipal metropolitan areas (Crawley, 2015). For municipalities, the choice of free Wi-Fi has been popular to serve communities because of its licence free mode of operation and, lower costs of installation (Hu, 2014) and its wide coverage that it can be used and openly accessed by a large number of citizens (Wang et al., 2016). From its inception municipalities' aim of offering free Wi-Fi has been to provide new experience of Internet access for the citizens (Bar & Park, 2006; Hu, 2014). There are a variety of goals; including the following:

- i. need to bridge digital divide (Gibbons & Ruth, 2006; Heer et al., 2010; Ortiz & Tapia, 2008),
- ii. support economic growth (Gunasekaran & Harmantzis, 2007; Stelzner, 2015) &
- iii. increase efficiency in selected cities (Tapia, Maitland, & Stone, 2006).

From the early 2000s, cities around the world began projects of constructing city wide Wi-Fi networks. Singapore, Taipei, San Francisco, Philadelphia Florida and St Cloud, Perth, and London were amongst the first and most popular to offer free Wi-Fi within their communities (Crawley, 2015; Gunasekaran & Harmantzis, 2007; Hu, 2014). Some of these projects have

failed (Frazer, 2009; Hudson, 2010), whilst others have continued to foster forward with Private Public Partnership (PPPs) for municipal wireless (Girth, 2014).

Previous studies have focused on these developed and semi-developed cities but little research has focused on municipalities offering Wi-Fi in cities in South Africa and in particular underprivileged communities (Chigona, Mudavanhu, Siebritz, & Amerika, 2016). Recently, Chigona et al., (2016) studied the adoption of free Wi-Fi in disadvantaged communities in Cape Town, however the research further recommends on future research to focus on these communities using longitudinal timeframe.

2.4. DIGITAL DIVIDE

Digital divide happens when a group of people are unable to access the Internet they lack the skills of embracing the “the knowledge base economy” Merrit (2012). Wi-Fi provided by municipalities to disadvantaged populations is expected to ultimately close this gap with what has been termed digital-divide-justification. Accessing the Internet has always been viewed as an expensive luxury that is necessary to improve earning power. That earning power has long been held back for some citizens, however with the intervention of free Wi-Fi Internet access is possible for all (Gibbons & Ruth, 2006). The gap of the “haves” and “have not’s” widens both in technical competence and information literacy (Ortiz & Tapia, 2008) The choice of the network allows municipalities to offer broadband at very low prices or in the case of free Wi-Fi at no charge to try and bridge the gaps created (Gibbons & Ruth, 2006). Internet access and ICTs are considered crucial in enhancing social, economic, and educational lives of citizens.

2.4.1. DATA COSTS

High costs of data packages (or popularly known as data bundles) have been fingered as the one of the highest contributors of digital divide Africa. Most low-income earners use prepaid data services to access the Internet in Africa (Esselaar, Stork, Chair, & Kahn, 2016).

Research ICT Africa (RIA) in their 2016 third quarterly report; revealed the prices offered by 50 African countries the cost of one gigabyte (1GB) on prepaid and bundle rates (Mochiko, 2016).

Table 2.2: Cost of prepaid & bundle rates in African countries (Mochiko, 2016).

THE COST OF 1GB			
Prepaid and bundle rates		Q3 2016 (US\$)	Q3 2016 (R)
	Mozambique	2.27	30.16
	Tanzania	2.39	31.75
	Ghana	2.54	33.74
	Egypt	2.82	37.46
	Nigeria	3.25	43.18
	Guinea	3.35	44.50
	Uganda	3.59	47.69
	Rwanda	3.91	51.94
	Tunisia	4.54	60.32
	Cape Verde	4.97	66.03
	Liberia	5.0	66.44
	Kenya	5.02	66.70
	Niger	5.1	67.77
	Morocco	5.16	68.57
	Burundi	5.46	72.56
	Sudan	5.64	74.95
	Namibia	5.83	77.47
	Gambia	6.55	87.05
	Mauritius	6.61	87.84
	Malawi	6.73	89.44
	Cameroon	6.8	90.36
	SA	7.04	93.55
	Lesotho	7.11	94.47

Table 2.2 shows that in the third quarter of 2016, South African average price was R93.55 placing it 22nd spot out of the 50 countries (Mochiko, 2016). Vodacom a South African service provider (Esselaar et al., 2016), which operates in Mozambique, was the cheapest with an average of R30.16 (Mochiko, 2016). Although the comparisons is a fair representation and perspective of African countries; converting the prices against the United States dollar (US\$) and in Rands, does not take into consideration the cost of living of the comparative countries.

2.4.2. SUCCESS AND ULTIMATE FAILURE OF FREE WI-FI

A common example of a PPP is Toronto, Canada’s largest metro-wide Internet access which partnered with Ernest & Young (Crawley, 2015; Powell & Shade, 2006). London’s Internet access Wi-Fi robust partnered with The Cloud; it has been described as the most robust in the world (Crawley, 2015). In Africa and other developing countries providing Wi-Fi for citizens has continued. In South Africa, the Knysna municipality partnered with WISP UniNet (van Gorp & Morris, 2008) and City of Tshwane partnered Project Isizwe (ProjectIsizwe, 2017), with and

have been the most successful projects, both serving under-serviced areas (van Gorp & Morris, 2008).

Some projects as highlighted earlier have continued to thrive but others have dismally failed (Frazer, 2009). This has led to an on-going debate with some researchers supporting the projects (Crawley, 2015) while other researchers continually “spell doom” for Wi-Fi projects (Frazer, 2009; Gillett, 2006). Researchers have continued to argue against offering Wi-Fi for free; claiming that it was an unsustainable exercise (Frazer, 2009). These are projects that had dismally failed in developed countries (Bar & Park, 2006; Crawley, 2015), but were being revived 15 years later in South Africa.

2.5. DISADVANTAGED COMMUNITIES IN SOUTH AFRICA

Disadvantaged communities popularly known as townships in South Africa (Jürgens, Donaldson, Rule, & Bähr, 2013) are by-products of the apartheid regime whose policies came into effect from the Dutch settlers between 1948-1994 (Clark & Worger, 2016). These segregationist policies took the natives assets’ especially land, distorted economic markets through racial bias which destabilised the country (Clark & Worger, 2016). Further, asset base of individuals and communities were degraded leading to ultimate nature of poverty in South Africa. The core of the apartheid policy which was racial segregation successfully moved the so called Black Africans, Coloured and Indians to less economically viable areas which were crowded (Clark & Worger, 2016; Jürgens et al., 2013).

Post-apartheid, that little has been done to improve and intergrate people from the past structures, improve on businesses and the general well-being of the dwellers from these communities (Christopher, 2005). Efforts of the people are still clouded and controlled by numerous restrictions and this has led to numerous violent service delivery strikes (Mkhize, 2015). Some argue that post- apartheid has been marred by violent crimes (Singh, 2016), drug use, alcohol abuse and teenagers lack of opportunities (Kaminer & Gillan, 2016). While some argue that the most significant changes have been the successful start and progression of numerous government sponsored ICT project targeting learners (Hodgkinson et al., 2007).

2.5.1. ICTS AND DISADVANTAGED COMMUNITIES

Debates continue on the role of ICTs among individuals in disadvantaged communities and their connection to poverty alleviation. Some of these arguments include the selection of who is considered poor and how they should benefit from the growth of ICTs (May & Diga, 2015).



Others are optimistic of the potential economic prospects both for social and business relations among individuals and national economies amongst these marginalised communities (Oliner & Sichel, 2000). Computer Applications Technology (CAT), is a new subject (also a subset of ICT projects) in the school curriculum which aims at developing ICTs skills with Microsoft packages Word, Excel, Access, Outlook, PowerPoint and basic webpage design HTML (Igshaan, 2016). It was at a learner's discretion to take on the subject. From the groups interviewed only one learner in Grade 12 was studying CAT.

Positive effect of ICTs in South Africa's disadvantaged communities has been minimal. ICTs that have been injected into communities have included but not limited to Telecentres, provision of computer labs in schools and numerous free Wi-Fi zones. The success or failure of ICTs is affected by three elements poor access, ownership and usage all dependant on affordability. Similar findings have been observed by Barrantes & Galperin (2008).

2.5.2. SCHOOLS IN DISADVANTAGED COMMUNITIES

More measures in the education sector to redress the imbalances created during the apartheid era have been created targeting schools that focuses equity in school funding (Badat & Sayed, 2014). The most significant has been the national norms and standards for schools (NNSSF) where schools are placed under a quintile system ranked one to five (Mestry & Ndhlovu, 2014).

Quintile system addresses schools at the extremes (Q1-Q5). Low is identified by Q1 and Q2, whilst medium is Q3 and finally Q4 and Q5 high. Schools in disadvantaged communities are in the low quintile whilst affluent school are the extreme high (Mestry & Ndhlovu, 2014). This measure is determined by three poverty measures levels income, unemployment and level of education of the community (Sayed, 2016). Table 2.3 shows nine provinces and in the Western Cape, 8.6% of the learners are in the poorest. However, the Western Cape has the lowest poverty rates compared to other provinces (Western Cape Government, 2014).

Table 2.3: The provincial breakdown of the quintiles (Western Cape Government, 2014).

National Poverty table for 2014					
	National Quintiles				
	1	2	3	4	5
EC	27.3%	24.7%	19.6%	17.0%	11.4%
FC	20.5%	20.9%	22.4%	20.8%	15.4%
GP	14.1%	14.7%	17.9%	21.9%	31.4
KN	22.1%	23.2%	20.2%	18.7%	15.8%
LP	28.2%	24.6%	24.2%	14.9%	8.0%
MP	23.1%	24.1%	21.5%	17.7%	13.5%
NC	21.5%	19.3%	20.7%	21.4%	17.1%
NW	25.6%	22.3%	20.8%	17.6%	13.7%
WC	8.6%	13.3%	18.4%	28.0%	31.7%
SA	20.0%	20.0%	20.0%	20.0%	20.0%

Numerous arguments have been raised around the quintile system failing poor learners and continuously empowering privileged schools (Sayed, 2016). This has been challenged as the NSSF policy outlines that schools in Q1 receive seven times more state funding than schools in Quintile 5. Further arguments state that Q1 and Q2 receive “adequacy benchmark” amount more than their counterparts (Mestry & Bisschoff, 2009).

This is in light of the fact that communities are placed in Living Standards Measure (LSM). (Foundation, 2016), explains that the LSM; is divided into 10 groups, 1 being the lowest and 10 the highest, these measuring the socio-economic status of a population. Low income households are in level, 1-4, middle 5-7 and high income households represented by 8-10 (Badat & Sayed, 2014; Mestry & Ndhlovu, 2014).

2.5.3. PERFORMANCE INDICATORS FOR SCHOOLS

Middle income countries including South Africa participate in cross national assessments of educational achievements (Spaull, 2013a). There are three international tests of educational achievement which South Africa participants in:

- a) Trends in International Mathematics and Science Study (TIMSS),
- b) Progress in International Reading literacy study (PIRLS), and
- c) The Southern and Eastern Consortium for monitoring Evaluation (SACMEQ).

Achievement tests rank learners against each other locally and with other African countries. SACMEQ tests Grade 6 learners’ literacy. This is a crucial test for most learners as there is one year to perform well before they enter into the 1st year of high school in Grade 8 (Badat & Sayed,

2014). The SACMEQ 2000 and 2007 revealed that most South African learners were illiterate for Grade 6 and these learners were from Quintile 1 to 3 schools (Spaull, 2013a).

TIMSS tests mathematics to the new entrants into high school. Grade 8 learners in their 1st year of high school and Grade 9s in the second year of high school. In the 2007 results showed that learners from Quintile I performed three years behind than their counterparts in South Africa in Quintile 5. These poor performing learners usually drop out either in their third year of high school in Grade 10 or the following year in Grade 11 (Anderson, Case, & Lam, 2001). Few learners that struggled and participated in these tests sit the National senior certificate also known as Grade 12 the senior year of high school or the Matric year. In all the evaluations, South Africa performed worse than countries that are considered low income or poor (Spaull, 2013a). Anderson et al., (2001) attributes this poor performance to lack of support from the family structure.

2.6. THE RESEARCH GAP

It was crucial to embark on this research that answers several questions. Aforementioned research work discussed developed countries such as USA and Canada (Crawley, 2015). A recent study filled the gap by understanding the adoption and use in disadvantaged communities in the Cape Town. Through interviews, the research identified that learners used the free Wi-Fi for research and preparing for classes respectively. Users were able to access the free Wi-Fi in libraries (Chigona et al., 2016). This assumption is that where the free Wi-Fi has been launched in disadvantaged communities' adoption and use is guaranteed.

This research aims to give insight into how and why high schools adopt free Wi-Fi in a school environment particularly in disadvantaged communities.

2.7. SUMMARY OF THE CHAPTER

This review explains that Wi-Fi alliance has endorsed the name Wi-Fi to refer to any products that are 802.11 certified. Connecting to the Wi-Fi requires a user's device and stable connection. However, the existence of numerous AP in a user's range the user can be disruptive and compromise a smooth connection. Steps to connecting to the Wi-Fi requires WPA or WPA2 path

A municipality offering free Wi-Fi to their communities is not a new concept. Most of those projects have failed whilst only a few have continued to serve their communities. Municipalities' goals for offering free Wi-Fi has been a need to bridge digital divide, support economic growth,



and increase efficiency. Bridging digital divide a common motivating factor, is viewed as crucial in empowering and providing a service that is costly for most citizens living below the poverty line. Data costs in South Africa have been blamed for contributing to digital divide.

Disadvantaged communities in South Africa are a by-product of the apartheid era that ended in 1994. Post-apartheid some effects and traces can still be visible. Despite harsh conditions the government has placed measures to assist in the change and assist the growth of the communities. The solution has been ICTs and these have targeted schools. However, some researchers argue on the effectiveness of these ICT interventions. Schools which have been recipients have been mostly from disadvantaged communities. Schools in South Africa are placed in Quintiles 1-5. Quintiles 1-3 are called the no fee schools and the government gives an allowance for each learner towards the school. This system has been controversial from its inception. NNSF as it has been named has been mostly criticised for attracting unqualified teachers and offering sub-standard education to learners.

The chapter closed with the research gap. Research has focused on affluent areas and very little on disadvantaged communities especially among learners.

CHAPTER 3: THEORETICAL FRAMEWORK

A theoretical framework has been used to guide this research. Different number of frameworks could have been used to study, however they had limitations that were identified. Ultimately the domestication framework was chosen as lens for this study. The explanation of this choice will be explored in this chapter.

3.1. ADOPTION THEORIES

There are a number of theories explaining the adoption of ICTs (Korpelainen, 2011). The challenges with adoption include the lack of making a distinction between individuals pre and post adoption beliefs and attitudes (Karahanna, Straub, & Chervany, 1999). Further, suppliers' of ICT products lack the vision of their targeted audiences, therefore approaches needing a comprehensive approach (Verdegem & De Marez, 2011). This has applied within the discipline of IS / IT and outside where several models have been constructed that could assist the researcher to explore the Wi-Fi adoption experiences of learners within their communities.

Individual level adoption and use were the focus of this study in a school context thereby eliminating organisational adoption and use approaches. ICT adoption and use at individual level follows three processes, depicted in the figure 3.1 is pre-adoption, adoption and post adoption (Kim & Crowston, 2011).



Figure 3.1: ICT Adoption and use processes (Kim & Crowston, 2011).

- **Pre-adoption-** sees a potential user examine and consider a technology.
- **Adoption-** is when intention to use is created leading to the actual purchase and use.
- **Post-adoption-** users continue use or reject a technology. In post adoption once a technology is rejected a new one to replace the rejected is sought.

Different adoption and use research theories have played a role of guiding research design and interpret results (Kim & Crowston, 2011). Kim & Crowston (2011) explains ICT adoption

theories that were considered but not applied for this research. Presented are Technology acceptance model (TAM), Theory of planned behaviour (TPB), Unified theory of acceptance and use model (UTAUT), Digital competence assessment framework, and Information systems success model. The models presented guide researches on people's intentions to take on a technology and ultimately use it. Table 3.1 summaries the theories that were considered for this research. Appendix A shows the images of the theories

Table 3.1: ICT Adoption theories

Model	Authors	Description	Limitations
Technology Acceptance Model (TAM)	Venkatesh & Davis (2000).	<ul style="list-style-type: none"> Explains and predict the sometimes acceptance and sometimes rejection of Information Systems (IS) Predicts the intentions of IS 	Limited explanation & lack of practical application
Theory of Planned Behaviour (TRA)	Madden, Ellen & Ajzen (1992).	<ul style="list-style-type: none"> Explains the relationships between attitudes and behaviours within human action 	Focuses on the adoption and use of technologies at an organisational level.
Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh & Davis (2000).	<ul style="list-style-type: none"> Acceptance of the use of information Managers and decision makers use the framework to analyse the success of a technology introduced in an organisation Answers what the user's attitude towards accepting ICT solution is. 	No Cohesion, constructs are analysed independently
The Digital Competence Assessment Framework	Ferrari (2012).	<ul style="list-style-type: none"> Framework is used as a project on Internet and schools. Problems of Accessibility, Equality Policies and Information Management Framework proposes a definition and conceptualisation of Digital Competence which is linked in a series of tests generally aimed at secondary school Students (15-16 year olds) 	Applicable for short term ICT launch projects
Information Systems Success Model	Delone & Mclean (1992).	<ul style="list-style-type: none"> Literature on IS success and categorized success measures into six major categories: system quality, information quality, use, user satisfaction, individual impact, and organisational impact. Focus of the analysis is on critical success factors in ICT implementation in organisations. 	Organisation focused and not on Individuals
Diffusion of Innovations	Moore & Benbasat (1991).	<ul style="list-style-type: none"> designed to measure the various perceptions that an individual may have of adopting an information technology (IT) innovation Intended to be a tool for the study of the initial adoption and subsequent diffusion of IT innovations within organisations. 	Applies only in Initial adoption. Disregards Post adoption.

Whilst the theories mentioned in Table 3.1 could have been considered for this study, they had numerous limitations. It should be noted that the research is focusing on adoption and use of free Wi-Fi amongst individuals. Theories displayed miss out on the post adoption of a technology. They fail to answer the question of whether a user will continue using a technology and ultimately share experiences with others or not do anything.

Kim & Crowston, 2011 who studied ICT adoption and use in depth identified that the theories tabled approach a technology as a cognitive process. It assumes a user constantly views at what stage of adoption they are in rather than a continuous process between a user and a technology.

3.2. CHOICE OF DOMESTICATION THEORY

Domestication theory follows an individual's adoption and use making it the ideal choice for this study. The theory aligned with the objectives of the study which intend on understanding how individuals adopt technology into their environment. Domestication theory in this study answers the questions of how and why learners' experience and give meaning to free Wi-Fi in their lives in their communities.

Domestication theory has its roots in media studies; where people and the consumption of media in their chosen environment were studied (Silverstone & Haddon, 1996). Traditionally, domestication is the taming of a pet or animal (Berker, Hartmann, Punie, & Ward, 2006). In the context of this research, domestication looks at social shaping of technology; describing the progression of Wi-Fi as entering a home unknown ("wild"), integrated into everyday of users (Haddon, 2007). Domestication framework approach views technologies as to being defined by social settings than by the technological make-up (Haddon, 2007).

3.2.1. PREVIOUS STUDIES AND DOMESTICATION THEORY

Other authors that have employed the framework as depicted in Table 3.2. The theory has been applied in other fields such as Information Systems, where it has been used to mostly study ICT (Chigona et al., 2010; Chigona et al., 2016; Donner, Gitau, & Marsden, 2011). These studies have noted that ICTs can go through all the stages and two possibilities arise; users can either accept or reject the technology (Haddon, 2007).

Table 3.2: Authors that used the domestication theory

Author	Title	Area of application
Chigona, Mudavanhu, Siebritz & Amerika (2016).	Domestication of free Wi-Fi amongst people living in disadvantaged communities in the Western Cape of South Africa	Adoption and use of free Wi-Fi in disadvantaged communities.
Letsi, Kabanda & Chigona (2015).	Economically disadvantaged families domesticating mobile devices	Use of phones in the home in economically disadvantaged homes.
Chigona (2015).	Teacher education students' domestication of ICTs for teaching and learning	Prospective teachers domestication of ICTs for learning and teaching.
Cantrell (2011).	Factors influencing the integration of the learning process in South Africa, Western Cape	Challenges with the integration of computers in schools.
Donner, Gitau & Marsden (2011).	Exploring mobile-only Internet use: Results of a training study in Urban South Africa	Challenges, practices and emergent framings of mobile only Internet use.
Chigona, Chigona, Kayongo & Kausa (2010).	An empirical survey on domestication of ICT in schools in disadvantaged communities in South Africa	Appropriation of ICTs in curriculum delivery in disadvantaged communities

Understanding how the user integrates a technology into their environment is the core of this theory (Hynes & Richardson, 2009) in this study gave an understanding of how users which are learners integrated free Wi-Fi into their daily lives in their environment which has been highlighted as “disadvantaged communities”. The framework has enabled the researcher to capture the adoption experiences of the learners and successfully guide the study as previous researchers have done.

3.2.2. APPLICATION OF THEORY

Studies mentioned in Table 3.2 have used the framework to study ICTs within the home environment. Earlier studies used the framework to study adoption of televisions and computers (Haddon, 2007). The uncertainty of television technologies has been conquered. This study drew on the uniqueness of the framework by investigating the adoption and use of free Wi-Fi outside the home set up into the school environment. I further show the uniqueness of the framework in the study by using focus groups. Further, outside the home set-up where family members share experiences a home set-up in this research I place individuals in focus groups.

3.3. DOMESTICATION THEORY EXPLAINED

Domestication theory explains how a technology goes through a flow of linked stages as depicted in Figure 3.2 These stages are commodification, appropriation can be divided into objectification and incorporation and the final stage conversion.

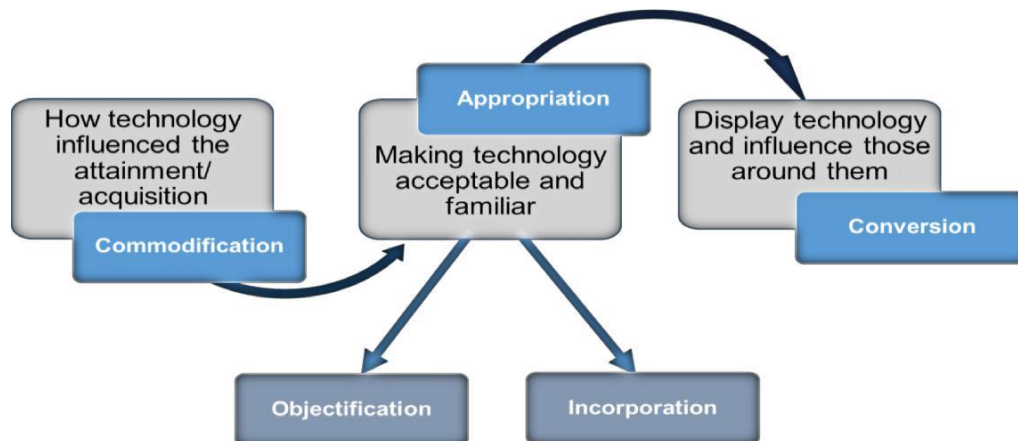


Figure 3.2: Domestication framework (Silverstone, Hirsch & Morley, 1992).

Commodification is the first stage in the domestication process; in this stage the technology is given an image by individuals. Commodification takes the form of methods used to lure or make a technology attractive for potential users to take up (Habib & Sonneland, 2010). This is at a point when a technology is unveiled to the public. This stage highlights on the importance of advertising; since advertising helps frame the technology (Chigona et al., 2010).

Appropriation After the technology has been heard of and purchased it goes through an *appropriation* phase where it is actually integrated into the environment and possessed by the user (Chigona et al., 2016). Appropriation is when a technology is taken, owned, and given

meaning. In this study, Wi-Fi is appropriated in the learner's environment. Habib & Sonneland (2010) suggested two sub-phases at this stage which are dependent on appropriation:

- Objectification – the technology becomes physically fully integrated into the environment (Habib & Sonneland, 2010).
- Incorporation - the technology becomes socially fully integrated into the individual's everyday life (Habib & Sonneland, 2010).

Conversion This is the final stage where the technology moves from the appropriation stage to physically show the adoption by way of displaying and showing off the technology in public (Letsie, Kabanda, & Chigona, 2015). Conversion is the stage which determines the ICTs growth and development in the future (Engen & Johannesen, 2012; Habib & Sonneland, 2010).

3.4. SUMMARY OF THE CHAPTER

There are numerous theories that have been used in research to study adoption and use of ICTs. Some of these theories discussed are TAM, TRA, UTAUT, The digital competence assessment framework and the Information Systems success model. None of the frameworks were suitable for the objectives the research intended to meet. An example is TAM and TRA which have been used to mostly understand adoption and use within organisations and not suitable for a school environment.

The choice of domestication was in line with the objectives of the study. The theory has its roots in media studies and has spread to be used in other fields such as IS. Its popularity has been used to study ICTs different communities including a disadvantaged community which is in line with this study. The uniqueness of the application of the theory was identified. Traditionally the domestication framework has been used to follow the adoption and use of ICTs inside the home. In this research the framework was taken outside the home and inside the school environment. This is a breakaway from how families intergrate and tame the ICTs into their homes. Unlike in the family the relation the learners share is school mates.

The chapter closed with the explanation of the theory. Domestication theory has three main phases. Silverstone (1992) explains the phases of domestication as: **Commodification** ownership or method of acquiring **Appropriation** is sub-divided into **Objectification** (display through physical integration) and **Incorporation** (Inclusion into daily routines, social inclusion). The last stage is **Conversion** (showing off the technology, taking it back to the public realm).

CHAPTER 4: RESEARCH DESIGN

The research design has the purpose of drawing a map to show the purpose and steps to be followed in a research journey. (Maxwell, 2013, p. 18) explains that the purpose of a good research design “will help to safely and efficiently reach its destination”. The research design and methodology will be explained in the following sections.

4.1. OVERVIEW OF THE DESIGN

The study used an interpretive epistemology within a cross-sectional timeframe. The framework was chosen due to time constraints of the research. Appendix K presents the schedule for the studies. The unit of analysis was a group and in this study they were grouped in a “Grade”. The study was deductive because it used the domestication theory.

4.2. ONTOLOGY AND EPISTEMOLOGY

Ontology is the “analytical view of the fundamental nature of the universe and all its components. It systematically describes how diverse communities have looked at reality in different eras” (Kroeze, 2011). In other words, ontology explains the nature of reality probing if social entities are objective or subjective in nature (Saunders, Lewis, & Thornhill, 2015).

This study followed the subjectivism stance. Subjectivism posits that a phenomenon can be explained from perceptions formed by actors directly involved within a social setting. Actors continue to give meaning to the phenomenon under study through their experiences that can be followed by a researcher (Wahyuni, 2012).

Epistemological stance is taken to set tone of a research. In IS epistemology discusses various paradigms and approaches to be applied in research (Becker & Niehaves, 2007). The three most common that will be further explained are positivist, critical, and Interpretivist.

Positivism follows the path of a hypothetical deductive approach. Positivists have the belief that the world is external and objective focusing on facts and uses quantitative methods of analysis of data (Gray, 2014).

This leads to findings being based on using scientific methods to enquire on a phenomenon, its properties, and relations (Tsang, 2014).

Critical advocates for change. It challenges the status quo by emancipating (Wahyuni, 2012). It has however been overshadowed by the popularity of the Interpretivist and the positivist stances (Chen & Hirschheim, 2004).

Interpretive was adopted for this research. Interpretive studies the nature of reality in human interpretations and meanings rooted in internal realism (Walsham, 1995).

It is important that the phenomenon is analysed in its natural habitat to analyse subjective situations to derive socially constructed meanings and experiences (Kroeze, 2011). Myers (2009) explains that researchers following the Interpretivist paradigm assume that reality is socially constructed from the experiences of the people. Experiences are derived from language, shared meanings, and instruments. Different researchers can interpret the behaviours of people within their environment in various ways (Saunders et al., 2015).

The research follows the adoption and use of free Wi-Fi within a social setting using a theoretical framework as its lens. The motivation for use of a theoretical framework stems from the motivation that to explore an Interpretive one of crucial steps to follow is to use theoretical framework that draws from accounts from previous knowledge and create a sensible theoretical basis (Walsham, 1995).

4.3. CASE RESEARCH STRATEGY AND DESIGN

Case studies are commonly used qualitative method in IS. A selected case study should have a high potential of yielding appropriate results that can enrich research (Yin, 2003). However, there are misunderstandings on the name, what defines a case study and the perceptions of case study being either or both a method and a methodology (Creswell, 2014; Flyvbjerg, 2006; Stake, 1995).

However, it is generally agreed that a case study allows researchers to discover individuals in their communities, through their interactions and relationships (Yin, 2013) about a phenomenon under study. Yin (2014) views a case as focusing on the scope, processes and method, whilst explaining the phenomena under study as important and the importance of the context of the case. Free Wi-Fi in disadvantaged communities in South Africa in Cape Town is a contemporary phenomenon that necessitates the use of a case study inquiry.

Yin (2003) argues that a case study should be considered when:

- a) The study answers “how” and “why” questions

- b) Participants under study cannot be manipulated
- c) There is a need to contextual conditions that are relevant to the phenomenon
- d) There is no clear boundary between the phenomenon and the context.

This study sought to determine how learners engaged with the free Wi-Fi and what influenced the decision they chose. The context of the case (as described in the literature review) influences the success or failure by learners to engage with the free Wi-Fi. The context thereby gave a true reflection of how the learners engaged with the free Wi-Fi.

4.3.1. NUMBER OF CASES IN THE STUDY

The study used a single case design. Yin (2003) explains that researchers need to be prudent when choosing a single case and if better understanding will be gained from though choosing multiple cases. The case was chosen for its uniqueness. The school was the first to receive the service of free Wi-Fi in the seven locations of Delft. This consequently, led to the richness of the case.

4.3.2. CASE SAMPLING TECHNIQUE

Purposive sampling has been chosen for this study. Purposive sampling is a technique widely used for qualitative research. It allows for the selection of information-rich case using the most effective resources (Palinkas et al., 2013). One of the key areas of purposive sampling is selecting knowledgeable individuals or groups that will impart accurate information or experienced with the phenomenon (Palinkas et al., 2013). Taking from this, the community and the school were selected purposively.

The school selected is located in a disadvantaged community, on line with the research topic. School is in a mixed race neighbourhood. The literature review explained the quintile rank that the schools in Cape Town have been placed in. Table 2.3 explained the quintile system that was used to categorise and confirm that the school selected in the lower quintile thereby justifying categorising them as “disadvantaged”. All these had potential to produce rich results.

4.4. RESEARCH SAMPLE

After briefing the school administrator, deputy principal and head teacher of the research topic, research question and the objectives, the school selected the learners of their choice to participate in the study. The message was announced on the Pro Audio system (PA system) for learners who were interested on the topic to volunteer but that the final selection will be done by a teacher.



The research sample focused on:

- a. **Grade:** included age, and experience in the school environment.
- b. **Gender:** different genders experiences of technology and application differ. Contradictory research has revealed diverse motivation and uses of technology (Kimbrough, Guadagno, Muscanell, & Dill, 2013).
- c. **Race:** The make-up of the community has a mixture of races mostly Black African and Coloureds (Frith, 2011).

4.5. NEGOTIATING ACCESS

A meeting was held with 26 learners that had volunteered two weeks prior to the start of the interviews. The meeting with the 26 was also used as a pilot on their understanding and interest on the topic. Learners were keen on the study and posed numerous questions on both the study and what the menu for the meetings would be. Research was explained in detail to the learners and what their role was going to be. However, when the official meetings started the number had dropped to 22.

The pilot study yielded good results in the form of a question. Learners posed the question “*Have you come to give us the password to the free Wi-Fi*”. The answer to this question took five days to answer and understand what they meant.

4.6. DATA COLLECTION TECHNIQUES

Numerous data collection techniques were used. These were focus group interviews, written essays, questionnaire, interview, field notes and participant observation. Table 4.1 summaries the primary and secondary techniques.

Table 4.1: Data collection techniques employed

Method	Respondent/s	Advantages
Primary		
Focus group interviews	Learners in Grade 8-12	<ul style="list-style-type: none">Detailed opinions and perceptions shared within the group
Written essays	Learners in Grade 8	<ul style="list-style-type: none">Comfortable method of self-expression without guidance
Secondary		
Questionnaire	School administrator	<ul style="list-style-type: none">Easy to answer
Follow up Interview	School administrator	<ul style="list-style-type: none">In depth explanations
Email conversations	Western Cape Government representative	<ul style="list-style-type: none">Ability to produce evidence
Field Notes	Personal	<ul style="list-style-type: none">Identify omitted facts
Observations	Personal	<ul style="list-style-type: none">Clear perspectives of surroundings
Experimentation	Personal	<ul style="list-style-type: none">Controlling variables to get intended or anticipated output

Use of multiple methods to collect data in case study is encouraged and found to provide a comprehensive view of the phenomena under-study (Stake, 1995; Yin, 2013). The most common include interviews and focus groups, observations, documents, and exploring artefacts depending on the research purpose and design (Stake, 1995).

Semi structured focus group interviews from learners were the primary sources of data collection. Written essays, a questionnaire administered to the school administrator and email conversations were secondary data sources. This data was collected from the 17th of March to the 10th of May 2017.

4.6.1. FOCUS GROUP INTERVIEWS

Table 4.2 summarises the reasons for the choice of focus group interviews over one on one interview. The table shows the differences and similarities between the two (Breen, 2006). The differences and similarities determined both the purpose and the sample to reach the required conclusions (Breen, 2006).

Table 4.2: One on one interview versus groups (Breen, 2006).

	One to one	Focus groups
Purpose	Probe experience	Generate ideas
Researcher role	Interviewer	Moderator
Sample	Aim to reach theoretical saturation (usually > 10–12)	
Equipment	Tape recorder, lapel microphone, quiet room	Homogenous groups of 4–6 participants in each Tape recorder, oval/round table/table microphone, props (flash cards, leaflets)

Interviews are viewed as a quick and opportune way of collecting data from a group of people. Focus groups overtly rely on group interactions as part of the method (Kitzinger, 1995). Semi-structured interviews were thereby used to collect the data from the groups. A challenge identified in low-income groups is the lack of confidence and low self-esteem among individuals (Rabiee, 2004). Focus group interviews can thereby be seen and used to as an opportunity to empower the individuals on the importance of research and the topic of discussion (Krueger & Casey, 2000, 2014). With the fragility of the focus group interviews the researcher worked closely and liaised with the school administrator and a trusted teacher amongst the learners.

The interviews with the groups were carried out in both English and isiXhosa; the two most spoken languages in Delft. The interviews were conducted by one researcher who speaks both English and isiXhosa with the help of one assistant. An assistant with prior experience in collecting data in a school set up helped with the learners. An assistant or note-taker is crucial in a focus group to moderate and observe non-verbal interactions, document exchanges, and take note of particular individuals; all this assists with a fuller analysis (Kitzinger, 1995).

A major consideration in group interviews is the size of the groups. This can be suggested with three to four individuals. A suggestion by Krueger & Casey (2000) was adopted for this research. Six to ten participants are large enough for effective interactions; variety of perspectives can be shared. The focus groups had a maximum of six individuals, with a total of five groups. Learners were purposively grouped according to Grade. This kind of segmented samples which are tied to homogeneity of focus groups, allow for “free” flowing conversations within groups (Morgan, 1997; Silverman, 2005). The school administrator advised that learners could only be interviewed after school hours. Since the interviews were held after school hours we provided snacks to the learners. After school hours were 3:45PM and the meetings including all had to be restricted to one hour.

Other forms of qualitative data collection methods can be used in conjunction with focus groups to maximise exploration (Morgan, 1997); of other perspectives that were otherwise not included in the groups (Kitzinger, 1995).

4.6.2. WRITTEN ESSAYS

With this noted, written essays were chosen. The essay question was communicated in English isiXhosa and Afrikaans. The topic of the essay was: *Write an essay on how you use the free Wi-Fi in your school. In your essay write about your experiences of how you knew about the free Wi-Fi, why you use it and if you have told anyone about it. There is no right or wrong answer as this is your personal experience.* There was a two page limit on the written essays.

During the focus group interviews, Grade 8 learners were passionate about the topic and eager to contribute. This prompted me to select the Grade 8s for the written essays. All the Grade 8s had prior experience with the free Wi-Fi from their different primary schools and were eager to share their experiences of the free Wi-Fi now in high school. Guidelines were given and five learners produced essays that were a maximum of a page long and two of the learners had a maximum of two pages. The learners handed placed their submissions in a Khakhi A4 envelope and handed the written essays to their class teacher.

Learners wrote assignments on paper and this was then transcribed in Ms Word. Responses were colour coded their using the guidance of the stages of the domestication theory. Nvivo was then used to back up the essays but manually analysed all seven essays. I compiled all the essays in one document and fed them in Jason Davie's Word generator, and produced a word map attached in Appendix L. For ethical reasons, any instances where the school was mentioned in the essays; this was removed before the word map was generated. Superfluous

4.6.3. QUESTIONNAIRE AND INTERVIEW ADMINISTRATOR

A questionnaire was administered to the school administrator who is also a Grade 12 English teacher. The views and perspectives of the school administrator were crucial for this study because they provided a teacher's perspective to that of the learners. Teacher's perspectives were not included in this study. For example, the school administrator knew more than the learners about administrative procedures of the school that learners were not aware of. The school administrator had physically met the Internet Champions (promoters of the free Wi-Fi), sat in for a presentation with the principal and the deputy principal, and was also a recipient of the demonstrations that were held to teach people on how to connect to the free Wi-Fi. Learners

were not aware that this had happened. He had experience with other ICT projects that had been implemented at the school. I conducted a follow up interview after the questionnaire.

4.6.4. Participant OBSERVATION

During the visits (approximately three months) to the school attempts to connect to the Smart-Cape network (under-study) were in vain. Trials were done with numerous Wi-Fi networks that appeared in the settings of a smartphone whilst I was in the school. I tried connecting to all the seven networks that popped up on my smartphone Wi-Fi settings.

Towards the end of data collection, I crossed the street and went into a government building to try and connect to Smart Cape or Neotel. Smart Cape required a password and partial success was on Neotel. I was able to access Neotel landing page but connecting took approximately 8 minutes but connection was lost.

4.6.5. FIELD NOTES

Field notes and observations were techniques I used in the collecting data. I observed what learners were doing and their surroundings and wrote these observations in my diary. I also observed how learners, teachers and the principal interacted in their environment.

4.6.6. E-MAIL CONVERSATIONS

After the numerous failed attempts I had trying to connect to any free Wi-Fi service, I contacted the Internet Champions phone and email. They explained that they had won a tender from the Western Cape government and any details about their service I had to direct the questions back to the tender offers. I contacted the Western Cape Government via email and explained my experience and if they could assist with an explanation or assistance if it was an error on the user's part. The Broadband Initiative Manager in his response, explained of the high number of both "log ins" and uses of the SmartCape public Wi-Fi networks in around the school compared to other areas. Statistics revealed that around hotspot servicing the school had 15Gigabyte (GB) of usage for 2,500 users within a month from archival data.

"Compared to all other hotspots, this hotspot has had relatively high usage statistics of approximately 15GB per month and 2,500 users per month. The Internet Champions worked in this ward from 1 March 2016 until 31 May 2016, and their engagements included the delivery of the Internet Champion course to the school and the dissemination of A5 flyers to the community. During this 3-month period, they were able to register 2628 course completions (individuals

who watched the 7 videos and completed the quiz at the end to receive a certificate signed by the Minister). This placed the ward as the 14th highest in terms of registrations across the first phase of 50 hotspots”.

4.7. DATA ANALYSIS

In qualitative research, particularly, data collected from focus groups serves the purpose of reducing the data (Rabiee, 2004). Yin (1992) explains that the goal of data analysis is to re-arrange the evidence to address the goal of the study. Krueger & Casey (2014), explain data analysis as the opportunity to reflect on the intention and that “purpose should drive the analysis” (Rabiee, 2004, p. 657).

Several methods can be used in a research design to analyse data. These include thematic analysis, structural analysis and interactional analysis or discourse analysis. The aim of the analysis is to understand the respondents’ experiences as related by them in the interviews saved. Thematic analysis considered as the foundation for qualitative analysis (Braun & Clarke, 2006) was used to analyse data from the focus groups and the interviews. It is considered the most appropriate for any study that intends to discover through interpretations (Marks & Yardley, 2004). The method allows the researcher the opportunity to identify possible themes in the raw data.

Thematic analysis is a comprehensive step by step process that identifies cross references in between themes emerging from the data (Ibrahim, 2012). It is crucial that the themes which arise from the analysis relate to the research question to be answered. Nvivo software designed to assist in qualitative research for non-numeric data Yin, (2009), was used to aid the thematic analysis. Attached in Appendix M were the initial codes during thematic analysis.

In analysing data collected from focus groups, there is a choice of listening to single voices or assuming consensus from the different opinions which emerge. The onus is however on the researcher to communicate the views of the group. The transcribed interviews were uploaded into Nvivo software. In analysing, it is crucial to protect the identities of the respondents. With this consideration, focus groups were coded using alphabets and numbers. The focus groups were coded FG8, FG9, FG10, FG11, and FG12. The interview from the school administrator was coded ICTR1. The seven written essays were coded EW1, EW2, EW3, EW4, EW5, EW6, and EW7. The essays were loaded into Nvivo software and into Jason Davie’s word generator to produce a word map.

Thematic analysis allowed the researcher to accurately relate concepts and compare with the views of the learners, the school administrator, and views provided by the WCG.

4.8. RESEARCH VALIDITY AND RELIABILITY

Validity and reliability are two crucial factors in a qualitative study as they assist with analysing results and judging the quality of the study (Patton, 2002). To ensure reliability trustworthiness needs to be tested whilst quality and rigor are checked by validity (Golofshani, 2003).

Research validity and reliability is crucial for a case study as explained above to assess trustworthiness establish credibility dependability and conformability for qualitative data (Baxter & Jack, 2008). The purpose is to prove and test the logic of the statements presented. The quality of these statements can be evaluated according to a set of four logical tests (Yin, 2013). Table 4.3 depicts these four tests which are construct validity, internal validity, external validity, and reliability.

Table 4.3: Case study tactics (Yin, 2003).

TESTS	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	<ul style="list-style-type: none"> ◆ use multiple sources of evidence ◆ establish chain of evidence ◆ have key informants review draft case study report 	data collection data collection composition
Internal validity	<ul style="list-style-type: none"> ◆ do pattern matching ◆ do explanation building ◆ address rival explanations ◆ use logic models 	data analysis data analysis data analysis data analysis
External validity	<ul style="list-style-type: none"> ◆ use theory in single-case studies ◆ use replication logic in multiple-case studies 	research design research design
Reliability	<ul style="list-style-type: none"> ◆ use case study protocol ◆ develop case study database 	data collection data collection

Construct validity – is the extent to which a test measures up to what it claims. The tests confirm or fail the predicted relationships (Wood & Haber, 2014). Table 4.3 states that the case study tactic for construct validity should include multiple sources of evidence (Yin, 2013). Others sources that were used as mentioned earlier included written essays, questionnaire and email conversations. There is a need to establish a chain of evidence (Yin, 2013). In the study, the learners’ response and proof of the understanding of the semi structured questions was important. After the interviews, the transcripts were given to the learners to check their responses. The transcripts were also shared with the assistant to check the responses against the questions posed.

External validity – is the extent to which the case can be generalised to other cases (Yin, 2013) Yin ((2011) explains that this tactic occurs in the research design and in the case of a single case study a theory has to be followed. In this study, the domestication theory was used as lens for the study.

Reliability – is the extent to which consistent results are produced on repeated measures (Wood & Haber, 2014; Yin, 2013). Reliability focuses on consistency, accuracy, precision, stability, equivalence, and homogeneity. The three main attributes being stability, homogeneity and equivalence (Wood & Haber, 2014). Yin (2009) states the use of case study protocol and creating a database and this occurs in data collection process. In this study protocol was followed from choosing the appropriate case (mentioned in the case description), conducting the interviews, transcribing, coding and storing finally through Nvivo software and hard copies. The steps of the process were documented that should the steps be repeated the same results revealed in the findings and discussion will be arrived at.

Triangulation is explained as the ability to “cross check” information through the use of multiple sources chosen (Flick, 2014; Johnson, 1997). Triangulation can be done through data, methods, investigator, or theory (Johnson, 1997). For this study data triangulation was chosen.

Figure 4.1, shows the data sources that verified the data collected. Flick (2014) explains that the benefits of triangulation a compensation for overlooked imperfections from sources, increases confidence in results reported, and finally crucial for follow up research work.

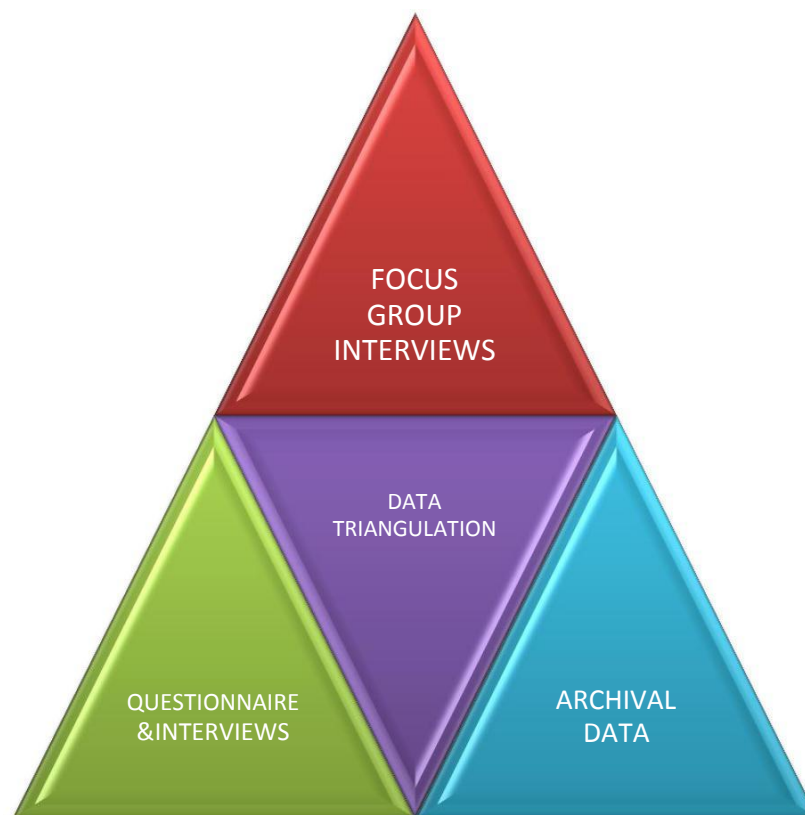


Figure 4.1: Data Triangulation

As revealed the data sources were focus groups interviews, questionnaires and interviews and archival data.

4.9. ETHICAL CONSIDERATIONS AND PROCEDURES

The ethics clearance for the research was sought from the University of Cape Town (UCT) from the Faculty of Commerce Ethics in Research. Attached in the Appendix is the ethics approval application form.

The majority of respondents interviewed in the study were below the age of 18. Several important stages had to be followed because of the learners being underage. Anyone under the age of 18 is deemed a minor and therefore a responsibility of an adult. With this considered, permission was sought first from the provincial department of education to conduct research at the school. An approval of six months was given to be at the school only within school hours.

Permission was granted by the principal of the school. The principal requested an official letter three weeks before the start of the interviews. Letters were sent to parents and guardians to



advise them that I have been allowed to work within the school with the learners. The principal delegated a teacher who I was to report to on each visit. The teacher would inform me of any changes in the learners' timetables or clashes with extra-curricular activities.

Permission and consent was again sought from the learner's themselves on the day of the official meeting of all learners. During each meeting learners were reminded that they were allowed to withdraw should they lose interest or feel uncomfortable during the process. Participation was voluntary. Importantly before the interview learners were asked not to write their names on the demographics pages or state their names to preserve confidentiality and anonymity. The teacher who was managing the process collected the demographics forms at the end of each interview and erased any names before handing them over to me.

4.10. SUMMARY OF THE CHAPTER

An Interpretivist stance was taken for this study. This choice was ideal for this research that followed a qualitative method in a case study. Single case study strategy was explained, although literature discourages the use of single case studies the reasons for this choice was explained. Data was collected using focus groups interviews.

The case sampling was purposive. The school was the first in the neighbourhood to receive the service of free Wi-Fi and is in a low quintile zone. Research sample focused on Grade, gender and race. A cross sectional time frame was followed.

It was important to carry a pilot study. This gave me the opportunity to explain the research to the learners and what their contribution would be. Learners also had the opportunity to ask questions about the research and on the logistics. Data collection instruments employed in this study were focus group interviews, written essays, questionnaire and interviews with school administrator, experimentation and e-mail conversations.

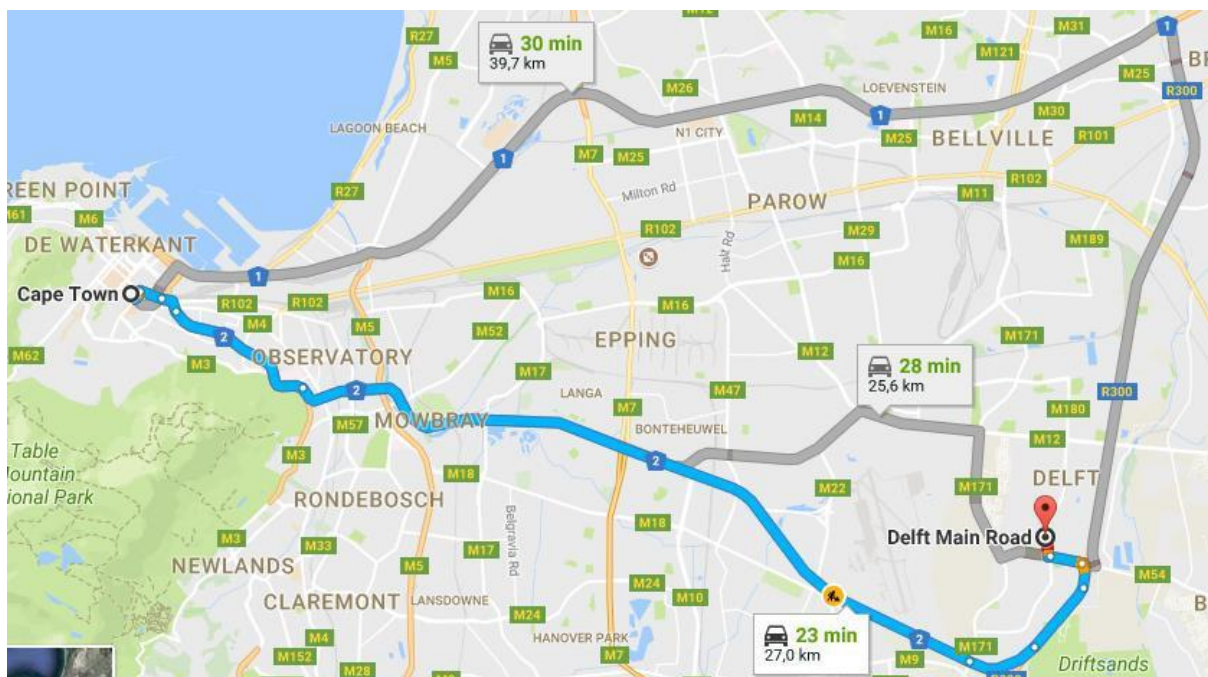
Data was collected and stored in Nvivo software, transcribed and analysed following thematic analysis. The reliability and validity of this research was done. Assumptions and limitations of the study were explained. One of the assumptions was that learners were receiving support from their teachers.

CHAPTER 5: CASE DESCRIPTION

This chapter describes the community of Delft chosen for this study. The school and policies that guide the school are revealed. ICT projects that have been implemented at school were discussed.

5.1. DELFT TOWNSHIP, CAPE TOWN

The school is situated in Cape Town in a “township” called Delft South. Delft, Cape Town is situated approximately 34KM north east of Cape Town central business district. Figure 5.1 shows the map of Delft extracted from Google (n.d.).



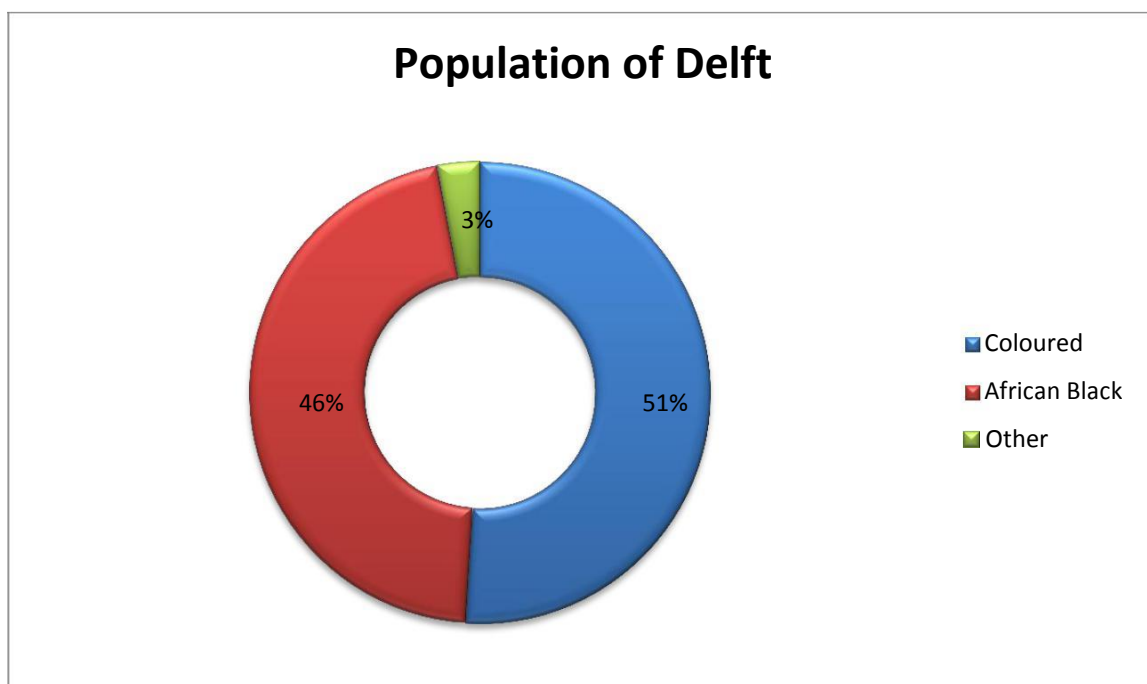


Figure 5.2: Population of Delft (Frith, 2011).

The dominant languages in the area are Afrikaans and isiXhosa. English is regarded a second language. In 2016, there was a total number of 9 452 crimes committed within Delft. Crimes ranged from contact crimes (murder, sexual offences & robbery), common assault, contact related crimes (arson), property related crimes and crimes detected as a result of police action (CrimeStatsSA, 2016). Despite its socio-economic woes, Delft was among the top 10 communities to be a recipient of the Free Wi-Fi projects provided by the City.

The case was therefore chosen on the basis of the location and the history. Post-apartheid the location still bears a resemblance of the structures and mixed cultures.

5.2. THE SCHOOL

For ethical reasons that require anonymity, I will name the school Alpha school. The living structures and patterns created from that time have remained to date the schools have also remained the same. Eight years into democracy in 2002 Alpha school was built. Occupation and schooling started in 2003.

In 2011 the minister of education in a media release, identified 20 schools in the Delft as replacements school. Replacement schools were identified in an infrastructure audit as needing replacement because of inappropriate material that was used to construct them. Projects to

replace the school included long and short term goals that would alleviate overcrowding and improve infrastructure (WCED, 2011). Alpha was one of the schools selected for the projects.

The school is state-owned with 1380 registered learners from Grade 8 to Grade 12. The school has 26 teachers, a principal, and a vice principal with six supporting staff.

Alpha school was a recipient of the Khanya project which has since been discontinued.

Learners at the school identify the only computer laboratory as the “CAT” lab. The CAT lab is a new project that was launched in 2016. Of all the learners interviewed none knew what CAT stands for including selected teachers. No cell phones or any electronic gadgets that connect to the Internet are allowed at Alpha school.

5.3. THE SMART CAPE INITIATIVE

On the first day of arrival at the school and on all the visits I tried to use the free Wi-Fi. All the networks either required a password or had a very poor signal to allow connection. I could not connect and eventually log in or use any sites of my choice. Learners advised me that reception for Neotel free Wi-Fi was good by the gate [FG10, FG11, & FG12]. I wanted to stand on the street outside the school gate to better reception but was warned about safety in the neighbourhood. I could not take out and use a phone on the street. I resorted to connecting in a different location (near the school) inside a city council owned building. Connection had improved.

I experimented with connecting to the free Wi-Fi. Figure 5.3 shows the screen shot taken in Delft (outside the school environment) to access the Internet using the Smart Cape public Wi-Fi. The network required logging in details as shown in B of the figure 5.3.

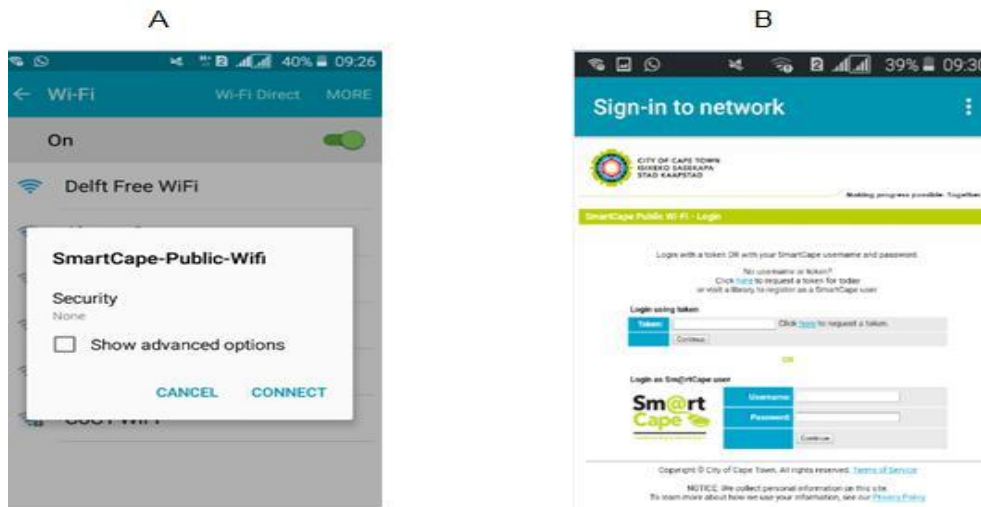


Figure 5.3: Smart Cape logging landing pages screen shots

Figure 5.4 shows the second screen shots captured at the location; i), ii) and iii). These are the landing pages of the Neotel hotspot.

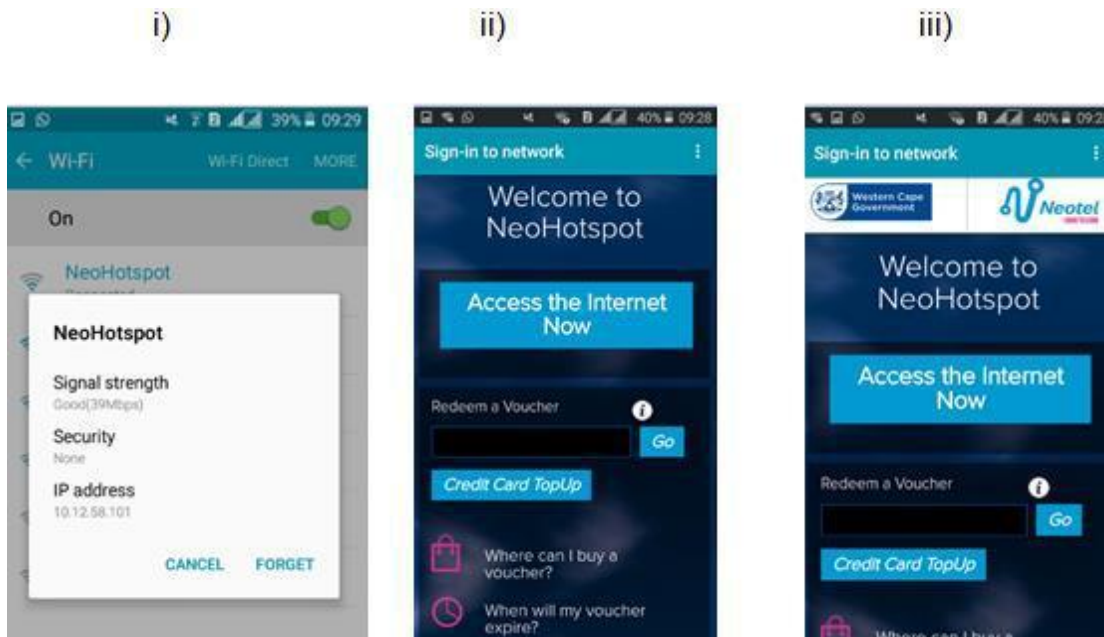


Figure 5.4: Neotel hotspot landing pages screen shots

No password was required as in 5.4. Labelled i) is the built-in function of a smartphone that shows the networks available, and the signal shows that it was good, no security and the IP address; labelled ii) welcomes the user, offers to redeem a, where to buy a voucher when the “free” allocation runs out, and when the voucher will expire. Labelled iii) has the same information as ii) but with WCG and Neotel hotspots. After these stages connecting to the

Internet took approximately 8 minutes. Smart Cape (shown in the case description) has a password and accessing of the Internet could not be done.

The implementers demonstrated to the school administrator and other selected teachers and a few selected students on how to connect to Neotel hotspot. It is likely demonstration. I followed up on this revelation with the learners; that the implementers had visited the school for demonstrations. None of them were aware of the visit. The demonstration was targeted teachers.

The Western Cape Government website outlines that there are at least 250 Wi-Fi spots in 78 areas around the city (Western Cape Government, 2017). In February 2016, the Western Cape Premier in the State of the Province address announced that the project was a success and a total of 384 hotspots would be launched during the 2016/17 financial year (Western Cape Government, 2017). In the free Wi-Fi project in the Western Cape citizens are provided with free access to 250MB of data daily. However, when they finish their allocation, they can purchase extra bundles; 700MB can be bought for R5, 2GB for R15 and 7G for R45.

5.4. WI-FI NETWORKS

Figure 5.5 shows a snapshot of the seven different Wi-Fi networks available within Alpha school. These available networks can be viewed from the settings of an electronic gadget with a network interface card.



Figure 5.5: Networks available at the school, screen shot

Table 5.5 shows the different networks available within Alpha school, the owners, status, number of bars and the signal strength. The networks were launched at different times but intend to serve to provide free Wi-Fi around Alpha. Networks provided by the municipality as in the case under study offer open networks. Table 5.1, shows all networks open except the ones owned by the school.

Table 5.1: Networks and Owners available at the school

Number	Name of Network	Owner	Status	Number of Bars	Signal Strength
1.	M [redacted] Admin Block	School Network	Locked	5/5	Good
2.	Delft free Wi-Fi	City of Cape Town	Open	5/5	Good
3.	M [redacted] lab	School Network	Locked	2/5	Weak
4.	B [redacted]	Unknown	Open	2/5	Weak
5.	Neo hotspot	City of Cape Town & Neotel	Open	2/5	Weak
6.	Smart Cape public Wi-Fi	City of Cape Town & State Information Technology	Open	1/5	Poor
7.	AlwaysOn	City of Cape Town & Internet Solutions	Open	0/5	Unavailable

Figures 5.3, 5.4 and 5.5 summarised in Table 5.1 show the networks that appear on a smart phone when in the school environment. This was confusing initially for myself and has been confusing for the learner's on which free Wi-Fi was supposed to be used and relied upon. Delft free Wi-Fi, Neo hotspot and Smart Cape public Wi-Fi are all affiliated to the Western Cape Government. Delft free Wi-Fi seems to have been a failed or discontinued project whilst Smart Cape public Wi-Fi could only be accessed in the library. Neo hotspot was the network to be relied upon within the school environment. However, what is contradicting as shown in Table 5.1 is how Neo hotspot that should be relied upon has a weak signal whilst Delft free Wi-Fi (malfunctioning) has a good signal. Understandable was Smart Cape public Wi-Fi that should be accessed in the library had a poor signal. The distance from the school to the library is approximately 5km and not within a reachable radius.

After all, the end goal of introducing an ICT in a school is more than its inception; but the provision the technology will offer (Miller, Naidoo, van Belle, et al., 2006).



5.5. SUMMARY OF THE CHAPTER

In the chapter the context, Delft Township was introduced. The community is unique in the history it holds; being the first mixed race community (Black African and Coloured) set up in Cape Town during the apartheid era.

The school has in the past and present been a recipient of ICT projects (Khanya and CAT) and importantly the access to free Wi-Fi projects. From the screen shots revealed within the school environment, within the range a learner can access numerous free Wi-Fi APs including the most recent hotspot; Neo hotspot.

Explanation on the networks concluded this chapter. The numerous networks, however, initially left me confused. Three of the networks were owned by the Western Cape Government which I presumed would be easily accessible. Six of the networks including the Western Cape Government owned were password protected.

CHAPTER 6: RESEARCH FINDINGS (RESULTS)

Research findings are shown in this chapter. The chapter begins by showing the demographic information of the learners. Guided by domestication theory the findings are revealed.

6.1. DEMOGRAPHIC INFORMATION OF LEARNERS

Focus group interviews were used as the main method for data collecting as explained in section 4.5.2 in the study of adoption and use of Free Wi-Fi. The focus groups were Grade 8, Grade 9, Grade 10, Grade 11, and Grade 12. A total of 22 individuals forming five groups were interviewed. Figure 6.1 presents the age ranges of the learners.

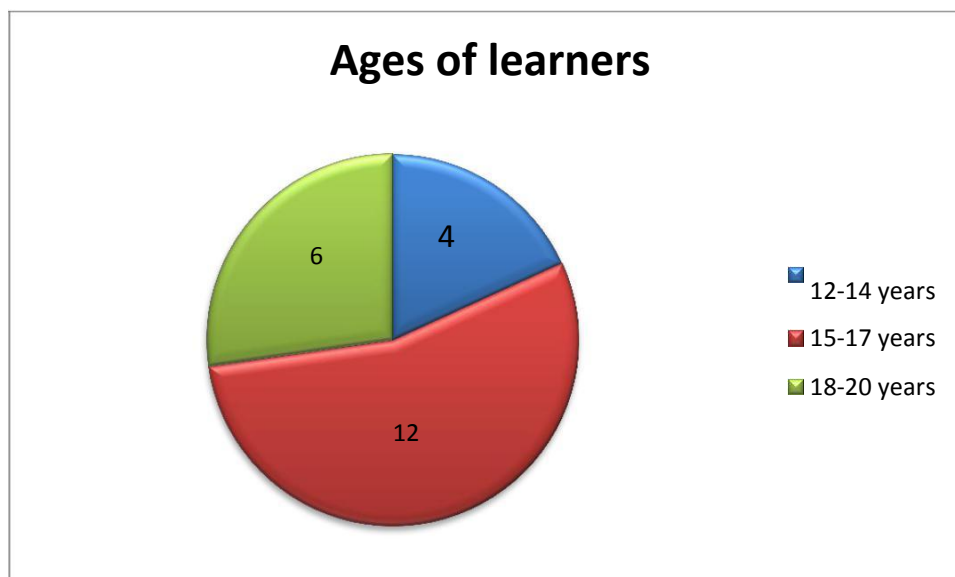


Figure 6.1: Age range of learners

In terms of gender, learners identified themselves within two groups, females, and males there were 18 females and four males. The school administrator advised that it has been a five year trend in the school to enrol more females than males. Eighteen learners identified to the female gender and four learners identified within the male gender.

Figure 6.2 represents these findings were; nineteen identified to being Black African, two Coloured and one learner preferred not to answer, that not identify with any race group.

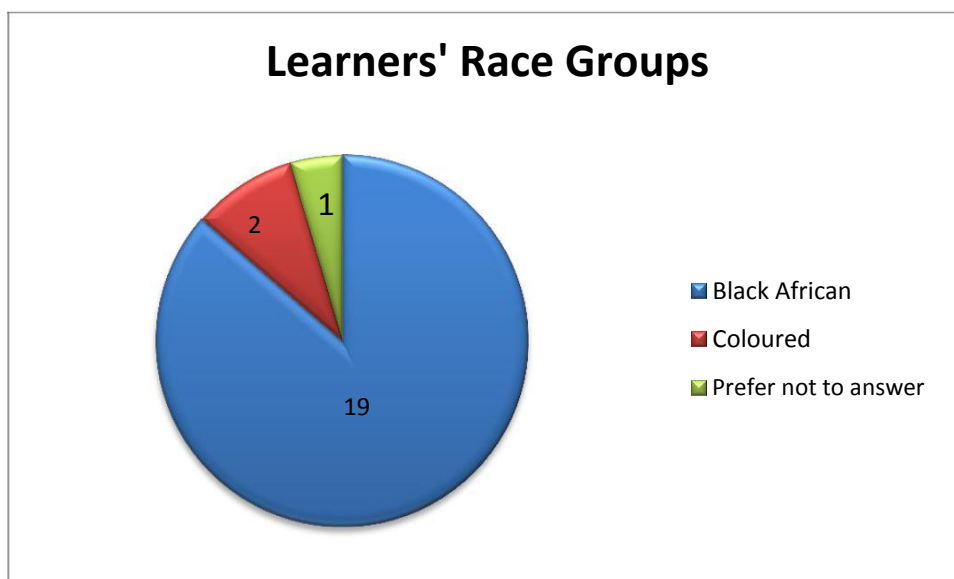


Figure 6.2: Learners race group

Learners in the sample were asked to state if they engage with the free Wi-Fi within the school environment, outside the school environment or in both environments. Figure 6.3 shows 17 out of the 22 learners stated that they used the free Wi-Fi within the school environment, 20 stated that they are able access the Internet outside Alpha. One preferred not to answer and 12 could access the free Wi-Fi within both environments.

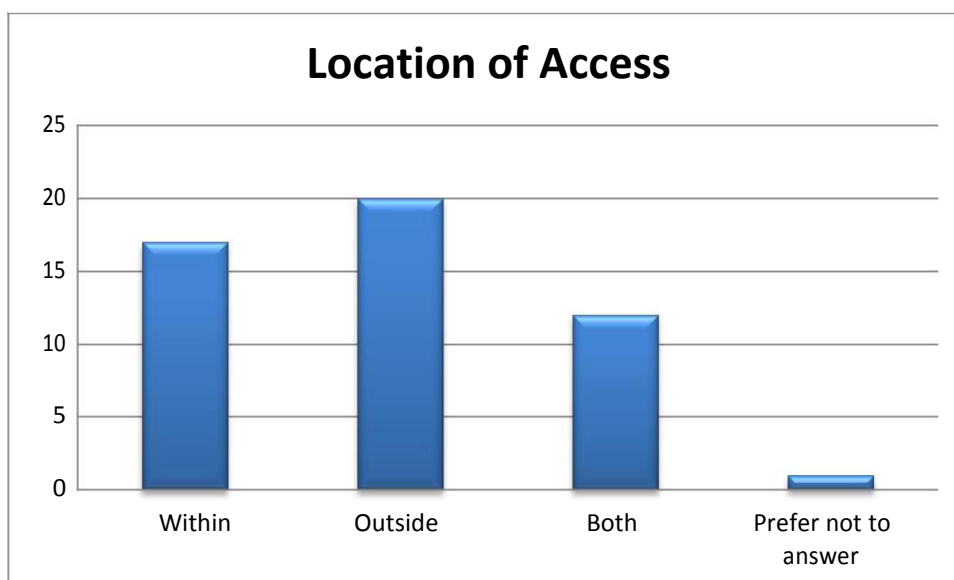


Figure 6.3: Location of access

21 of the 22 learners owned a smartphone. Two of whom owned laptops, and one owned a tablet. Six owned two or more various gadgets that could connect to the Internet.

6.2. COMMODIFICATION OF FREE WI-FI BY LEARNERS

The learners were not interested in engaging or going in depth with how they knew about the free Wi-Fi they were more interested in talking about uses. Lack of interest exhibited was expected, as these are learners from the city and are familiar with technology, particularly a technology which has the potential to keep them connected to the Internet.

There were various ways on how interest in their minds was evoked about the free Wi-Fi. These are word of mouth, pin up posters, observations, and mass media.

6.2.1. WORD OF MOUTH

Word of mouth from peers, teachers, and family members was the most popular method of commodification. Being a close-knit community as I observed, word of mouth is guaranteed to be effective.

“In 2015, I heard people talking about Wi-Fi. They said „guys did you know there is a new thing out named Wi-Fi?” [EW3].

“My brother told me about the free Wi-Fi, he was happy he said there is free Wi-Fi now in Delft” [FG8].

The principal and the teachers used the free Wi-Fi as a “hook” to lure the learners to the school. They encouraged learners to apply at Alpha assuring them of accessing free Wi-Fi. Although Alpha is a no fee school, the government pays an allowance for each child registered at the school (Spaull, 2013a; Van der Berg et al., 2011). So, any school with high enrolment of learners is guaranteed a higher subsidy. This could have been the case with the principal and teachers at Alpha. Further any when donor agencies when deploying ICT projects consider the number of enrolled learners. This clearly proves that teachers are aware of the power of any untapped ICT.

“Last year I went to a competition in library...Yes, and this principal of this school he says he expect us to come to this school because there was free Wi-Fi” [FG8].

“How I know about the free Wi-Fi service My English teacher told us in class” [EW1].

Only Grade 8s said that they had been told about the free Wi-Fi by other people, either a family member or friends. This was both in the focus groups and in the written essays.

6.2.2. PIN UP POSTERS

Pin-up posters were strategically placed in locations where learners would be expected to see them. The posters were placed at any angle that can easily draw attention. Figure 6.4 shows two different posters. One metallic poster **b)**, with measurements of approximately 30cm height by 15cm width. It was on the wall above the principal’s office with blue bold letters written “public Wi-Fi”. From a closer range, I was able to read the small font that gave instructions on how to connect to the Wi-Fi. At the corner of the poster is the Western Cape Government logo. None of the learners knew when the blue poster was put up.

Another poster is pinned on a fence at the staff car park with a small flower garden, at the principal’s designated parking spot. Poster **a)** with an approximate height of 50cm by 35cm has a bright orange background with instructions on how to connect, browse, and download. At the bottom of the poster is the Western Cape Government logo and Neotel logo. It is unknown who pinned it but learners state that they saw the orange poster in 2015.



Figure 6.4: Posters of advertised networks at Alpha school

“We saw the poster... (Fig 6.1), it was in 2015” [FG11].

“Yeah, It’s the orange poster I see it every day, but ah, I don’t read it” [FG10].

The groups seemed to be more aware of the poster **a)** and did not acknowledge poster **b)**. This could be explained by the location of the poster, being above the principal's window and at his view. The school security personnel explained that learners were not allowed to roam or be seen "loitering" close to the administration area. I found that both were inaccessible to read at close range.

6.2.3. OBSERVATION

Learners also observed the different free Wi-Fi networks on their smartphones. Smartphones are able to pick up signals of networks within a particular area. From the settings of the phone a user is able to see the names of the networks, the status if it is open to access or if it is password protected, and the signal strength.

"... But when your Wi-Fi was on you could see that there is Wi-Fi here at school now" [FG11].

This finding was echoed by all the focus groups. As stated learners made it seem like common knowledge that free Wi-Fi networks within any range pop up on the settings once prompted.

6.2.4. MASS MEDIA

One of the learners in a written essay response stated that they heard about the free Wi-Fi from mass media.

"The next day I played the radio a woman spoke about Wi-Fi and I decide to try Wi-Fi" [EW3].

This was interesting that only one learner mentioned the radio, meaning learners could have missed hearing it or there was not covered by the media widely.

Overall the most popular method was observation and word of mouth. Pin up posters and mass media were surprisingly least popular method in which free Wi-Fi was unveiled to the learners. The school administrator was the only one who discussed the demonstration.

6.3. APPROPRIATION OF FREE WI-FI BY LEARNERS

Appropriation was the most important phase for the learners, as they were eager to express themselves on the role the free Wi-Fi was being assigned in school. Appropriation became a question and best answers session. Roles were reversed, learners wanted to know of my experiences of free Wi-Fi at UCT and if I had tried the service at Alpha and my sentiments. I was

also requested to inform all the relevant authorities on their failure to use the service of free Wi-Fi with ease [FG8, FG11, FG12, EW1, EW3, and EW5]

6.3.1. OBJECTIFICATION AND INCORPORATION

Learners wanted to connect and use the free Wi-Fi within the school environment and outside but there were numerous hindering factors. Objectification and incorporation of the free Wi-Fi were influenced and affected by the following factors: usability, uses, frustration of use, the anticipated benefits of free Wi-Fi, and ICT self-efficacy. All the respondents from; focus groups, written essays and the school administrator were very passionate about how they gave meaning and integrated the free Wi-Fi.

6.3.2. SCHOOL POLICY

There is a prohibition or ban of phones or electronic gadgets at Alpha. The breach of this school rule attracted a R50 fine payable to the principal. FG1 learners respected the rule and either hid their phones or left them at home. The rest of the groups knew about the rule, discussed it but explained that “*there were ways around that rule*” [FG12], meaning they were in possession of their phones and used them with caution within the school environment. The school administrator expressed that he was “*forward thinking*” so the no phone rule was irrelevant to him. Technology was after all essential for teaching and learning.

FG8 felt it was fine that phones were not allowed in the school as most of the learners were unruly and the policy was the only method to control them. I asked the different groups if their parents allowed them to bring phones to school, there was mixed answers. Parents disallowed phones sighting that they will disrupt them from their studies FG9. Whilst FG10, FG11 and FG12 said phones were a normal part of their lives and parents not only bought the phones but also allowed them to bring the phones to school. Boyfriends, girlfriends, and partners bought the data bundles and airtime to maintain the phones.

6.3.3. USABILITY OF THE FREE WI-FI

Usability is the extent to which the free Wi-Fi can be manipulated to fit into the learners’ everyday life. All the respondents and researcher faced numerous challenges in using the free Wi-Fi. Successful attempts to connect were mostly done outside the school environment. Connecting to the “open” hotspots within the user’s radius goes as far as the landing page then loosing connection. For first time users like myself I was able to log in to the Neotel network but

not able to access the Internet. I was convinced that it was a malfunction of the hotspots designated near the school.

In a written essay learners expressed very different sentiments to the focus groups. They used the free Wi-Fi with ease:

“... People use Wi-Fi because they say it is cheap and easy to use” [EW3].

“Free Wi-Fi has made changes in our lives because we used to buy airtime to use the Internet but because of the free Wi-Fi we can use the Internet freely” [EW2].

School administrator and majority of learners struggled to log in to any of the free Wi-Fi “available”. The school administrator explained that a convenient accessing spot had to be secured first to log in and connect to the Internet. The last time the school administrator attempted connecting, he has to find *“a spot in the middle of the school hall and maybe this has changed”* [ICTR1] and inconvenient especially during class sessions.

Some learners knew the exact time; one could connect to the free Wi-Fi outside the school.

Unfortunately, this was only after school hours.

“I use it on Saturdays at 11PM in the evening. Then it connects nicely then” [FG8].

“The easiest time to get the Wi-Fi is 10 – 12 O’clock PM on weekends. When people rest or sleep. But then Wi-Fi also sometimes turns off and stops to work” [EW2].

“What I’m trying to say it is; better than outside to use the Wi-Fi than inside the school” [EW1].

“I stay close to the school, just behind here (pointing south), so I have access anytime; the Wi-Fi is active” [FG12].

Learners did not know which one was the free Wi-Fi to access. They resorted to connecting to any available network that was “open”. I asked if this was possible, learners confidently said “Yes”,

“During break is when I use Wi-Fi I walk around looking at any open Wi-Fi and I log in to any that is available... I hack... it can be done” [FG11].

Until the end of the research some learners were still confused on which free Wi-Fi was available for them to use.

6.3.4. USES AND BENEFITS OF FREE WI-FI

6.3.4.1. Social engagements and hedonic purposes

Most learners used free Wi-Fi for social engagements and hedonic purposes. The lower grades who were between the ages of 12-14years used free Wi-Fi for “Google”. *“I Google big words, if I see a new word and want to use it I Google it [FG8].* Higher grade learners between the ages of 18-20years used the free Wi-Fi for research and virtual group discussions. The most preferred application for their discussions was WhatsApp and Facebook. WhatsApp groups were set-up for research work among assigned groups selected in class. Learners managed to keep in touch with their group members during the tasks.

“About this Wi-Fi, I know a lot about it because it is helpful in a lot of school projects, without it there are a lot of things we wouldn’t know. Everyone at school knows about the Wi-Fi and they use it for school work and a lot of things to browse around the school” [EW6].

“It’s only nice to be in a group when you are using Wi-Fi after the group research is done, I just quit the group because girls start sending pictures and if you are not on free Wi-Fi this wastes data bundles, so I quit and delete the group” [FG12].

Not all of the learners in the groups could connect to the free Wi-Fi. Learners used trusted Cell C that they all relied on and spoke very highly of. Cell C was trusted because of the affordable data packages it offered compared to other providers. Learners mentioned of numerous data bundle “deals” were affordable for learners. Cell C offered WhatsApp bundle and data extender bundles. A special deal called the Smart data bundle was the most popular; it cost learners R10 for bought 25MB of data. FG8 told me that if I was not on Cell C then I needed to switch service providers because I was missing out on great deals.

6.3.4.2. Gender differences

Females and males used free Wi-Fi for different purposes. The females in FG12 talked of shopping for their “*big day*”, Matric Ball that was coming up in August. They needed to know the prices of their gowns, hair, and nails could possibly cost. The few number of boys in the

groups were not interested and explained that there was really nothing to Google for, for matric, they just stick to school work and their “*other personal business*” [FG12] when on free Wi-Fi.

Cases of online stalking and online bullying were discussed by the learners. Females bullied by other females, and males bullying females. Learners cited that it was mostly Grade 12 learners that could easily access the free Wi-Fi; were the perpetrators of stalking. A male learner in the group explained:

“You see there are celebrities here at school, so over the weekend we take pictures of our celebrities, how they are dressed. When we get to school on the free Wi-Fi you post on Facebook. If you wear the same clothes and you are a celebrity, we post you on Facebook” [FG11].

A female member within the same group [FG11] explained that the content posted was very hurtful because she is also a celebrity, so she always had to maintain the high standards set for the school celebrities. FG12 explained that the bullying of female celebrities had placed everyone under immense pressure because if you were not on free Wi-Fi then you had to buy Cell C data bundles to know what and who is trending. These were cases of mobile bullying.

6.3.5. FRUSTRATIONS OF USE

The need to connect and use the free Wi-Fi without difficulty caused frustrations. This was identified during the interviews. One unanswered question was:

“So is the government aware that sometimes the Wi-Fi cannot connect” [FG8].

“Access to the Wi-Fi gets harder day by day because every day everywhere... The hardest part is that as much as everyone wants to use the Wi-Fi only is accessed by a few people and that is an unfortunate thing, because as far as everyone is concerned the Wi-Fi is for everyone living in that certain area” [EW2].

Learners explained that the 250MB allocated to individuals daily could be used up on trials only without accessing the Internet [FG10 & FG11]. [FG5] explained that there was the option to use the Internet by clicking a trial button which allows the user to try the Neotel network for 30minutes. This option was sometimes reliable.

6.3.6. ANTICIPATED USES

The school administrator only hoped for the untapped possibilities free Wi-Fi could have. The school administrator; also a Grade 12 teacher, explained that he asks learners to buy data bundles



so he can use Google and YouTube as teaching aids. He however, noted that if the free Wi-Fi was available the uses would be “*endless and wonderful*” [ICTR1], benefitting both teachers and students.

In a written essay a learner in 2 pages explained about the free Wi-Fi in San Francisco and the benefits the citizens were enjoying through the service [EW7]. The learner gave a detailed account of only the benefits and nothing mentioned of the free Wi-Fi either in Africa or particularly in Delft.

Other learners said:

“If we had it...we can do so many things using the free Wi-Fi service like writing emails searching for information. And another thing, I encourage the students because why bother to use airtime to find information than using the Free Wi-Fi service” [EW1].

“For me my understanding about Wi-Fi is that you can use at certain places like a mall or school, airport or even at major restaurant” [EW4].

Some learners were only too aware of the dangers associated with the uses of free Wi-Fi.

“Lots of people abuse the power of Wi-Fi. They take it for granted and use it in the wrong ways” [EW4].

“Learners at this school cannot be trusted with anything, its fine the principal takes our phones and we can use the Wi-Fi. It’s really fine” [FG8].

6.3.7. SELF-EFFICACY

Learners did not give up on using the free Wi-Fi. Learners knew that the failure to connect was not their fault. Learners placed blame on either the government or the on technical errors. They never placed blamed on themselves. Learners explained:

“I would really love for the government to come and fix our Wi-Fi because it’s not working for us either way it’s not working for teachers” [EW2].

“I have to try and try again something like 10 times and it goes through. I need luck. Others are not like me, they just struggle” [FG11].

“I once thought that it might be the new Wi-Fi that has been inverted but it is the same I’ve been using since last year in Grade 7 (primary school)” [EW2].

Despite the learners not blaming themselves, they never sought help. Help to connect could have been sought from calling the toll-free number written on the pin-up posters and appearing on website landing pages or send emails.

Generally, this was both an informative and interesting part of the focus group interviews. Learners were fully engaged and the physical and social integrations formed a very crucial aspect of this study.

6.4. CONVERSION OF FREE WI-FI BY HIGH SCHOOL LEARNERS

Most learners reached the conversion stage in the domestication of free Wi-Fi. They are willing to tell other people about the free Wi-Fi and the experiences of using the service. However, conversion is affected by the frustration to use the free Wi-Fi. Learners tell others about service but attach a judgment to their recommendation

The focus groups had explained that they used data bundles for accessing the network since the free Wi-Fi was unreliable. They explained that people needed to know about the free Wi-Fi so they could save money, used to buy data bundles.

6.4.1. CONVERSION WITH JUDGEMENTS AND CAUTION

Learners expressed that they would tell others about the free Wi-Fi but attached negative judgments and caution FG11 simply said no they will not recommend the free Wi-Fi Learners said: “I have told people but I say you will suffer to use it” [FG11].

Some groups said they started using the free Wi-Fi because they were told by family members that the whole community now had access, so this process of sharing experiences will likely continue.

6.4.2. CONVERSION WITH POSITIVE RESULTS

Conversion with positive results was mostly discussed in the written essays. Learners explained that free Wi-Fi was a better option because it saves money over buying data bundles. It was also a fast way of connecting to the Internet [FG8, EW1, and EW4]. One learner expressed how learners’ knowledge had increased and their performance at school had improved [EW6].

“Yes, I have told a lot of people, this thing saves you money” [FG8].

“I encourage the students to adopt the free Wi-Fi service because it is the faster way to connect your phone to the Internet” [EW1].



“And another thing, I encourage the students because why bother to use airtime to find information than using the Free Wi-Fi service” [EW4].

Conversions stage involves personal discussions about the free Wi-Fi and possibly recruit other people into using it. Unexpected uses of the free Wi-Fi also make up the conversion stage. The statements were confirmation that conversion was reached by the learners.

6.5. SUMMARY OF CHAPTER

The findings reveal that the learners had gone through all the stages of domesticating the free Wi-Fi. Importantly learners reached the conversion stage where they had involved other people and where using the free Wi-Fi in ways not anticipated.

The chapter started by discussing the demographics of the learners. More females than males participated in this study. This is because more females than males are registered at the school. Responses from the males and the females differed on how they engaged with the free Wi-Fi. Demographics were also recorded by age. However, race did not influence domestication. Lastly location of the access of free Wi-Fi revealed that learners were able to access the free Wi-Fi easily outside the school environment easily than inside. 12 learners could access the service from both inside and outside the school.

In domesticating the free Wi-Fi learners were not interested in how they commodified the service; they made it seem too obvious of responses to discuss. Findings discussed reveal that word of mouth was the most popular way in which free Wi-Fi was known in the school. Other methods included pin-up posters, observation, mass media, and finally a consultative process.

Learners were dissatisfied with the service of free Wi-Fi within the school. Although they were able to use Neotel hotspot they struggled to engage with the free Wi-Fi with ease. Although phones were not allowed at this school, learners explained that this was not a hindering factor to their use. The service was generally unreliable. Learners used the free Wi-Fi for Google, WhatsApp, and Facebook. What stood out were cases of stalking that seemed to upset most learners were prevalent especially done by the male students who were able to easily access the free Wi-Fi easily than others.

Learners reached the conversion stage. They were able to share their experiences with other people and use the free Wi-Fi by using trial sessions.

CHAPTER 7: DISCUSSIONS

This chapter gives insight into the findings revealed in the previous chapter. The chapter links the discussion to the literature review. Assumptions held before the study and the realities are discussed. The chapter concludes by answering the research question and discussing the objectives.

7.1. ASSUMPTIONS

Chapter 1 presented a number of assumptions which guided the study. Findings revealed that the assumptions were incorrect. Learners have barriers such as school policy, time access, and network capability that prevented them from using the free Wi-Fi within the school environment. Other assumptions and the discussion are presented in Table 7.1.

Table 7.1: Assumptions and findings of the study

Assumptions	Realities
Learners use the free Wi-Fi in the school environment for learning	<ul style="list-style-type: none">• Learners have difficulties in connecting to the free Wi-Fi.• School policy prohibits the use of smartphones in the school• Learners do not use the free Wi-Fi in the classroom.
Learners receive support from the teachers on the adoption and use of the free Wi-Fi	<ul style="list-style-type: none">• Learners and their teachers are not allowed to use smartphones in the classroom• Both teachers and learners are unable to connect to the free Wi-Fi
There is a continuous use of free Wi-Fi from the school environment to the home environment	<ul style="list-style-type: none">• There is limited time access. Access is controlled by time and radius from an Access Point

After these assumptions were proven incorrect, the question that remained unanswered to me was why the learners never sought help or alerted the Western Cape Education Department or Neotel on their challenges to connect to the free Wi-Fi.

7.2. COMMODIFICATION OF WI-FI

Learners discussed the commodification of the Wi-Fi passively. However, it was clear that commodification of free Wi-Fi was successful as learners discussed about the numerous ways in

which they heard the service. However, it is evident that learners did not require aggressive advertising. To advertise free Wi-Fi is not valid but a mere procedure. Some of the strategies employed by implementing were placing pin-up posters and conducting demonstrations and issuing certificates.

The school is in an urban area in Cape Town and the target groups are learners and considered in their youth. Young people living in urban areas in South Africa understand, know and are consumers of the Internet (Bryne, Nixon, Mayock & Whyte, 2006). The UNFPA (2014) revealed that 88% of South African youth are highly technological, with access to mobile phones and Internet access. Smartphones which are popular and location enabled afford learners portability, and mobility to connect into physical and social spaces (Schrock, 2015). Kreutzer (2009) found a high usage of mobile Internet amongst learners from low-income dwellers in Cape Town. The research was carried out among Grade 11 learners; 77 % owned a handset and 68% had accessed the Internet the day before interview. This is backed by Chigona, Beukes, Vally & Tanner (2009) who found high mobile usage among low-income urban dwellers in South Africa.

ICT projects have been used in school enrolments in Africa (Kayisire & Wei, 2016). Numerous researchers have discussed on schools which have been recipients of ICT projects in disadvantaged communities in Cape Town (Cantrell & Visser, 2011; Chigona & Chigona, 2010; du Toit, 2012). Some of the projects have been successful and increased the digital literacy and skills of learners (du Toit, 2012). Teachers and the principal at Alpha school used the free Wi-Fi as a recruiting tool for prospective learners. This marketing strategy shows that the principal and the teachers understood their target market (the youth) and the value of an ICT project (free Wi-Fi). Learners [FG8] explained that the promise of their potential choice of the high school having free Wi-Fi was crucial. Their primary schools had provided the service. So, they expected to enjoy the continuity of the benefits of free Wi-Fi.

The question, however, remains whether the school was marketing the school Wi-Fi that required a password or the free Wi-Fi provided by the government. If it was the school Wi-Fi, why then was the principal not releasing the password to the learners and changing the no phone policy? If it was the municipality free Wi-Fi, was the school aware of the connection challenges that were agitating and irritating the learners.

7.3. APPROPRIATION OF WI-FI IN SCHOOLS

Learners attached value in how they appropriated the free Wi-Fi into their environment. Most learners faced numerous challenges. Some of the challenges included identifying the correct network to log into. This has been a challenge with the popularity of WLAN access. Users' devices are often confronted with numerous mobile or fixed APs (Sagari et al., 2013). It is therefore important for users to be aware of network they can and want to connect to (Pitkanen et al., 2010). Learners explained that they “hacked” into open Wi-Fis. Some learners were overwhelmed with the availability of numerous networks with different names. Most of the networks were either password protected or could not be accessed. The difficulty is in identifying the correct network to log into.

Why was Wi-Fi being offered for free; when learners had little or no access and had resorted to using Cell C data bundles to connect to the Internet? Purchasing data bundles in South Africa is expensive and is one of the contributors of digital divide (Esselaar et al., 2016).

Alpha's policy on the use of phones at school hindered the success appropriation of free Wi-Fi. Phones or any electronic devices were not allowed within the school premises; before classes at 7:45AM, during classes, break time 11:00AM, until closing time at 2:45PM. The policy affected both learners and the teachers. Research work on “no phone” policies in schools yielded mixed emotions and thoughts on learners using phones in schools (Gao, Yan, Wei, Liang, & Mo, 2017; O'bannon & Thomas, 2012; Warnich & Gordon, 2015). Phones are viewed as disruptive both for learners and teachers. Disruptive in the form of ringing when messages are received, can be used as a mechanism for cheating, downloading of inappropriate material, “sexting” and numerous forms of cyber bullying (Warnich & Gordon, 2015).

Despite the seemingly harsh rule that attracted a fine of R50 and bringing a parent to school; learners brought their phones to school. Learners who did not have own but shared their phones with parents or siblings were the ones that left them at home by choice. There is a demand of the free Wi-Fi, but little or no supply. The fact that the learners are trying to log in and have not given up means the demand can be met if supply was constant and reliable.

Self-efficacy is a person belief in one's own abilities to achieve a specific task (Bandura, 1997). Internal locus of control is people's belief that they are in charge and have power to control events and situations that occur whilst external locus of control is when individuals believe that

external factors control a particular outcome or result. Persistence of use can be explained by the distinction between external locus of control and self-efficacy (Bandura, 1997; Zimmerman, 2000). Internal locus is when learners' place blame on themselves for the inability to do a task because they have power over the Wi-Fi.

Self-efficacy made learners believe in their own abilities to use the Internet, making them know that difficulty to connect was not their fault. In this case, self-efficacy assisted learners in identifying that it was probably the hotspots that were malfunctioning and the blame was not on them. External forces were the cause of the difficulties. The blame lay on the government that was providing the service "*So is the government aware that sometimes the Wi-Fi cannot connect*" [FG8]. This confidence prompted them to continually try to connect and use the free Wi-Fi.

Cases of mobile bullying were experienced by some learners especially the females. Males took pictures of "celebrity" females and shared them on social networks once they were on a free Wi-Fi zone at school. Oosterwyk and Kyobe (2013) define cyber bullying as the use of ICT by individuals to discredit or harm others. Technologies used in bullying include instant messaging, social networks and mobile phones. The females in [FG11] explained that the Facebook posts were a demeaning and disruptive practise at the school. A study by Kyobe et al., (2016) found that school culture had an influence on mobile bullying.

Learners are not accessing the free Wi-Fi provided by municipality at Alpha school. These findings differ from Chigona et al (2016) on a similar research of domesticating free Wi-Fi in the disadvantaged communities who noted that users could easily log in and use the free Wi-Fi in their communities with little or no difficulty. This study, however, focused on users that could access the service in the libraries. This could explain the difference in the results produced by this study.

7.4. CONVERSION

Learners reached the conversion stage. Respondents expressed different experiences discussed in relation to adoption and use consequently affecting conversion. Some have shared positive results with others whilst others negatively discussed their experience with free Wi-Fi. Others simply have not shared the experience.

7.5. REVIEW OF RESEARCH QUESTION AND OBJECTIVE

This study asked the question “*How do high school learners from disadvantaged communities in Cape Town, South Africa use with the free Wi-Fi in a school environment?*”

The objective was; *to gain an understanding of the adoption and use of free Wi-Fi in the learning environment amongst high school learners from disadvantaged communities in Cape Town, South Africa.*

Learners in disadvantaged communities engage with the free Wi-Fi with difficulty and frustrations. It is difficult to identify the network to access which are free, to access and to eventually use and connect to the Internet often. Learners revert back to using data bundles; connecting to the Internet. Costs of data bundles in South Africa are high (Mochiko, 2016) and expensive for most citizens especially those from low-income households (Gillwald et al., 2012) This defeat the purpose set by the Western Cape government objective of alleviating poverty and bridging the digital divide by providing free Wi-Fi in disadvantaged communities (Western Cape Government, 2017).

The context of disadvantaged communities has a negative effect on learner’s integration of the free Wi-Fi in their school environment. Some ICT projects implemented in schools in disadvantaged communities have failed in the past (du Toit, 2012). Reasons for failure included lack of support from the implementers. Therefore, the chances remain low.

7.6. SUMMARY OF CHAPTER

The findings of the research were discussed in this chapter. The discussion was linked to literature. A discussion on the assumption at the start of the research was revealed.

The research question was answered and objective discussed. Engaging with free Wi-Fi is a challenge at the school. The environment of the learners is a contributing factor to the challenges.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1. INTRODUCTION

The aim of the study was to understand how and why learners in disadvantaged communities adopt and use the free Wi-Fi. One of the key findings revealed was how commodification was achieved in numerous ways, including word of mouth, posters and through a consultative process from the implementers. Most groups revealed that they became aware of the service in 2015 and immediately began the process of trying to use it at school. Learners that can access using free Wi-Fi for both academic and hedonic uses.

There is a mismatch of information, provided by the Western Cape Government through email conversation and the interviews done with the focus groups. The Western Cape Government revealed that there was high usage surrounding the school whilst learners expressed difficulty to use or no use of free Wi-Fi at all. If the learners paid for the service would it then be of high quality than the one being currently provided?

Frazer (2009) argues that the free Wi-Fi should be paid for just like any service that municipalities offer to its citizens. Whilst Hudson (2010) explains it free Internet services as mere political campaigns that fail at the end. Difficulties to connect and use the free Wi-Fi defeated the purpose of offering and advertising the service as “*free*”. The meaning of “*free*” from the experience of the learners was redefined. Free means capped, free means slow, free means available at specified times, free means password, free means long loading time, free means unavailable, free means nowhere to complain and finally free means finally resorting to purchasing data bundles.

8.2. CONCLUSION

The paper concluded by showing that learners reached the conversion stage. One major contribution of the study is that the learners were able to reach the conversion although the success was hampered by the frustrations to use.

The study focused on the perspective of the learners. This limits a holistic view of the implementers, policy makers, teachers, and the principal on why successful adoption and use has not been achieved. Future research could follow to achieve more results with responses from key stakeholders mentioned. We recommend that community and in-school training be conducted twice a year on available access points, how to access them, troubleshooting and terms of use. Finally, we also recommend continuous quality control of the system that the functioning of the networks be tested occasionally so that the assurance that the service of free Wi-Fi receives the people is guaranteed.

8.3. RECOMMENDATIONS

A limitation to the study was the focus on learners within the school environment. Demographic showed that more learners were able to connect outside the school environment than inside the school. Future studies could employ a quantitative approach to include teachers and the rest of the community members. This would give clarity to implementers on where to strategically house the Wi-Fi equipment to cover a large spectrum.

Future studies could do comparative studies on Municipalities with successful projects and failed projects particularly in Africa. Lessons from such studies could be vital for Municipalities to either correct errors or improve services offered to citizens.

Learners could be encouraged to provide feedback on ICTs that are set up in their communities. For instance, Neotel rely on a system that captures user's login traffic and not actual use of the service. I recommend that the Western Cape Government and Neotel during their launches in different communities emphasize on the importance of feedback from the learners. This would allow them to compare records of actual feedbacks and records from the system to know when, where and how to improve on the service.



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APPENDIX A: ADOPTION AND USE THEORIES

Name	Adoption and Use theories
Technology Acceptance Model (TAM)	<pre> graph LR EV[External Variables] --> U[Perceived Usefulness (U)] EV --> E[Perceived Ease of Use (E)] U --> A[Attitude Toward Using (A)] E --> A A --> BI[Behavioral Intention to Use (BI)] BI --> ASU[Actual System Use] U --> ASU </pre>
Theory of Planned Behaviour (TPB)	<pre> graph LR BA((Behavioral attitude)) --> I((Intention)) SN((Subjective norms)) --> I PBC((Perceived behavioral control)) --> I I --> B((Behavior)) PBC -.-> B </pre>
Unified Theory of Acceptance and Use of Technology (UTAUT)	<pre> graph LR PE[Performance Expectancy] --> BI[Behavioral Intention] EE[Effort Expectancy] --> BI SI[Social Influence] --> BI FC[Facilitating Conditions] --> BI BI --> UB[Use Behavior] G[Gender] -.-> BI A[Age] -.-> BI E[Experience] -.-> BI V[Voluntariness of Use] -.-> BI </pre>
The Digital Competence Assessment Framework	

<p>Information Systems Success Model</p>	
<p>Diffusion of Innovations</p>	



APPENDIX B: DEMOGRAPHIC INFORMATION OF LEARNERS

1. What is your age?

12-14 15-17 18-20

21 & over Prefer not to answer

2. What gender are you?

Male Female Prefer not to answer

3. What race group do you belong in?

African Black Coloured Indian

White Caucasian Prefer not to answer

4. What community do you come from?

Delft, Suburban Delft, Leiden Philippi

Cross Roads Other,

Specify.....

5. Do you have any (or all) of the following

Mobile Tablet

Laptop Other

Specify.....

6. Can you access internet on the device?

Yes No Prefer not to answer

7. Where do you use Free Wi-Fi?

Within School Outside school Both, at school and outside school

APPENDIX C: INTERVIEW GUIDE FOR FOCUS GROUPS

Section 1: Appropriation

(AWARENESS)

1. Are you aware of the Free Wi-Fi at the school?
 - 1.1 How did you get to know about the free Wi-Fi?
 - Do you know the free Wi-Fi by name?
 - 1.2 Is that the reason you have the communication device you have?
 - Are you carrying your device with you now, if Yes how are you connected to the Internet during this Interview
 - 1.3 Do you know who provides the service of Free Wi-Fi at your school?
 - If you don't who do you think could be providing this service?

2. What kind of training did you receive from the providers or the school on the use of Free Wi-Fi?
 - 2.1 Was it useful or you still need more training?
 - 2.2 How long have you been using the Free Wi-Fi?

Section 2: Commodification

(ADAPTING USER AND ENVIRONMENT)

2. During what intervals do you connect to the Free Wi-Fi? Why?

2.1 When is good reception and where is it?

2.2 Are the times mentioned the same times that your friends/family/ classmates connect?

2.3 Do any of you of your friends prefer to connect using data bundles?

- How and why do you switch the free Wi-Fi and connecting using data bundles

2.4 What do you use the Free Wi-Fi for? Are there certain sites that are faster or slower to load when using free Wi-Fi...And with data bundles?

2.4.1 What are your favourite sites?

2.4.2 How many of these are academic sites and how many are social sites?

2.4.3 Is there any **specific material/s** that you like to share with family or friends when connected on the Free Wi-Fi? (anything that stands out that intrigued that was circulated or is still circulating)

2.4.4 And why do you consider the above mentioned academic or social?

2.5 How do your teachers use the Free Wi-Fi for teaching / learning purposes?

2.5.1 Do the teachers encourage or discourage the use of Free Wi-Fi?

2.5.2 What are their reasons for encouraging or discouraging the use?

2.5.3 Do the parents encourage or discourage the use of Free Wi-Fi? (*using less bundles bought by their parents*)

2.5.4 What are their reasons?

Section 3: Conversion

3. Who are the people (classmates, friends) that know that you use the Free Wi-Fi?
 - 3.1 Is it a source of pride or is it a secret for you, why or how?
 - 3.2 What is your reason for the answer given?
(Why is it a secret, why is it a source of proud and how do you keep it a secret and how do you show it off).
 - 3.3 Is the project of free Wi-Fi a good idea for high school learners to access either at school or at home
 - 3.4 Of the people discussed above who have you physically shown or told about the Free Wi-Fi.
 - 3.4.1 How do you encourage them to connect to the Free Wi-Fi?
 - 3.4.2 If you don't encourage them what is your reason for that?
 - 3.5 How do you connect to the internet when you are at home?
 - 3.5.1 How many people do you know that connect to the school Free Wi-Fi after school hours?
 - 3.5.2 Are some of those people your family members connected if yes, when did they get access and did they tell you?

Follow-up interview request

Should an individual find the need to elaborate on some of the answers provided within the group as an individual, follow up interview will be carried out at the participants' most comfortable time.

It is important to note that all information provided will remain strictly confidential and protected by the ethics code of the University of Cape Town.



APPENDIX D: QUESTIONNAIRE TO SCHOOL ADMINISTRATOR

Section 1: Demographic information

**Please complete by ticking one box*

1. What gender are you?

- Male Female Other
 Prefer not to answer

2. What is your age?

- 21-30 31-40 41-50
 51 & over Prefer not to answer

3. Job Title

- Administrator Admin Assistant Teacher
 Other *(please specify)*.....

4. Highest level of Education:

- Matric Certificate / Diploma Degree
 Other *(please specify)*.....

5. Employment status

- Full Time employed Part-time employed Volunteering
 Other *(please specify)*.....



6. How long have you been aware of the existence of the free Wi-Fi in this school.....months/ years.

7. Who introduced you personally to the free Wi-Fi *(tick one box only)*

The school staff

The Municipality

Learners

Other *(please specify)*

8. Are students aware of the Free Wi-Fi within the school? Are you the one who told the learners about the service?

Yes

No

Other

(please specify).....

9. What kind of training did you receive from the municipality on the implementation of the Free Wi-Fi at the school? What is the name of the hotspot?

.....

10. How was the Wi-Fi facilitated at the school? Can you briefly explain

.....

11. If you could would you change anything about how the free Wi-Fi was implemented what would it be? Please elaborate.

.....



Section 3: Appropriation

6. Briefly describe the procedure a student has to follow to register to the free Wi-Fi?

.....

7. Does the school control the usage of the free Wi-Fi? If so how is it controlled?

Yes No

.....

8. During what times does the Wi-Fi experience high volumes of usage?

.....

9. Describe some of the connectivity problems that students experience that you assist them with?

.....

10. In which way do you find Free Wi-Fi complicated for the learners?

.....

Section 4: Conversion

11. What are some of the sites that you have heard learners say they enjoy connecting to?

.....

12. How do learners continue using the Free Wi-Fi after school hours?

.....

13. Is the surrounding community aware of the Free Wi-Fi that the school hosts? If so who told them about it. Do they have their own that is access or do they connect to the school Free Wi-Fi?

.....



Should you find the need to elaborate on some of the answers provided in the questionnaire to the administrator, please enter your name, contact number and a follow up interview will be done.

It is important to note that all information provided will remain strictly confidential and protected by the ethics code of the University of Cape Town

Return Instructions

After completion, survey questionnaires will be collected personally by the researcher or emailed directly to me at [email removed](#). Thank you for the patience in taking time to complete this questionnaire survey.



APPENDIX E: CONSENT LETTER TO PARENTS



Department of Information Systems

Leslie Commerce Building
Engineering Mall, Upper Campus

OR

Private Bag, Rondebosch 7701
Tel: +27 (0) 21 650 4028 Fax: +27 (0) 21650 2280
Internet: <http://www.commerce.uct.ac.za/informationssystemsf/>

16 November 2016

To Parent/s or Guardian

Ref: **Consent for a learner to participate in a focus group**

I am a student studying towards a Masters degree in Commerce specialising in Information Systems at the University of Cape Town (UCT). As part of the course requirement I need to conduct research and have chosen to conduct the research in your community. My research topic titled "Domestication of Free Wi-Fi amongst high school learners in the Western Cape, South Africa.

I would kindly like to invite your child to be part of the interviews. Your child can withdraw from the interview session anytime. The research is the property of the University of Cape Town and ethical consideration and confidentiality are a priority in the study. The information shared by your child will be treated with confidentiality.

A prerequisite to participate in the focus groups interview your child needs to be a

1. Full time student at the school
2. Resident of the student community understudy

The focus groups will be guided by the researcher and will take approximately 30 minutes.

Your co-operation will be greatly appreciated

signature removed

Zwelithini Mabhena
Department of Information Systems
University of Cape Town
Email: email removed

signature removed

Professor Wallace Chigona
Department of Information Systems
University of Cape Town
email removed



APPENDIX F: RESPONSE LEAFLET FROM PARENTS

Letter to Parents/Guardians

I, ----- agree that my child can participate in the research by being part of the focus group discussion for the research study (*Domestication of Free Wi-Fi amongst high school learners in the Western Cape, South Africa*).

I am aware that her/his/other participation is voluntary and she/he/other can withdraw from the study anytime if so they wish.

.....

.....



APPENDIX G: CONSENT LETTER TO SCHOOL ADMINISTRATOR



Department of Information Systems

Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag, Rondebosch 7701
Tel: +27 (0) 21 650 4028 Fax: +27 (0) 21650 2280
Internet: <http://www.commerce.uct.ac.za/informationssystemsf/>

16 November 2016

To the Administrator / ICT role

I am studying towards a Masters degree in Commerce specialising in Information Systems at the University of Cape Town. As part of the course requirement, I am required to conduct research. My research is titled "*Domestication of Free Wi-Fi amongst high school learners in disadvantaged communities in the Western Cape, South Africa*". The purpose of the research is to understand how and why high school learners from disadvantaged communities adopt Free Wi-Fi. I have chosen to conduct research at your school.

I would kindly like to invite you as an administrator/ICT role to answer the questions given. You are allowed to discontinue with the research anytime you feel like it. This is voluntary.

The research is the property of the University of Cape Town and ethical considerations and confidentiality are a priority in this study. The findings of research and the final thesis write-up remain the property of UCT.

Thank you for time and participation.

Sincerely,

signature removed

Zwelithini Mabhena
Department of Information Systems
University of Cape Town
Email: email removed

signature removed

Professor Wallace Chigona
Department of Information Systems
University of Cape Town
email removed



APPENDIX H: ETHICS APPROVAL -UCT



Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za



@Commerce_UCT



UCT Commerce Faculty Office

17 March 2017

Ms Zwelithini Mabhena
Department of Information Systems
University of Cape Town

Dear Ms Mabhena

Project: Domestication Of Free Wi-Fi Amongst High School Learners In Disadvantaged Communities In The Western Cape, South Africa

Thank you for submitting your study to the Faculty of Commerce Ethics in Research Committee.

It is a pleasure to inform you that the EIRC has **formally approved** the above-mentioned study.

Approval is granted for the period of 12 months. Should you require an extension or make any substantial changes to the research methodology which could affect the experiences of participants, you must submit a revised protocol to the Committee for approval.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Your sincerely

SAMANTHA ALEXANDER
Administrative Assistant
University of Cape Town
Commerce Faculty Office
Room 2.24 | Leslie Commerce Building

Office Telephone: +27 (0)21 650 2695
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"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."



APPENDIX I: ETHICS APPROVAL – WESTERN CAPE GOVERNMENT



Directorate: Research

Audrey.wyngaard@westerncape.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20161215-7046

ENQUIRIES: Dr A T Wyngaard

Ms Zwelithini Mabhena
25 Irma's Lane
Diep River
7945

Dear Ms Zwelithini Mabhena

RESEARCH PROPOSAL: DOMESTICATION OF FREE WI-FI AMONGST HIGH SCHOOL LEARNERS IN DISADVANTAGED COMMUNITIES IN THE WESTERN CAPE, SOUTH AFRICA

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators, and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners, and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **18 January 2017 till 18 May 2017**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings, and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards.

Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 15 December 2016

APPENDIX J: RESEARCH DELIVERABLES

Seminar Schedule for IS Masters									
Day of the week:			MON	TUE	WED	THU	FRI		
Week No & Date			Lecture Topics					Deliverables Due	
1	01-Feb	04-Feb					Welcome Registration / Function		
2	22-Feb	25-Feb	Departmental research topics (all staff members)				Presentation skills-1 PCU	Student Pres 1	
3	21-Mar	24-Mar	Human rights day 21/3				1st Vacation - Good Friday 25/3	Student Pres 1 (HL Prop) 23/3	
4	28-Mar	31-Mar	1st Vacation - Family Day 28/3	1st Vacation	1st Vacation	1st Vacation	1st Vacation		
5	25-Apr	28-Apr	Research Design		Freedom day 27/4	Research Design	Workers Day 1/May	Dissertation Proposal 29/4	
6	06-Jun	09-Jun	Mixed Methods 1			Mixed Methods 2		Mid-year vacation (11th June-17 July)	
7	11-Jul	14-Jul	MID-YEAR VACATION (11th June - 17th July)						
8	25-Jul	28-Jul						Literature Survey Thu 25/7	
9	17-Oct	20-Oct						Research Design 20/10	
10	28-Nov	01-Dec	Research Progress & Course Wrap-up						



APPENDIX L: INITIAL CODES

Code Number	Code Name				
1	Advantage				
2	Android				
3	Area				
4	Area				
5	Beyoncé				
6	Better				
7	Boring				
8	Boys				
9	Brother				
10	Bundle				
11	Buy				
12	Celebrities				
13	Cell				
14	Clinic				
15	Close				
16	Clothes				
17	Connect				
18	Cool				
19	Cost				
20	Crime				
21	Data				
22	Delete				
23	Delft				
24	Dressed				
25	During				
26	Easy				
27	Exit				
28	Expensive				
29	Facebook				
30	Far				
31	Fix				
32	Free				
33	Gate				
34	Girls				
35	Google				
36	Government				
		37	Grade	75	Poor
		38	Grant	76	Popular
		39	Group	77	Poster
		40	Hack	78	Principal
		41	Hard	79	Quit
		42	Harder	80	Radio
		43	Help	81	Read
		44	Helpful	82	Rest
		45	High better	83	Rule
		46	Home	84	Saturday
		47	Inside	85	School
		48	Instagram	86	Sister
		49	Inverted	87	Secret
		50	IPhone	88	Service
		51	Knew	89	Sleep
		52	Know	90	Struggle
		53	Last	91	Smartphone
		54	Library	92	Sunday
		55	Lot	93	Talking
		56	Made	94	Teacher
		57	Make-up	95	Telkom
		58	Mall	96	Time
		59	Matric	97	Told
		60	Monday	98	Township
		61	Mother	99	Try
		62	Nails	100	Unfortunate
		63	Naughty	101	Upset
		64	Neotel	102	Uses
		65	Nothing	103	Walk
		66	Off	104	Weekend
		67	Online	105	Ways
		68	Open	106	Wi-Fi
		69	Outside	107	Windows
		70	Placed	108	Wrong
		71	Password	109	Year
		72	People	110	Young
		73	Pictures		
		74	Pin		