

**ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY
(ICT) AMONG PERSONS WITH DISABILITIES (PWDs) IN NAIROBI COUNTY**

BY

ROSE WAMBUI NJUGUNA


K50/74984/2014

**A Thesis Submitted in Partial Fulfillment of the Requirements for the Award of Degree
of Master of Arts in Communication Studies (Development Communication), School of
Journalism and Mass Communication at the University of Nairobi**

NOVEMBER 2016

DECLARATION

This thesis is my original work and has not been presented anywhere to the best of my knowledge. No part of this thesis may be reproduced without the prior permission of the author.

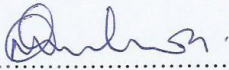
Signature.....

Date.....09/11/2016.....

ROSE NJUGUNA

REG NO: K50/74984/2014

This project report has been submitted with my approval as the university supervisor.

Signature.....

Date.....09/11/2016.....

DR. MARTINA MUTHEU

DEDICATION

I dedicate this research project to my mother and sisters for their endless love, support and encouragement that makes me be where and who I am today. Special dedication to Nancy for your walk with me step by step. I love you all dearly.

ACKNOWLEDGEMENTS

I thank the Almighty God for the strength, courage and grace to get this far in my journey in studies and in life and for providing me this opportunity to proceed with this work to its successful completion. I would like to express my appreciation and thanks to my supervisor Dr. Martina Mutheu for her guidance, assistance and patience during this research process. Thanks to all my sisters and mother who have been my source of encouragement when it seemed darkest. Thank you for your prayers. And to my friends for providing support and friendship that I needed.

Special recognition to Kenya Society for the Blind, Deaf Aid and Francis Anyenda (NCPWD) for their support as well as everyone else who made this process manageable.

Nonetheless, I take responsibility for the omissions, errors and distortions in this project despite having all the support.

Bless you.

TABLE OF CONTENTS

DECLARATION	Error! Bookmark not defined.
DEDICATION	i
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
ABBREVIATIONS AND ACRONYMS	ix
ABSTRACT	x
CHAPTER ONE	1
INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.0 Overview	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	4
1.3 General Objective	5
1.3.1 Specific Objectives	5
1.3.2 Research Questions.....	5
1.4 Significance and Justification of the Study.....	5
1.5 Operational Definition of Terms	6
CHAPTER TWO	8
LITERATURE REVIEW AND THEORETICAL FRAMEWORK	8
2.0 Overview	8
2.1 Access to ICTs among PWDs	8
2.2 Barriers towards Access of ICTs among PWDs	9
2.2.1 Financial and Economic Barriers	10
2.2.2 Societal Attitudes and Exclusion.....	11
2.2.3 Policy and Governmental Support.....	11
2.2.4 Support, Educational and Training Barriers	12
2.3 Interventions to Enhance ICT Accessibility among PWDs	12
2.4 Theoretical Framework.....	14
2.4.1 Capability Theory (CT)	15

2.4.2 Social Constructivist Theory (SCT)	16
CHAPTER THREE	18
RESEARCH METHODOLOGY.....	18
3.0 Overview	18
3.1 Research Design	18
3.2 Research Approach.....	18
3.3 Research Methods	19
3.3.1 Questionnaires	19
3.3.2 Key Informant Interviews	19
3.4 Research Site	20
3.5 Target Population	20
3.6 Sampling Technique and Sample Size	20
3.7 Data Collection Procedures.....	21
3.8 Data Analysis and Presentation.....	21
3.9 Scope and Limitations of the Study.....	22
3.10 Research Ethics	22
CHAPTER FOUR.....	24
DATA ANALYSIS AND INTERPRETATION	24
4.0 Overview	24
4.1 Demographic Information.....	24
4.1.2 Gender.....	24
4.1.3 Age.....	25
4.1.4 Education Level.....	26
4.1.5 Employment Status.....	26
4.1.6 Disability Type	27
4.2 ICTs adopted by PWDs in Nairobi County	28
4.2.1 ICTs Used among PWDs	28
4.2.3 ICTs Wish PWDs Use	29
4.3 Barriers facing PWDs use of ICTs	30

CHAPTER FIVE.....	36
SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	36
5.0 Overview.....	36
5.1 Summary.....	36
5.2 Conclusion.....	37
5.4 Areas of Further Studies.....	40
Appendix 1: Consent Letter.....	48
Appendix 2: Questionnaire for Persons with Disability.....	49
Appendix 3: Key Informant Interview Guide.....	52
Appendix 4: Certificate of Fieldwork.....	53
Appendix 5: NACOSTI PERMIT.....	53
Appendix 6: Certificate of Correction.....	55
Appendix 7: Plagiarism Certificate.....	56
Appendix 8: Declaration of Originality.....	57
Appendix 9: Table of Recommended Sample Size (n) for Finite Populations (N).....	58

LIST OF TABLES

Table 3.1: Sample Size Distribution	20
Table 4.1: ICTs used among PWDs Respondents	28
Table 4.2: ICTs PWDs Wish they Could Use	29
Table 4.3: PWDs ICT Use Barriers.....	30
Table 4.4: Interventions of ICT Use among PWDs	33

LIST OF FIGURES

Figure 1: Gender of Respondents.....	25
Figure 2: Age Distribution among Respondents.....	25
Figure 3: Education Level of Respondents.....	26
Figure 4: Employment Status of Respondents.....	27
Figure 5: Disability Type among Respondents.....	28

ABBREVIATIONS AND ACRONYMS

ATs	Assistive Technologies
CT	Capability Theory
ICTs	Information and Communication Technologies
ILO	International Labour Organization
KNCHR	Kenya National Commission on Human Rights
NACOSTI	National Commission of Science Technology and Innovation
NCAPD	National Coordinating Agency for Population and Development
PWDs	People with Disabilities
SCT	Social Constructivist Theory
SWDs	Students with Disabilities
UNCRPD	UN Convention on the Rights of Persons with Disabilities
WHO	World Health Organization
CRPD	Convention on the Rights of Persons with Disabilities

ABSTRACT

This study sought to investigate the accessibility to information and communication technology among Persons with Disabilities in Nairobi County, Kenya. The study was guided by two specific objectives; to find out the ICTs that are adopted by PWDs in Nairobi County and investigate sustainability of ICTs adopted by PWDs in Nairobi County. The study adopted the Capability Theory and Social Constructivist Theory to guide the research. The research was a descriptive survey and adopted both qualitative and quantitative approaches of data collection. The stratified random sampling procedure was adopted in this study. The sample size for the study was 381. A semi-structured questionnaire was adopted as the primary tool for collecting data. It was administered to the persons with disabilities and was used for the purposes of collecting primary quantitative data. The study was able to collect 160 questionnaires and three key informants were conducted from 3 members from the Kenya disability web portal. The findings revealed that the most used ICTs among PWDs were mobile phone/television and radio/mobile phones. The study found that PWDs wish they could use internet connected ICTs. The respondents also cited that they would wish to use portable internet accessible devices. The study found that limited training on device use and rehabilitation services was the major barrier in PWDs use of ICTs. Affirmative action and waiver of taxes on ICTs for PWDs was cited as the most significant intervention to enhance sustainability of PWDs use of ICTs. The study concluded that there is need for ICT training for PWDs in order to bridge the digital divide between PWDs and their able-bodied peers. The study further concluded that granting of privileges for PWDs was the best way for PWDs to be able to access and use ICTs. The study recommends that the government should stimulate the introduction of ICT-enabled solutions for persons with disabilities, increasing the availability of accessible ICTs and promoting the affordability of assistive technologies. Policy makers can address market failure in assistive technology through public interventions and mandatory incorporation of accessibility requirements into public procurement policies. Business entities should design, manufacture, develop and distribute into the market key ICT-enabled solutions for persons with disabilities and civil society organizations can bring about awareness of persons with disabilities and their parents of what ICTs can do to bring about their economic and social integration.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.0 Overview

This chapter presents the background to the study, statement of the problem, the objectives of the study, which are distinguished by the general objective and specific objectives, research questions derived from the research objectives, justification of the study, significance of the study, scope of the study and operational definition of terms.

1.1 Background to the Study

Information and Communication Technologies (ICTs) have immensely been incorporated into almost each part of our wellbeing. ICT is now a force to reckon especially in transformation and an integral component of individual and organisational development. It has the capacity to cut costs in terms of coordination, communication and information processing (Brynjolfsson & Hitt, 2000). Information communication technologies have social, economic, environmental and political impact in the modern society (Islam, 2015).

The World Bank (2007) estimated that 10-12 % of global population were living with disabilities. A report by World Health Organization (WHO) and the World Bank estimated that 15 % of the global population (more than one billion people) were living with some type of disability, physical or cognitive. A high percentage live in developing countries (WHO & World Bank, 2011). Statistically, the United Nations (UN) points out that 10 % of the global populations encompass persons with disabilities in distinct forms.

The International Labour organization (ILO) estimated that 82 % of PWDs in the third world countries live on less than a dollar per day and mostly devoid of access to crucial components of development such as social amenities according to ILO (2012). Furthermore, they encounter barriers in the job environment as a result of inadequate skills and education. A report by the United Nations Educational, Scientific and Cultural Organization (UNESCO) more than 80 % of disabled people survive in secluded regions in the least developed countries. It further shows that the rate of unemployment for such

individuals in such countries adds to about 90% while in the developed world to around 70% (UNESCO et al., 2011).

According to the Kenya National Survey for Persons with disabilities conducted in 2007, the aggregate rate of disability in the country is approximately 4.6% translating to around 1.7 million people. They are a crucial lot in the population and have an elongated encounter when it comes to marginalization. Moreover, a bigger proportion of them are exposed to an environment with no socio-economic services such as education, health among others. National Coordinating Agency for Population and Development [NCAPD], 2008).

Information communication technologies are relevant in the allowing of the socio-economic and political incorporation and ICTs mainstreaming by availing to them different services, job opportunities, information and essentially, to communicate properly despite their condition. Nonetheless, for ICTs to perform such a task, different ICT services must be accessed and affordable as well. In acknowledging the importance of Information Communication Technologies, the United Nation Convention on the Rights of Persons with Disabilities (UNCRPD) has emphasized on the role of the government to make sure that there is availability of the same to disabled persons. The Convention was incepted by the UN General Assembly on 13th December, 2006 and has been approved by around 146 nations and signed by 146 countries since September, 2010 rendering it a binding agreement since 5th May, 2008. Kenya ratified the UN Convention on Rights of Persons with disabilities (CRPD) on 19 May, 2008 and thereafter was a component of the law under Article 2 (6) of the Constitution of Kenya (Kenya National Commission on Human Rights, [KNCHR], 2014).

Article 9 of the Convention describes accessibility to ICT as an essential element of the Accessibility Rights. In addition, Article 21 on Freedom of expression, opinion, and access to information particularly mentions that ‘States Parties shall take all appropriate measures to ensure that persons with disabilities can exercise the right to freedom of expression and opinion, including the freedom to seek, receive and impart information and ideas on an equal basis with others and through all forms of communication of their

choice...”. The Convention describes communication as incorporating the entire ways of socializing that may get rid of hindrances. In its development blueprint, The Kenya Vision 2030, the state is aware of the fact that technology is a fundamental element of economic success. The nation’s objective of knowledge oriented economy targets at moving the existing industrial advancement path to creativitiy where development, acquisition, adaptation and application of knowledge stays as the main point of economic success. ICT is an essential component of increasing human capital and is mainly dependent on a framework of generating, disbursing and using data and intelligence which in return plays a big role in spurring higher output; thus, economic development in the long term (Government of Kenya, 2013).

Osman (2015) agrees that ICT performs an important function in the lives of persons with disabilities. However, they encounter a number of challenges in accessing ICT services. Therefore, ICT is regarded as a successful mediator in empowering some of the marginalized communities and individuals in Kenya. Concerning empowering of disabled persons in employment, the research presumes that ICT is instrumental in this respect. Since ICT proficiency is now among the most fundamental skills to compete in the business environment, training of disabled individuals in this field is required as soon as possible.

There exists a properly drafted study to indicate the presence of a ‘digital divide’ in the society based on convenience and application of ICTs (Warschauer, 2008). This divide also exists for individuals with disabilities [Dobransky & Hargittai, 2006; Hackett, Bambang & Xiaoming, 2006). The concept “disability divide,” aims at refocusing knowledge of how digital divide impacts disabled people especially, and to deal with the gap existing between them and able-bodied in spite of developments in assistive technologies and increased recognition of executing a well-known design (Bakera, Hansonb & Myhill, 2009).

In the United States, Jaeger (2006) contrasted and assessed the current countrywide surveys applied in the gathering of information, and suggested that an all-rounded participation relies mainly on the capability to apply IT. Individuals experiencing

impediments when it comes to accessing and applying ICTs are as well disadvantaged both educationally and economically. In acknowledging the importance of ICT in assisting disabled persons to be self-sufficient and in allowing them to be incorporated in the mainstream society, the study seeks to investigate access to ICTs among PWDs in Nairobi County. In its Vision 2030, the government, proposes programmes and Projects for 2013-2017 include mainstreaming disability (incorporation and availability) which seeks to make sure that problems that immediately impact them are sufficiently eliminated by introduction of policies and legal structures, programs, and programs. Nonetheless, Williams et al. (2006) pointed out that there is a shortage of Special education needs exploration into applicability, to disabled individuals, and even less regarding people with learning challenges.

1.2 Statement of the Problem

There are several authors that have explored the relationship between PWDs and access to ICTs in Kenya. Murugami and Mazrui (2012) conducted a study on challenges faced by disabled persons when accessing the internet. Some of the barriers included inaccessible elements of social networks; incomprehensible structure; web design not allowing for users to customize and inadequate components for audio material. Kakiri (2012) conducted a study on challenges facing the deaf in accessing ICT. The study revealed that mobile handsets are not structured to attain the disabled persons demands and desires; Deaf users were unable to stream videos; none of the ICT goods in Kenya were formulated to inform the deaf in the event of calamities and devoid of the will to institute rules and regulations associated with accessibility to ICT.

Njoka's (2012) research on promoting accessibility to ICT services for PWDs showed that illiteracy; lack of a productive technology to assist the disabled; inadequate of explicit intervention techniques by the state; poor leadership; Many of the disabled persons thrive in rural and underdeveloped areas of the country with poor coverage of the existing ICT infrastructure and distinct designs of ICT components not good for application by disabled persons were barriers to ICT accessibility.

Despite these authors' contributions, there is less evidence of academic research on ICT access among PWDs in Kenya. To attain an actual inclusive society, each one of us should be in a position to utilize information and communication technologies (ICTs) effectively. It implies that enhancing the "accessibility" of ICTs should be prioritized. This study therefore seeks to investigate on information and communication technology accessibility among persons with disabilities in Nairobi County, Kenya.

1.3 General Objective

The general objective of the study was to investigate access to information communication technologies among people with disability in Nairobi County, Kenya.

1.3.1 Specific Objectives

The study was guided by the following specific objectives;

- i. To find out the ICTs that are adopted by PWDs in Nairobi County
- ii. To investigate sustainability of ICTs adopted by PWDs in Nairobi County

1.3.2 Research Questions

The study aimed to answer the following questions;

- i. What are the ICTs that are adopted by PWDs in Nairobi County?
- ii. To what extent are ICTs adopted by PWDs sustainable in Nairobi County?

1.4 Significance and Justification of the Study

The study proposes to be useful to multiple stakeholders. First, the study will be of importance to policy and decision makers as it will provide information on the challenges facing PWDs in accessing ICTs. This information will be useful in policy making. Second, the study will be of significant to manufacturers and distributors of ICTs in Nairobi County and in Kenya in general as it will advise these stakeholders on what challenges PWDs face and how manufacturers can incorporate PWDs friendly designs to ICTs. Third, the study hopes to be of significance to PWDs as it will provide an avenue for these groups of society to give their experiences in accessing ICTs in their day to day lives. Lastly, the study will be of importance to scholars and researchers as it will

contribute to the body of knowledge on PWDs access to ICT and also suggest areas of further study in the field of PWDs and ICT accessibility.

Approximately 18 % of the global population are disabled which represents around 1 billion people in the world (Vicente & López, 2010). ICTs such as handsets, TVs and the world wide web, are a popular means that extends beyond crucial public services, enhancing inclusion digitally. Computers and the Internet have become a necessity for many. For those with disabilities, these technologies have an even more significant value because they provide access to information in formats that are not available elsewhere. According to United Nation's (2009), ICT should be a key element of the inclusive agenda to persons with disabilities. It was also agreed that accessing ICT for PWDs and improving the availability of such technologies needs to be regarded as an important component of international and national techniques to eliminate the existing hindrances encountered by disabled persons.

In a time where we are all rallying for equality, the person with disability seems to be short changed in terms of ICT accessibility. We only have two TV stations in Kenya that are signing for people with hearing impairment. Disabled people should have similar rights to able-bodied people and therefore given an opportunity to take part in national development. The developed technology needs to be inclusive to all persons with disability whereby, any technology developed, should already include functions that will give the persons with disabilities access to its features.

1.5 Operational Definition of Terms

Accessibility – Refers to the good or service used by certain audiences regardless of their deficiencies or abilities. One's capability to apply technology can be adverse as a result of sensory, visual, and mental disabilities.

Assistive Technologies – Describes any element, item either altered or personalized, used to raise, conserve, or enhance the working abilities of a disabled individual.

Information Communication Technologies – Alludes to any communicating device and application, including radios, TVs, mobile handsets, PCs, satellite system, software and hardware, services and applications.

People with Disabilities – The Persons with Disabilities Act 2003 describes disability as a physical, sensory, cognitive or other defects, encompassing any visual, hearing, learning or physical challenge, which affects negatively on social, economic or environmental inclusion. In this study PWDs included the physically disabled, deaf, and blind.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Overview

This chapter of the study presents the literature review where empirical and theoretical framework of the study is presented. The empirical literature of the study is presented in terms of the study research objectives.

2.1 Access to ICTs among PWDs

The Global Initiative for Inclusive ICTs (G3ict) defines accessibility as “a measure of the degree that a good or service may be utilized disabled person successfully in absence of the predicament or disability. It suggests that ICTs as obtained from the Constitution and as required to be used in the ICT structure. This consists mainly of persons with disabilities viewpoint of crucial ICTs; comprehending essential ICTs; and experience in application of ICTs.

Availability of internet services in contemporary society has become fundamental for continued personal development and growth. According to Chadwick, Wesson and Fullwood (2003) ICT can be perceived as a fundamental element in the contemporary world. Many people are going online for a number of purpose such as learning, commercial objectives, data searching, employment, making new friends and searching for love. Therefore, digital connection is very important to individuals and the entire economy (Shapiro & Rohde, 2000).

In the literature, a huge proportion of explorations on internet accessibility mainly focus on disability. Fox (2011) found a “disability divide” in web accessibility in America, around 80% of the able-bodied individuals accessing the internet compared to 54% by the disabled. A United States research discovered a big difference between households governed by a disabled person and those by non-disabled person in technology possession (53% against 79%), web application (48% vs. 76%) and broadband usage (46% against 73%). A British study revealed that disabled persons have a higher probability of never accessing the World Wide Web contrasted to able-bodied people (Dutton & Helsper, 2007). A recent study in the UK found out that disabled people are three times more

probable to have never used the internet compared to non-disabled people (Chadwick et al., 2013).

In South Africa, Mashangoane (2012) found that only 57 % of disabled persons have a mobile handset. Price is the fundamental catalyst of choice by service providers; individuals with physical and sight issues have a higher chance of using public utilities than those hearing and communication challenges. Community service phones were found to be within a walking distance from PWD's homes. Community service telephones are normally close to disabled's household. (ramps, assistive technologies).

In Kenya, Murugami and Mazrui (2012) conducted a study on hindrances to web access for disabled individuals. They encompassed unavailable aspects of the social channels; Some of the barriers included inaccessible aspects of social networks; improper layout and format; a web design restricting customization and shortage of relevant items for audio purposes. The KNHRC (2014) found that PWDs faced challenges to access to communication job data like announcements of vacancies in incomprehensive and structures via the internet and newspapers which a majority could not obtain. The report found that the means of relaying information on latest employment opportunities has been barring a number of advertisements in print media and through the world wide web rendering the disabled persons obsolete.

Vicente and Lopez (2009) study found that disabled people have a lower chance of using the web despite higher levels of income and education. As such, it need not be regarded as sign of incapability. As a matter of fact, it can be regarded as an indication of issues of accessibility. Studies have revealed that around 5.3% of the state websites and other commercial sites in the EU are entirely in line with the fundamental accessibility requirements.

2.2 Barriers towards Access of ICTs among PWDs

Islam (2015) conducted a study on the rights of the people with disabilities and social exclusion in Malaysia. Islam showed that there was social exclusion of PWDs which emanated from the state in regard to ICTs. These included lack of government supports, poverty, lack of education and inaccessible information and communication.

These forms of social exclusion also present themselves as the barriers towards ICT access among PWDs in the community. The study concluded the ICT is not placed in the country according to the needs and demands of the disabled people.

Ong'eta and Nyambura (2012) conducted a study on Use of ICT to promote access and participation of students with disabilities in higher education - benefits and challenges. The authors found that design of buildings presented a barrier for PWDs in accessing ICTs, shortage of assistive technologies to help disabled students or students with disabilities (SWDs) and lack of government support for ICTs access among PWDs. In their study of smart help in the work environment for disabled individuals, Kbar et al. (2015) argued it is considered that a large number of products, either software or hardware, are inaccessible to bigger proportions of the populace. Experts in most cases regard layout for regular applicants and are mostly ignorant of the special demands of disabled persons or incapable to consider their requirements.

In Indonesia, there exists obstructions and problems to give ICT accessibility to disabled individuals. These are: inadequate funding to accelerate the communication tools from state; inadequate support and creation of structure facility and infrastructure of ICT accessibility for disabled persons; there exist dissimilar knowledge of Indonesia Sign Language System, whether among the disabled, and officers and inadequate education for rehabilitation officers on the accessibility of ICTs for disabled people.

2.2.1 Financial and Economic Barriers

Because of its function as a process of collecting information and sharing, application of ICT fits in with possessing high power and command in the society. The digital divide highlights how disabled groups with scarce resources have lower chances of accessing ICT. Scientific evidence affirms that fiscal indicators are important in accessing the internet. To disabled people especially those financially troubled, cost is a main challenge to computer application and web access. (Hoppestad, 2013). It is a clear reflection of the incapacity to fund the acquisition of computer and therefore getting access in various households or day care institution (Hoppestad, 2007). Therefore, accessibility of ICT can be termed as social justice based on the two elements (fiscal

disadvantage and challenges to information access) working together to aggravate oppression.

2.2.2 Societal Attitudes and Exclusion

Problems to information access is not always a result of monetary constraints. Based on social attitudes, the accessibility guidelines to disabled people are constantly ignored or not understood mainly due to the invisible nature of the general population (Kennedy, Evans & Thomas, 2010). Wehmeyer, Smith, Palmer and Davies (2004) state that information technology is mentally inaccessible to PWDs because non-inclusion in issues related to computer design.

Goggin and Newell (2003) point out that disabled people do not occupy powerful position in organizations making crucial choices on web policies and therefore the digital divide will persist. In Palmer, Wehmeyer, Davies & Scott (2012) study, 13 % of participants said that device complication as an obstruction to web application. To make sure that disabled people can utilize the website additional development of recognized design principles are important.

2.2.3 Policy and Governmental Support

Even though the presence huge legal essentials and societal responsibilities to foster inclusion and complete citizenship of individual with disabilities (Mashangoan, 2012), do not seem to have showed these do not appear to have manifested in actual attitudinal transformation to foster ICT accessibility, encompassing the web, for disabled persons. General design includes “the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (UNCRPD, 2010) and is not clear in the bigger part of sites that have been explored (Petrie, Hamilton, King & Havan, 2006). There appears to be inadequate technique on how to incorporate disabled people and despite legal actions have been realized as a way of fostering compliance, execution of such penalties is devoid (Petrie *et al.*, 2006).

2.2.4 Support, Educational and Training Barriers

The majority (84%) of participants in Palmer et al. (2012) study found out that education as an obstruction to application. Furthermore, Blackburn *et al.* (2005) in their research imply that family care providers require extra training concerning the technology alternatives present to them and in how to apply technology associated supports to allow people with mental disabilities to accessing them. Gu, Bricout and Huang (2012) noted that persons with disabilities with higher education levels have a higher chance of accessing the web. Osman (2015) found that persons with disabilities used to encounter to encounter fiscal challenges to access to sources of technical skills since many are poor. It is an issue that bars accessibility to training sources.

Parsons, Daniel, Porter & Robertson (2008) point out that the scope to which care givers bar or allow web access for persons with disabilities is because of organisational culture and the nature of workers regarding the application of information technology, encompassing web access. Inadequate support services render disabled persons over reliant on their loved ones, which bars them from economic and social inclusion (Kbar *et al.*, 2015).

2.3 Interventions to Enhance ICT Accessibility among PWDs

In their study, Ong'eta and Nyambura (2012) proposed several suggestions to enhance ICTs access among PWDs. These included Infrastructural – availability of Assistive Technologies (ATs), PCs, connectivity, institutions (banks, government offices). Presence of support – from government & agencies on fostering accessibility and taking part of SWDs, providing information for example media – braille or audio county editions and fiscal data. Needs assessment on the profile levels of disability and target each adequately. Training – of staff and non-teaching staff on needs and trends in special education.

In a study on ICT competency and employment among Malaysian PWDs, Osman (2015) concluded that education and training is essential to person's with disabilities access to ICT expertise. Osman recommends that there must be enough processes to give ICT education to people with disabilities at convenient prices. It will facilitate them to

contest in the labor market and be employed. In a study on exploiting ICT for empowering people with disabilities in India, Singh (2013) recommended that for the visually impaired that manufacturers could introduce accessibility features such as flexibility for adjustment of font size, screen readers, clear audio and large button phones. Singh recommended that for those with hearing impairments we could adopt extra loud ringing tones, captioned telephony relay service, sign language via video calls, audio amplification and voice recognition software for people with disability who use keyboard gadgets.

There are several assistive technologies software that are available in the market today. These include Window-Eyes - powerful screen reader tool offers overall command over what a person hears; further provides improved Braille support. JAWS – an accessibility solution for visually impaired; access' information on PC screening utilizing synthesized speech with a proper Braille illustration and also customized based on personal demands. Head-mouse Extreme – which is a computer mouse for individuals unable to apply or contain limited application of their hands when commanding a computer and other devices and highly relevant for physically challenged people (Singh, 2013).

Bekteshi (2015) conducted a study on information and communication technology and disabled students in Albania. Bekteshi recommended that there was the desire to increase the knowledge to learners and educators for the application of technology in education for disabled students. It is important to create curriculum and teaching techniques for learners with disabilities. Similarly, it is essential to search for solutions and create proper techniques for customizing the ICT and making sure appropriate ICT for disabled persons.

Bekteshi (2015) further recommended there was need to formulate special posts for disabled students with unique software and hardware: Huge keyboards, colored keys, key guard, nonstandard keyboards incorporating single handed are more accessible, on-screen keyboard; Rather a regular mouse, students with disabilities must employ a rollerball, a touchpad; utilize larger screens, to aid students with physical disability, touch screens for those unable to manage a mouse; Speech to text software that allows text to

appear in a gadget when spoken; A large number of software are present for speech feedback important to learners or other disabled applicants.

In the United Kingdom, Nganji (2012) conducted a study titled *Designing Disability-Aware E-Learning Systems: Disabled Students' Recommendations*. The study was conducted among both disabled and non-disabled respondents who evaluated an ontology-driven e-learning system (ONTODAPS). Nganji recommended that after the findings of the evaluation, there was need to design IT systems and technologies for visually impaired students, hearing impaired students and students with multiple disabilities.

Vicente and Lopez (2009) results suggested the importance for encompassing techniques towards disabled people that emphasize on eliminating obstructions of access and improving internet accessibility. Therefore, it can be helpful to reduce both the purchase and the update of ICT facilities and the adaptive advancements as a significant individuals with disabilities warranty the application of ICT. The rising essence of broadband wireless, such reductions need not emphasize on acquisition PCs only but further on handsets which facilitate disabled persons to be on the internet everywhere.

Studies (Hackett et al., 2006; Dobransky & Hargittai, 2006) have revealed that there is lack of a legal framework for ICT accessibility among PWDs. Other studies (Baker et al., 2009; Estevez, Janowski & Lopes, 2016) have also confirmed that although there are legislations and policies on mainstreaming PWDs in ICT use. Due to nature and severity of the problem, governments around the world are strengthening public policies for the use of AT to ensure inclusive education and access to information for disabled persons. These studies have shown that there is poor enforcement of such policies which have led to exclusion of PWDs in accessing ICT developments in their countries. In Kenya, Ongeta and Nyambura (2012) demonstrated that there was limited monitoring and evaluation on policy implementation in regard to PWDs access to ICTs.

2.4 Theoretical Framework

Theories are designed to describe, forecast, and comprehend situations and, in a number of occasions, to challenge and go past the current knowledge in the limits of

crucial bounding presumptions. (Jacard & Jacoby, 2010). The study proposes to adopt the Capability Theory (CT) proposed by Amartya Sen and the Social Constructivist Theory (SCT).

2.4.1 Capability Theory (CT)

The Capability Approach was first articulated by the Indian economist and philosopher Amartya Sen in the 1980s. The theory remains most closely associated with him. His focus is on the impact of personal characteristics, including what he calls a handicap or disability, which is an impairment in disability theory, on a person's capabilities set and the assessment of poverty and well-being (Sen, 2002).

The approach has been used by Toboso (2011) to present an assessment of disability in Sen's abilities and functioning technique based on information and communication technologies. After a crucial assessment of the aspect of disability from its initial description as a basically medical concept to its later explanation as a culturally constructed group we will bring into being the aspect of functional diversity Toboso (2011) the essence of one's diversity in the abilities and functioning technique requires inclusion of this concept to the assessment of welfare and standard of life in disabled people concepts in which technologies apparently plays a crucial role. In the event of a contemplation of the technologies, it is explicit that elements like accessibility, inclusive design, and user engagement in growth and execution procedures are important techniques in fostering similar rights and opportunities for disabled people in the diverse environments of information. Based on the capability approach, disability can be assessed at two diverse levels, as a shortage of abilities (Mitra, 2006).

Adopting the capability theory in the world of ICT and PWDs. Toboso (2011) asserts, 'a culture of 'standard' design for applicants attached in some theoretical parameters of 'normality'-still is present in goods and services development. Unfortunately, web technologies are devoid of barriers.' To further elaborate on the abilities of all individuals in their complete diversity, therefore the author points out that more emphasis needs to be paid to the universal design and user engagement in the nature of ICT. To allow this transition, Toboso points out to substitute the notion of disability,

‘with its adverse connotations’, with the more overall concept of ‘functional diverse’ explaining the real aspects of people with possible access to similar functions as other in a different manner.

The capability theory is significant for the study as it provides a basis for the need for accessibility of ICT among the disabled. The theory argues that capability is a function of accessibility. In this case, access to ICT provides an opportunity for PWDs to reach their potential and live fulfilling lives. According to Sen, the proponent of this theory, capability can be socially constructed whereby PWDs may be socially excluded from accessing ICTs by not having manufacturers not provide ICTs that are inclusive of the needs of PWDs.

2.4.2 Social Constructivist Theory (SCT)

Vygotsky (1978) is the advocate of social constructivism. Social constructivists emphasize the social aspects of educating and that intelligence is created and developed. Vygotsky was of the idea that this elongated life process of growth was reliant on social inclusion and that social education really results in mental development. The SCT proposes that all ideas are socially constructed. Social construction theory does not allege that identities are vulnerable, unavoidable or are slowly emergent in retaliation to the predefined factors. Instead, it emphasizes on the fluid nature of identities, mutable constructs emergent and designed via social interaction and rapports (Foucault, 1965).

SCT argues that intelligence is developed via social interaction incorporating dialect and our application. It ends up axiomatic; thus, the participation of society all knowledge is constructed through social interaction including language and our use of it. It becomes axiomatic therefore that the engagement of the community with groups of individuals especially those with challenges is socially constructed and not ‘natural’ (however that may be defined). There are a number of important ways in that social constructivist theories assist to define the identities disabled people. Mackelprang and Salsgiver (1998) argue that “unfortunately, persons with disabilities are also susceptible to internalizing stereotypes and negative beliefs.” Due to this social construction, PWDs become victims of their own development as they feel that they may be disempowered or

are not worthy of having access to ICT. The society has also contributed to the poor accessibility of PWDs to ICTs. This can be explained by use of the social constructivist theory.

The SCT therefore becomes an important theoretical framework for this study. A Social Constructivists are of the perception that ICTs originate out of the procedure of choices and discussions between social groups (Heap et al., 1995) therefore proposing the notion that technology is the final result of social procedures, formulated in the desire of a certain social group and against that of others (Webster, 1996).

According to the SCT, when PWDs learn how to use ICTs and have access to ICTs they have the ability to learn, develop, empower themselves and contribute to the development of the society. The Government of Kenya through its Vision 2030 has proposed and implemented various ICT projects such as the e-government and Huduma Centres. However, these ICT projects have demonstrated the determinist fashion in which ICTs are being presented as a panacea for development and yet do not include PWDs. A social constructivist perspective will be useful in critiquing the determinist way in which PWDs issues are handled in implementation of ICTs.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter presents the different approaches and strategies the researcher adopted to attain the objectives of the study. These encompass the design, site, target population, sample and sampling size, collection of data methods, data collection procedures and data analysis procedures.

3.1 Research Design

According to Saunders, Lewis and Thornhill (2007) research design are often categorized according to their purpose. These categories are often exploratory, descriptive and explanatory. Exploratory design is often essential when the study questions are complicated and presence of inadequate theory for prediction. Descriptive research is used to describe a certain situation. In descriptive approach, things are described to provide a measure of an event or activity. The research was a descriptive survey involving both qualitative and quantitative methods which enhanced the credibility and validity of the findings as each method strengthens the others' weaknesses. The study used the cross-sectional survey design which refers to the collection of data during a specified duration of time.

3.2 Research Approach

The study adopted both qualitative and quantitative approaches. The quantitative approach is based on numerical data and focuses on gathering information that can be categorized and quantified. Quantitative data involves data that can be ranked or score according to a certain measurement. These included tables and figures giving your important findings. Qualitative approach on the other hand refers to gathering information that is based on personal experiences and provides in-depth information through personal stories and experiences of the respondents. Qualitative dissertations included descriptive material, usually extracts from interviews, discussions, documents.

3.3 Research Methods

The researcher proposes to adopt both qualitative and quantitative methods of collecting information. This approach enhances the validity and reliability of the study through triangulation. The research adopted the questionnaires and key informant interviews to collect data for the study.

3.3.1 Questionnaires

A semi-structured design was adopted as the main element primary tool for collecting data and distributed to the persons with disabilities and was used for the purpose of collecting primary quantitative data. The questionnaire comprised of three sections which included the respondents' demographic information, the types and use of ICT adopted and the barriers facing PWDs in access and use of ICT. The questionnaire was used for a number of reasons: a) its possible to be accessed by a significant proportion of participants in a timely manner, b) offer the participants enough time to reply to various items, c) provides confidentiality to the participant and d) regarded as an objective strategy because there due to absence of private attributes (Owens, 2002).

It consisted of four sections. These include the background information, which were gender, age, education level, employment status and type of disability. The second part of the questionnaire consisted of the different types of ICTs that PWDs use and access, the reason for using these ICTs and the benefits of these ICTs. The third part of the questionnaire sought information on the barriers and challenges for accessing ICTs among PWDs. The fourth section sought suggestions and recommendations from study participants on enhancing ICT access among PWDs.

3.3.2 Key Informant Interviews

They were carried out in the environments of the study participants. The key informants were conducted from 3 members from the Kenya Disability Web Portal. The Kenya disability web portal is a partnership of the Communications Authority of Kenya (CAK), National Council for Persons with Disabilities (NCPWD) and Disability Rights Organization via the United Disabled Persons of Kenya (UDPK). This approach is recommended because this technique gives confidence to the respondents and thereby

enhances their motivation to participate in the study. The key informant interviews were conducted after administration of the questionnaires is complete. This assisted the researcher to probe for further information during the interviews about observations made from the questionnaire administration.

3.4 Research Site

The study was carried out in Nairobi County. Nairobi has the largest population in East Africa of around 3.1 Million. The 2009 Census, revealed that 3,138,295 people live in 696 Km² (269 Sq M). At the moment, Nairobi is among the largest cities in Africa with the inclusion of the suburbs and surroundings (Ogubala & Kiarie, 2014). The research site was chosen as the most strategic for the researcher as it is in the environs of the university and residence and populations from this location were available for the researcher.

3.5 Target Population

Ogula (2005) pointed out that it is section of institutions, objects and people with similar attributes. The target population for the study are persons with disabilities within Nairobi County. The target population of the study was derived from the Kenya National Population and Housing 2009 census. The target population of disabled is 48,716 as shown in Table 3.1.

Table 3.1: Sample Size Distribution

Type of Disability	Population	Sample Size
Visual Disability	24,659	192
Hearing Disability	6,927	54
Physical Disability	17,130	135
Total	48,716	381

Source: Kenya National Population and Housing 2009 census

3.6 Sampling Technique and Sample Size

According to Mugenda and Mugenda (1999) a sample is a group or sub-group derived from the general population. Mugenda and Mugenda (2003) define sampling as the selection of a portion of a population. The stratified random sampling procedure was utilized in this study. Stratified sampling entails dividing the population to similar

categories where each individual in the strata is given an equal chance of representation in the sample. These strata were based on the type of disability. Table 3.1 shows the sample size distribution for the study. In order to determine the required sample size for the study, the study used Krejcie and Morgan (1970) sample size table. According to Krejcie and Morgan sample size table (Appendix 4) the required sample size for a population of 48,716 is 381 respondents.

In order to have proportionate sample of representation in each strata, the researcher calculated the population of individual category of PWDs divided by the total population of all PWDs (target population) multiplied by the sample size of 381 thus the sample size of the study becomes 381.

$$\frac{\text{Population of the individual category of student's}}{\text{Total target Population}} \times 381$$

3.7 Data Collection Procedures

The researcher sought help from the selected institutions for interpreters and translators. The study seeks to interview deaf, physically challenged and blind respondents and this may require sign language assistance. The respondents were contacted beforehand to confirm their availability before the researcher sought any information from them. The researcher distributed the questionnaires to the selected participant's with assistance from sign language experts and interpreters.

3.8 Data Analysis and Presentation

Data analysis refers to the process of making sense of raw information while data presentation refers to the graphical display of data for interpretation. There are several steps involved in the data analysis process. First, the questionnaires were checked for completeness accuracy and consistency which was done during the data collection process. Second, the researcher captured the raw data into the Statistical Package for Social Sciences (SPSS) for analyse for the close-ended questions. In order to analyze the open-ended questions, the researcher identified the occurring themes from the responses and codes this data. Third, the researcher used descriptive statistics to analyse the data.

These descriptive statistics included frequencies, percentages, mean and standard deviation.

According to Glewwe and Levin (2016) suggest that tables and graphs offers fundamental concerning desirable interests utilizing descriptive statistics. They include, percentage distributions, medians, means, and standard deviations among others. The data was presented in Tables and Figures and the researcher's own interpretation. The interpretation of the data comprised of comparing and contrasting the study findings with the literature reviewed.

3.9 Scope and Limitations of the Study

The study was limited to Nairobi County. Nairobi County is well connected in terms of ICT and was the best venue for the study as compared to other towns that may not have such ICT connectivity and thus the study wouldn't give accurate results. The study was limited to PWDs that include blind, deaf and the physically handicapped. The study did not include PWDs with mental disabilities. The study included PWDs who have achieved the minimum age requirement in Kenya. The study will also be limited in terms of accessibility to PWDs. To address these limitations, the researcher used gatekeepers to access the PWDs. These are the program officers of the PWDs associations to interview the PWDs.

3.10 Research Ethics

In order to collect data, approval was requested from the University of Nairobi to undertake the data collection process and a Certificate of Fieldwork was issued (see Appendix 4). The researcher requested and acquired a permit from the National Commission of Science Technology and Innovation (NACOSTI), (see Appendix 5). A letter of introduction was also drafted and attached to the questionnaire to seek consent from respondents before carrying out the interviews (see Appendix 1). The researcher administered questionnaires, (see Appendix 2) and key informant interview guide, (see Appendix 3) to collect data.

The researcher defended the thesis and after incorporating the corrections, a Certificate of Correction was issued (see Appendix 6). A certificate of plagiarism (see Appendix 7) was issued upon a successful plagiarism test.

The researcher was issued with a certificate of originality upon submission of the final thesis (see Appendix 8).

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.0 Overview

This chapter consists of the data analysis and interpretation. The data is presented in tables and charts and researchers interpretation. The chapter is presented in terms of the demographic information, ICTs adopted by PWDs and sustainability of ICTs adopted by PWDs.

4.1 Demographic Information

Studies (Choudrie et al., 2013; Dwivedi et al., 2015), have shown that there is a relationship between demographic characteristics and ICT use. The study sought the demographic information of respondents as this would assist in understanding ICT use trends among sampled PWDs. The demographic information for the study was gender, age, education level, employment status and type of disability.

4.1.2 Gender

The results showed that 56.3 % were male participants compared to 43.8 % female participants as shown in Figure 1. Macha (2002) study in Tanzania found that gender and ICT use among the female population was lower than male. Macha explained the patronizing that female with disabilities was seen as objects of pity and charity. This assumes that male with disabilities have more access to and use ICTs. However, Bekteshi (2015) study found no difference on ICT use among PWDs based on their gender.

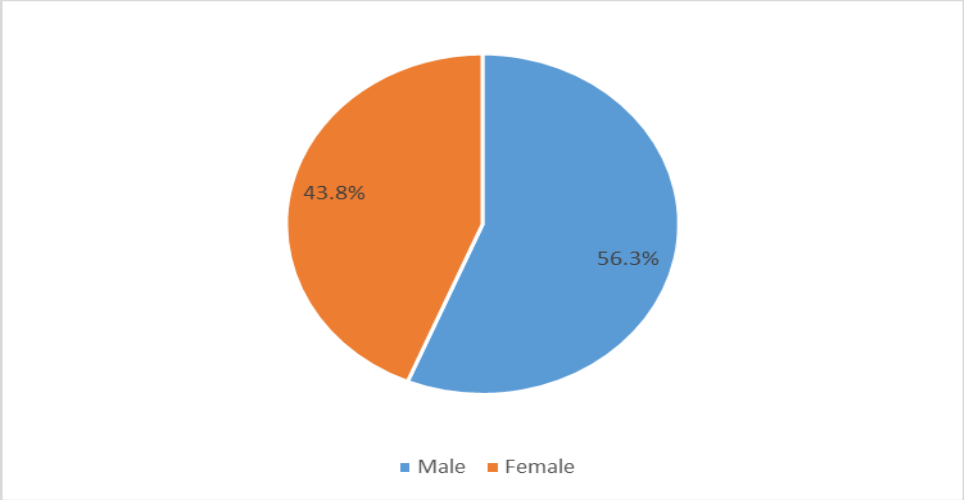


Figure 1: Gender of Respondents

Source: Field Data

4.1.3 Age

In terms of their age, majority of the respondents were aged 18-24 (46.3%), 25-34 (38.1%), 35-44 (12.5 %) and 45-55 (3.1 %) as depicted in Figure 2. The findings show that the majority of the respondents were 18-24. These findings confirm that the use of ICTs is much more confined to younger generation and as such this gives validity to our findings as most of the respondents were using or likely to use ICTs.

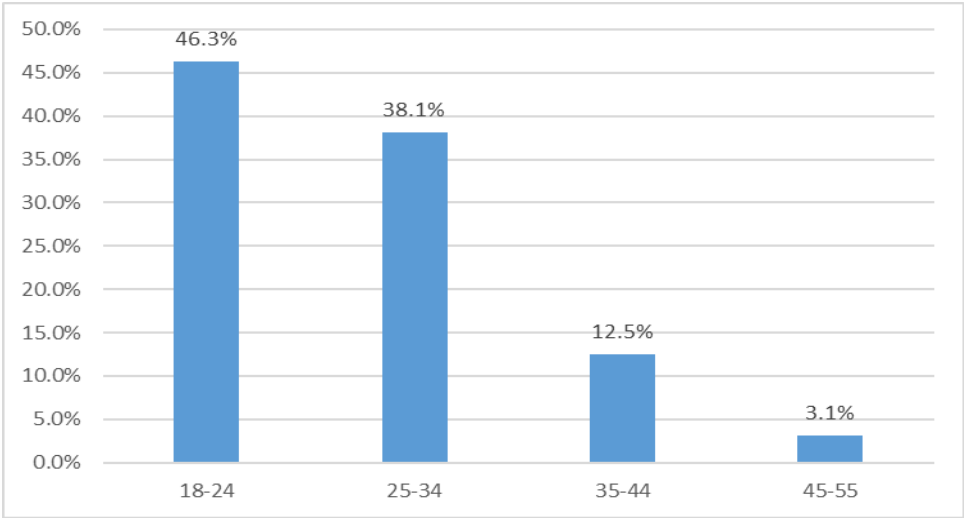


Figure 2: Age Distribution among Respondents

Source: Field Data

4.1.4 Education Level

Figure 3 shows that 49.4 % had attained a certificate level of education, 19.4 % were diploma, 16.9 % had attained high school education, 10.0 % were degree holders, 1.9 % had no formal education, 1.3 % had postgraduate education and 0.6 % had college and primary levels of education respectively. The majority of the study participants had attained basic education. This confirmed that the sample for the study would be able to participate in the survey and provide information on ICT use and PWDs.

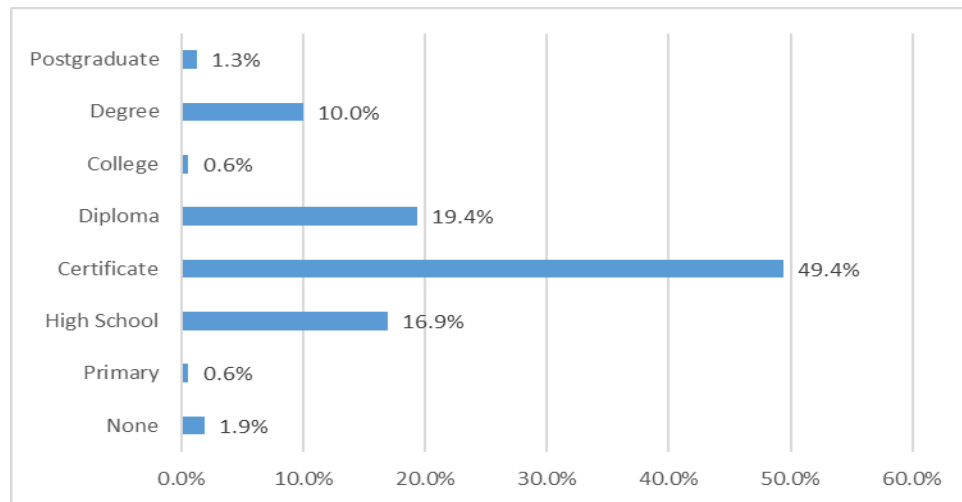


Figure 3: Education Level of Respondents

Source: Field Data (2016)

4.1.5 Employment Status

In reference to the employment status of the respondents, 38.8 % were students, 22.5 % were out of work and looking for work, 16.9 % were employed, 13.8 % were self-employed, 6.9 % were out of work, not looking for work, 0.6 % were homemakers/self-employed and homemakers as presented in Figure 4. The findings show that majority of the respondents were students. This is attributed to the knowledge that the researcher collected information from institutions offering training to PWDs. These findings confirm that majority of PWDs are outside employment.

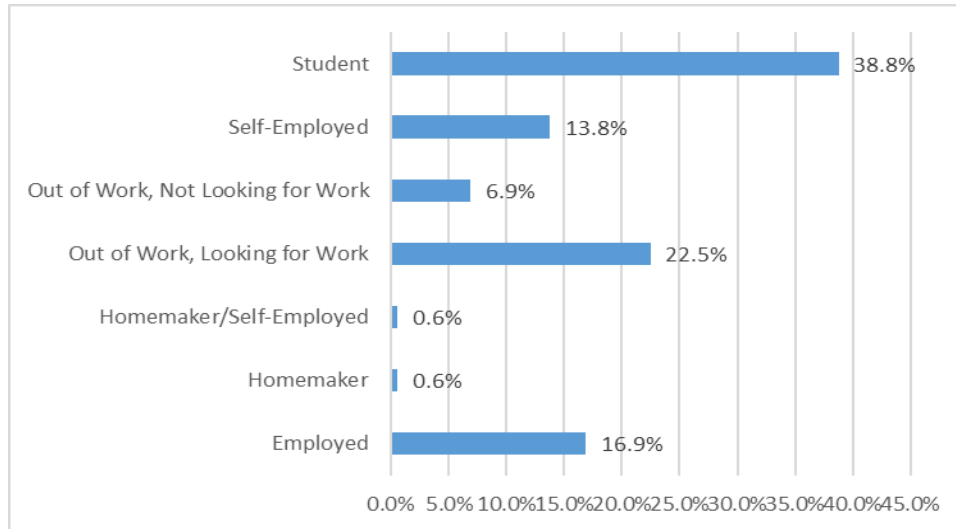


Figure 4: Employment Status of Respondents

Source: Field Data (2016)

4.1.6 Disability Type

The study sought to identify the type of disability among respondents, the findings show that 48.1 % were blind, 30.6 % had physical disability, 15.0 % were deaf and dumb, 4.4 % had partial hearing, 1.3 % had a seeing impairment and 0,6 % were partially blind as shown in Figure 5. These findings confirm the PWD statistics from KNSPWD (2008) survey which found that the majority of PWDs was physical, followed by those with visual impairments and blind, hearing disabilities, mental disabilities and speech disabilities.

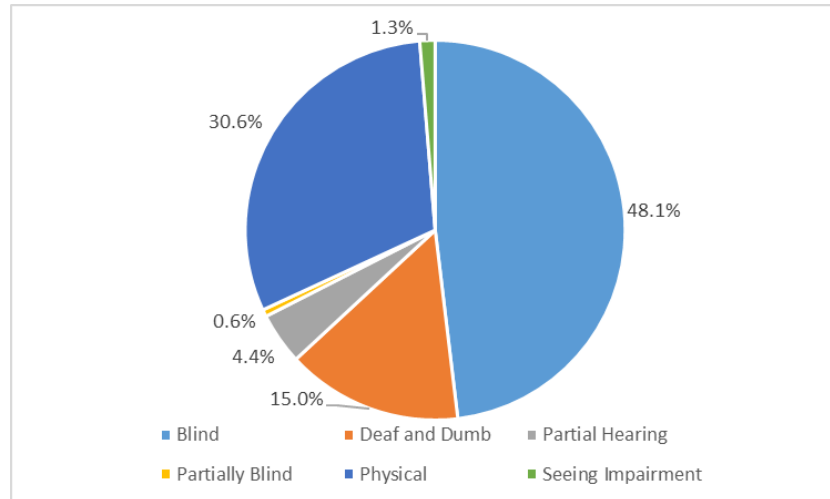


Figure 5: Disability Type among Respondents

Source: Field Data (2016)

4.2 ICTs adopted by PWDs in Nairobi County

4.2.1 ICTs Used among PWDs

Table 4.1 shows ICTs used among sampled PWDs. The findings revealed that the most used ICT was mobile phone/television (33.8 %), radio/mobile phones (24.4 %), Smartphone/Computers/Mobile Phone (16.3 %), Television/Mobile Phone/Radio (15.6 %), Computers/Smartphone (4.4 %), Computers/Mobile Phone/Radio (3.8 %) and Laptop/Radio/Television (1.9 %). Other ICTs used by PWDs included Computers/Smartphones/Laptops (33.1 %), E-Newspapers (5.0 %) and iPad/tablets (1.9 %).

Table 4.1: ICTs used among PWDs Respondents

ICTs	Frequency	Percent
Computers/Smartphone	7	4.4
Computers/Mobile Phone/Radio	6	3.8
Mobile Phone/Television	54	33.8
Laptop/Radio/Television	3	1.9
Radio/Mobile Phone	39	24.4
Television/Mobile Phone/Radio	25	15.6
Smartphone/Computers/Mobile Phone	26	16.3
Total	160	100.0

Source: Field Data (2016)

4.2.3 ICTs Wish PWDs Use

The study established the ICTs that were adopted among PWDs in Nairobi County. The researcher went further to identify ICTs that PWDs wish they could use. Table 4.2 shows that majority of the respondents cited computers with Assistive Technologies (30.6 %), Portable ICT Devices (20.6 %) and smartphones (3.1 %). The results indicate that PWDs would wish to use ICTs that were internet connected. These included computers with assistive technologies, smartphones and portable ICT devices such as tablets and iPads. According to Hegarty (2004, p. 129) the internet has been explained as “the most pervasive and educationally far-reaching innovation in ICT”. It is at the moment a large number of organizations are attempting to ensure that their sites are available to individuals with special interests.

Access to the internet provides opportunities for communication, business and interaction that could give them the ability to learn, empower themselves and contribute to the development of the society. Research has indicated that the internet may be essential to persons with disabilities. For instance, a research in the United Kingdom initiated by Leonard Cheshire Charity (Knight et al., 2002) revealed that 54% of participants regarded web access ‘essential’, compared to about 6% of the whole population. Research (Pilling et al. 2004; Williams et al., 2006) pointed out that the proof available is widely very positive on people with disabilities attitude to the web.

Table 4.3: ICTs PWDs Wish They Could Use

ICTs	Frequency	Percent
Computers with Assistive Technologies	49	30.6
Portable ICT Devices	33	20.6
Smartphones	5	3.1
Non-Response	73	45.6
Total	160	100.0

Source: Field Data (2016)

4.3 Barriers facing PWDs use of ICTs

The study sought to establish the barriers facing PWDs use of ICTs shown in Table 4.3. The results revealed that the highest mean score was observed was limited training on device use and rehabilitation services (M=4.83; SD=0.646) followed by limited availability of information communication technologies (M=4.67; SD=0.756) and low incomes and limited educational opportunities (M=4.40; SD=0.877).

Table 4.3: PWDs ICT Use Barriers

Barriers	No Extent	A Little Extent	Moderate Extent	To An Extent	To A Great Extent	Mean	Standard Deviation
Low incomes and limited educational opportunities	1.9%	1.9%	9.4%	28.1%	58.8%	4.40	0.877
Cultural factors such as pity and shame and stereotypes	14.4%	18.8%	16.3%	17.5%	33.1%	3.36	1.464
Limited availability of information communication technologies for PWDs	–	4.4%	4.4 %	10.6%	80.6%	4.67	0.756
Lack of awareness by community at large	1.3%	11.3%	26.3%	25.0%	36.3%	3.83	1.080
Literacy levels of PWDs	1.9%	8.8%	13.1%	19.4%	56.9%	4.20	1.087
Limited training on device use and rehabilitation services	1.3%	1.3%	2.5%	3.1%	91.9%	4.83	0.646
Physical accessibility in buildings	19.4%	15.0%	5.6%	8.8%	51.3%	3.57	1.658

Source: Field Data (2016)

The result showed that the major barrier for ICT use among sampled PWDs was limited training on device use and rehabilitation services. These findings support previous studies (Njoka, 2012; Osman, 2015) findings that PWDs have lower levels of education and training in ICTs which has been influenced by the lack of integration of ICTs in PWDs education sector. Drigas and Ioannidou (2013) study concluded that there was need for ICT integration in education for special needs persons. The institution of ICTs in

special education covers a number of issues like enabling technology, web applications, augmentative systems of education, and adaptive gadgets.

These findings support earlier studies that have found that economic factors have an effect on ICT accessibility among PWDs. Limited opportunities to employment and sources of income lead to low spending capacities. Hoppestad (2013) found proof from various studies affirming that fiscal variables play an integral function in web access. To disabled persons especially more financially unstable, cost is a normal obstruction to accessing the internet.

The lowest observed mean score was cultural factors such as pity and shame and stereotypes (M=3.36; SD=1.464) and physical accessibility in buildings (M=3.57; SD=1.658). PWDs in most societies, more so in developing countries have been looked on with pity (Macha, 2002). Weiner (2003) pointed out that people with disabilities mostly survive as outcasts. Reason being, they are not allowed or given an opportunity to participate in any communal tasks and activities since it is presumed that they not able and need to be treated carefully or with caution. Such a scenario renders it hard to access their basic rights. This has led to the misconception that they may not be able to use ICTs but can only be helped to access these technologies which has led to further inaccessibility to ICTs.

According to key informant number 2, some of the barriers for PWDs use of ICTs were: The design of websites is a barrier because many of them are not disability friendly. They lack assistive technology. They don't offer audio options for the blind and navigation becomes impossible. Texts are also too small for persons with partial visual to read; Hardware and software are expensive to access. JAWS programme for the blind retails at Ksh 120,000 and it's without any tax and Braille machines retail at Ksh 80,000. Very few PWDs are able to purchase due to their economic status; Products being manufactured don't have accessibility; Mobile phones or smart phones with voice recognition function that alerts a blind person of the person calling or that has sent a message are very expensive and few can afford and these devices and software are difficult to access as an individual and are mostly accessible in institutions (Key Informant 2).

Key informant 1 stated that disability and poverty are intertwined, therefore PWDs who are poor don't have any means of accessing any Internet; Cost of software, hardware and services to PWDs are very

expensive. A blind person without audio software in a computer, can't use the internet, automated audio guides to browse the internet can allow people with eye impairments to navigate websites; key informants also revealed that there is a Lack of awareness on the need for PWDs in accessing internet services. PWDs are assumed not to have the capacity to access and use internet services and this stereotype has become a barrier to their access and use of ICTs in Kenya.

Key informant 3 informed the study that ICT use has been associated to level of education. It is more likely that individuals with high education levels tend to use more of ICTs. However, Levels of illiteracy is among PWDs is higher and therefore becomes a barrier to their use of ICTs. A deaf person who doesn't know how to use sign language cannot communicate; Infrastructure is very unfriendly making access to buildings with internet facilities hard. For instance, Lack of ramps in buildings and Mobility challenges to access buildings that host ICT services presents barriers for ICT use among PWDs. This comes in the form of wheelchairs and crutches for the physically disabled, white walking canes for the blind among others. This limits their movement to access services and Cultural beliefs where persons with disabilities are seen as a curse or bad omen. Parents and families are afraid of taking their disabled children or family members out in public or even admit to having one.

4.3 Sustainability of ICTs Adopted by PWDs

The study investigated the sustainability of ICT adopted by PWDs in Nairobi County. The researcher listed some of the ICT related interventions that are available in the literature as contributing to the sustainability of ICT use among PWD in Table 4.4. The results showed that the highest observed mean score was affirmative action and waiver of policies on PWDs (M=4.88; SD=1.471) followed by granting of privileges for PWDs (M=4.85; SD=0.506) and augmentative and alternative communication technologies (M=4.56; SD=1.706). The least observed mean score was accessibility of buildings at institutions (M=3.71; SD=1.471) and mouse alternatives and replacements for computers (M=4.13; SD=1.149).

Table 4.4: Interventions of ICT Use among PWDs

ICT Interventions for PWDs	No Extent	Little Extent	Moderate Extent	To An Extent	Great Extent	Mean	Standard Deviation
Mouse alternatives and replacements for computers	3.8%	8.1%	13.1%	21.3%	53.8%	4.13	1.149
Keyboard modifications and alternatives	2.5%	7.5%	13.8%	21.9%	54.4%	4.18	1.086
Voice recognition	2.5%	8.8%	15.0%	11.3%	62.5%	4.22	1.143
Accessible buildings and workstations	3.8%	9.4%	17.5%	21.3%	48.1%	4.00	1.173
Augmentative and alternative communication	–	1.9%	6.9%	24.4%	66.9%	4.56	1.706
Accessibility of buildings at Institutions	11.3%	15.0%	13.1%	11.9%	48.8%	3.71	1.471
Affirmative action and waiver of policies on PWDs	0.6%	0.6%	1.9%	3.8%	93.1%	4.88	0.506
Granting of privileges and existence for PWDs	1.3%	1.3%	1.3%	3.8%	92.5%	4.85	0.616

Source: Field Data (2016)

The findings show that there is need for granting of privileges to PWDs in regard to ICT accessibility. The Persons with Disabilities Act, No. 14 of 2003 generally domesticates the provisions of the Convention on the Rights of Persons with Disabilities (CRPD) in Kenya. Section 21 provides that “Persons with disabilities are entitled to a barrier-free and disability-friendly environment to enable them to have access to buildings, roads and other social amenities, and assistive devices and other equipment to promote their mobility.

These findings confirm Singh (2013) findings in India which concluded that legislation and constitutional provisions identifying and promoting needs of PWDs in ICT accessibility has helped improve compliance by institutions which has increased ICT accessibility and use among PWDs. Affirmative action towards ICT accessibility for PWDs has been found to have a significant effect on sustainability of ICTs use among

PWDs. In Lesotho, Chitereke (2010) shows how an ICT Policy, under the Ministry of Communications, Science and Technology has ensured that unique initiatives are created to reinforce access to technologies for disabled persons.

According to Koganuramath and Chowkimath, (2009) information access is a crucial issue for the disadvantaged individuals but nowadays ICT in collaboration with assistive technologies have assisted in the reduction of the digital divide by availing the required information. Respondents indicated that Augmentative and alternative communication (AAC) technologies would assist in sustaining PWDs access and usability of ICTs. Baker et al., (2009) accepts that accessible internet has a positive effect on persons with disabilities despite their location.

Systems incorporate technology applications like speech synthesizers or hardcopy items like charts, articles, charts among others (Williams et al., 2006). These ICT applications can assist PWDs use internet connected ICTs. Harrysson et al. (2004) study on web navigation of PWDs findings point out that the category were insufficient at navigation and utilized buttons with ease, and recognized hyperlinks. There were several suggestions given by key informant 1 which included:

Manufacturers and governments should embrace universal design; Adaptive hardware and software to be affordable to persons with disabilities; Affirmative action for PWDs; Community awareness on PWDs. In employment they are viewed as expensive to employ due to special devices and software needed for their use; High end devices come with good accessibility functions for PWDs. If the cost can be reduced, then many PWDs will benefit from the technology and that any equipment being manufactured should be accessible and usable to any person.

The findings showed that the least cited intervention for enhancing ICT use among PWDs was Accessibility of buildings at institutions. This means that there was adequate accessibility to buildings that housed ICTs in institutions. The Persons with Disabilities Act, No. 14 of 2003, Section 21 provides that “Persons with disabilities are entitled to a barrier- free and disability-friendly environment to enable them to have access to buildings...” these findings suggest that majority of the building in Nairobi County have adhered to this legislation. However, Nganji (2012) study in the United Kingdom (UK)

found that higher institutions of learning experience inaccessibility issues when conveying education and other services. Even though a lot has been implemented in creating the physical surroundings accessible to individuals with complications like availing lifts, wheelchairs among others.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Overview

This chapter presents the summary of the study by all chapters, conclusions based on the study findings, recommendations of the study and gives suggestions for areas for further research.

5.1 Summary

The study sought to investigate the accessibility to information and communication technology (ICTs) by Persons with Disabilities (PWDs) in Nairobi County, Kenya. The study was guided by two specific objectives; to find out the ICTs that are adopted by PWDs in Nairobi County and investigate sustainability of ICTs adopted by PWDs in Nairobi County. The study adopted the Capability Theory and Social Constructivist Theory to guide the research. The research was a descriptive survey and adopted both qualitative and quantitative approaches of data collection. The stratified random sampling procedure was adopted in this study. The sample size for the study was 381. A semi-structured questionnaire was adopted as the primary tool for collecting data. It was administered to the persons with disabilities and was used for the purpose of collecting primary quantitative data. The study was able to collect 160 questionnaires and three key informants were conducted from 3 members from the Kenya disability web portal.

The findings revealed that the most used ICT among PWDs was mobile phone/television and radio/mobile phones. The study found that PWDs wish they could use internet connected ICTs. The respondents also cited that they would wish to use portable internet accessible devices. The study found that limited training on device use and rehabilitation services was the major barrier in PWDs use of ICTs. Affirmative action and waiver of policies on PWDs was cited as the most significant intervention to enhance sustainability of PWDs use of ICTs. The study concluded that there is need for ICT training for PWDs in order to bridge the digital divide between PWDs and their able bodied peers. The study further concluded that granting of privileges and existence for PWDs was the best way for PWDs to be able to access and use ICTs.

The study recommends that the government should stimulate the introduction of ICT-enabled solutions for persons with disabilities, increasing the availability of accessible ICTs and promoting the affordability of assistive technologies. Policy makers can address market failure in assistive technology through public interventions and mandatory incorporation of accessibility requirements into public procurement policies; private sector entities are already playing a key role in designing, manufacturing, developing and putting into the market key ICT-enabled solutions for persons with disabilities and civil society organizations can bring about awareness of persons with disabilities and their parents of what ICTs can do to bring about their economic and social integration.

5.2 Conclusion

The findings of this research confirm that there is limited training on device use and rehabilitation services for persons with disabilities. The study found that lack of training in ICTs is a significant barrier for ICT use among PWDs as well as lack of educational opportunities for PWDs to get training in ICT use. The training of PWDs in ICT enhances their ability to work and perform daily activities. The study findings confirmed that importance of training as it helps job seekers to acquire the basic skills of modern technology required to compete in the labour market. The study reaffirmed that there is no training for ICTs that is specifically tailored for PWDs in Kenya. There is an urgent need to increase the number of training centers for teaching the PWDs the skills that qualify them to work and contribute to national development. The researcher further confirmed that education can assist disabled persons to achieve ICT skills which in turn enable them to compete in the job market and get empowerment. Education also helps PWDs to get access to ICT training and increases the chances of affordability to join institutions that impart ICT skills.

The study sought to determine the barriers to PWDS access and use of ICTs. The study confirmed that there is no existing ICT policy with regard to PWDs. The study therefore found that lack of this policy has hampered efforts or has led to duplication of efforts to address challenges to ICT use among PWDs. It is the researcher's conclusion that lack of a mainstream policy for ICT use among PWDs is a barrier to addressing the

issue of access and usability of ICT among PWDs. The study found that there are efforts of a Draft National ICT Policy 2016 proposed by the ICT Ministry seeking to make amendments to the National ICT Sector Policy which was already being developed. The draft policy hopes to enhance access to ICTs by persons with disabilities, to ease access to government information, to promote access of ICT Infrastructure and encourage telecommunication companies to develop services with special attention to Persons with Disabilities/special needs.

The study sought to establish what strategies could be adopted to enhance sustainability of ICTs access and use for PWDs. Affirmative action and waiver of policies on PWDs access and use of ICT is the most sustainable way to achieve ICT access and usability among PWDS. Affirmative action refers to formulating and adoption of policies that provide opportunities for PWDs to access ICT and its related factors. These would include affirmative action in terms of providing education and training in ICTs tailored for PWDs. These could also include tax waivers on ICTs manufactured for PWDs. The study also confirmed that there is the need for service providers to be versed with the Kenya Sign Language (KSL). When deaf persons' access institutions (Government institutions, hospitals, police stations as well as public institutions), there should be a person who understands KSL and able to interpret what they need.

5.3 Recommendations

For Persons with disabilities to be included in National Development as well as their own empowerment and development in ICT, the following should be considered;

The main objective of the National Information and Communications Technology (ICT) Policy (2016) is to provide a foundation for an accessible ICT environment in the country in order to enable persons with disabilities to take full advantage of ICTs. In this regard, the Government will where appropriate take measures to:

(a) Ensure that ICT services and emergency communications made available to the public are provided in alternative accessible formats for persons with disabilities (PWD);

- (b) Review existing legislation and regulations to promote ICT accessibility for PWDs in consultation with organisations representing PWDs among others;
- (c) Promote design, production and distribution of accessible ICT at an early stage;
- (d) Ensure that persons with disabilities can exercise the right to access to information, freedom of expression and opinion;
- (e) Require both public and private entities that render services to the public to provide information and services in accessible and usable formats for persons with disabilities;
- (f) Require content producers for distribution and public consumption in Kenya to produce such content in accessible format such as audio description, audio subtitles, captions and signing for access to persons with disabilities.
- (g) Ensure that websites of government departments and agencies comply with international web accessibility standards and are accessible for persons with disabilities
- (h) provide incentives to providers of accessible technology solutions including software, hardware and applications
- (i) Take such measures that will lessen the burden of acquisition of accessible technologies and associated gadgets by PWDs through fiscal means such as tax exemptions, subsidization and funding acquisitions
- (j) Ensuring that licensed ICT service providers offer special tariff plans or discounted rates for persons with disabilities
- (k) Ensure that licensed providers of telecommunications services make available services and supporting technologies for persons with disabilities including emergency services, accessible public phones and relay services to enable persons with speech, hearing and seeing disabilities communicate with the rest of society.

Policy makers can address market failure in assistive technology through public interventions and mandatory incorporation of accessibility requirements into public procurement policies, the introduction of subsidies and the strengthening of research and development.

Business entities should design, manufacture, develop and distribute into the market key ICT-enabled solutions for persons with disabilities.

That civil society organizations can bring about awareness of persons with disabilities and their parents of what ICTs can do to bring about their economic and social integration. These organizations can initiate extensive training of persons with disabilities on the use of these ICT tools. One more priority action that can be considered by civil society organizations is advocacy for the mainstreaming of the use of the universal design principle in all development efforts.

5.4 Areas of Further Studies

This study was conducted in Nairobi County among PWDs with hearing, blind and physical disabilities. The researcher proposes for further study among PWDs with development challenges and ICT use. The study also recommends for further research in all counties to learn about the experience of other PWDs.

References

- Baker, P. M. A., Hanson, J. & Myhill, W. N. (2009). The promise of municipal Wi-Fi and failed policies of inclusion: The disability divide”, *Information Polity: The International Journal of Government & Democracy in the Information Age*, 14 (1/2) 47-59
- Baker, P. M. A., Hanson, J. & Myhill, W. N. (2009). The promise of municipal Wi-Fi and failed policies of inclusion: The disability divide, *Information Polity*, 14, 47–59
- Bekteshi, L. (2015). Information and Communication Technology and Students with Disabilities, *European Scientific Journal*, 11 (22), 337-341
- Brynjolfsson E. & Hitt L. M. (2000). Beyond Computation: Information Technology, Organizational Transformation and Business Performance, *Journal of Economic Perspectives*, 14 (4), 12-25
- Chadwick, D., Wesson, C. & Fullwood, C. (2013). Internet Access by People with Intellectual Disabilities: Inequalities and Opportunities, *Future Internet*, 5, 376-397
- Chitereka, C. (2010). People with Disabilities and the Role of Social Workers in Lesotho, *social work and society international online journal*, 8 (1), 1-9
- Choudrie, J., Vyas, A., Voros, T. & Tsitsianis, N. (2013). *Comparing the adopters and non-adopters of online social networks: A UK perspective*. In Proceedings of 46th Hawaii International Conference on System Sciences, Wailea, Maui, USA, January 7-10, 2013.
- Dobransky, K. & Hargittai, E. (2006). The disability divide in Internet access and use. *Information, Communication & Strategy*, 9, 313–334.
- Drigas, A. S. & Ioannidou, R-D. (2013). Special Education and ICTs, *International journal of education and technology*, 8 (2), 41-47
- Dutton, W. & Helsper, E. J. (2007). *The Internet in Britain 2007*. Oxford Internet Institute: University of Oxford. United Kingdom
- Dwivedi, Y. K., AlAlwan, A. A., Rana, N. & Williams, M. D. (2015). *Jordanian customers' intention towards and use of Internet banking: Exploring demographic*

- differences on their perception.* In Proceedings of United Kingdom Academy of Information Systems International Conference UKAIS. Oxford: Oxford University.
- Estevez, E., Janowski, T. & Lopes, N. V. (2016). Policy Monitoring on Accessible Technology for Inclusive Education – Research Findings and Requirements for a Software Tool, *JCS&T*, 36 (1), 29-37
- Foucault, M. (1965). *Madness and civilization: a history of insanity in the Age of Reason.* New York, NY: Vintage.
- Fox, S. (2011). *Americans Living with a Disability and Their Technology Profile.* Washington, DC: Pewinternet
- Glewwe, P. & Levin, M. (2016). *Presenting simple descriptive statistics from household survey data.* [Online]. Available: http://unstats.un.org/unsd/hhsurveys/pdf/chapter_16.pdf accessed June 29, 2016
- Goggin, G. & Newell, C. (2003). *Digital Disability: The Social Construction of Disability in New Media.* Lanham, MD: Rowman & Littlefield
- Government of Kenya (2013). *The Kenya Vision 2030: Second Medium Term Plan 2013-2017.* Nairobi. Government Printers.
- Guo, B., Bricout, J. C. & Huang, J. A. (2005). Common open space or a digital divide? A social model perspective on the online disability community in China. *Disability Sociology*, 20, 49–66.
- Hackett, S., Bambang, P. & Z. Xiaoming, Z. (2006). A retrospective look at website accessibility over time, *Behaviour & Information Technology*, 24, 407–417
- Harrysson, B., Svensk, A. & Johansson, G. I. (2004). How people with developmental difficulties navigate the internet, *British Journal of Special Education*, 31 (3), 137-142.
- Heap, N., Thomas, R., Einon, G., Mason, R. and Mackay, H. (1995). *Information technology and society: A Reader.* London, UK: Sage/Open University
- Hegarty, J. (2004). Managing innovations in ICT, in Florian, L. and Hegarty, J. (Eds), *ICT and Special Educational Needs: a Tool for Inclusion*, Open University Press, Buckingham, pp. 128-46

- Hoppestad, B. S. (2007). Inadequacies in computer access using assistive technology devices in profoundly disabled individuals: An overview of the current literature. *Disability Rehabilitative Assistive Technology*, 2, 189–199.
- Hoppestad, B. S. (2013). Current perspective regarding adults with intellectual and developmental disabilities accessing computer technology. *Disability Rehabilitative Assistive Technology*, 8, 190–194.
- ILO, (2012) Statistical update on employment in the informal economy. [Online]. Available: <http://laborsta.ilo.org/informaleconomyE.html> accessed June 13, 2016
- Islam, R. M. (2015). Rights of the People with Disabilities and Social Exclusion in Malaysia, *International Journal of Social Science and Humanity*, 5 (2), 171-177
- Jacard, J. & Jacoby, J. (2010). *Theory Construction and Model-Building Skills: A Practical Guide for Social Scientists*. New York, NY: Guilford
- Jaeger, P. T. (2006). Telecommunications policy and individuals with disabilities: Issues of accessibility and social inclusion in the policy research agenda, *Telecommunications Policy*, 30, 112–124.
- Kakiri, O. N. (2012). *Challenges Facing Deaf in Accessing ICT*. E-Accessibility Workshop for People with disabilities Laico Regency Hotel, Nairobi Kenya 10-11th May, 2012
- Kbar, G., Aly, S., Elsharawy, I., Bhatia, A., Alhasan, N. & Enriquez, R. (2015). Smart Help at the Workplace for Persons with Disabilities (SHW-PWD), *International Journal of Computer, Information, Systems and Control Engineering*, 9 (1), 84-90
- Kennedy, H., Evans, S. & Thomas, S. (2010). Can the Web be made accessible for people with intellectual disabilities? *Information Sociology*, 27, 29–39.
- Kenya National Commission on Human Rights [KNCHR] (2014). *From Norm to Practice: A Status Report on Implementation of the Rights of Persons with Disabilities in Kenya*. Nairobi. Kenya National Commission on Human Rights
- Kenya National Survey for Persons with Disabilities (2008). *Preliminary Report*. National Coordinating Agency for Population and Development. Nairobi
- Knight, J., Heaven, C. & Christie, I. (2002). *Inclusive Citizenship*. London, UK: Leonard Cheshire

- Koganuramath, M. M. & Choukimath, P. A. (2009). *Learning resource centre for the visually impaired students in the universities to foster inclusive education*. International Conference on Academic Libraries, Delhi, India, 5th-8th October, 619-625
- Krejcie, R. V., & Morgan, D.W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607 – 610.
- Macha, E. (2002). *Gender, Disabilities and Access to Education in Tanzania*. PhD Thesis. University of Leeds. [Online]. Available: <http://etheses.whiterose.ac.uk/282/> accessed September 29, 2016
- Mackelprang, R. W. & Salsgiver, R. O. (1998). *Disability: A Diversity Model Approach in Human Service Practice*. Washington, DC: Lyceum.
- Mashangoane, P. (2012). *Accessibility to ICT Services by Persons with Disabilities – South African Perspective*. [Online]. Available: [http://www.un.org/disabilities/documents/egm2012/Phosa.PowerPoint-Presentation-Accessibility-to-ICT-Services-by-PwDs-\(Tokyo%2019%20April%202012\).pdf](http://www.un.org/disabilities/documents/egm2012/Phosa.PowerPoint-Presentation-Accessibility-to-ICT-Services-by-PwDs-(Tokyo%2019%20April%202012).pdf) accessed May 15, 2016
- MINISTRY OF INFORMATION COMMUNICATIONS AND TECHNOLOGY (June, 2016). NATIONAL INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) POLICY. [Online]. Available: <http://www.information.go.ke/wp-content/uploads/2016/06/Draft-National-ICT-Policy-20June2016.pdf> accessed September 30, 2016
- Mitra, S. (2006). The Capability Approach and Disability. *Journal of Disability Policy Studies*, 16 (4), 236–247
- Mugambi, M. P. (2012). *Challenges Facing Persons with Disabilities in Access of ICT*. Launch of the Persons with Disability Web portal and e-accessibility workshop for persons with disabilities, Laico Regency Hotel, Nairobi Kenya
- Murugami, M. & Mazrui, L. (2012). *Barriers to Internet Access for Persons with Disabilities*. Special Needs Education. Kenyatta University. Nairobi.
- National Coordinating Agency for Population and Development [NCAPD] (2008). *Kenya National Survey for Persons with Disabilities-Preliminary Report*. Nairobi, Kenya

- Nganji, J. T. (2012). Designing Disability-Aware E-Learning Systems: Disabled Students' Recommendations, *International Journal of Advanced Science and Technology*, 48, 61-70
- Nganji, T. J. (2012). Designing Disability-Aware E-Learning Systems: Disabled Students' Recommendations, *International Journal of Advanced Science and Technology*, 48, 61-70
- Njoka, C. (2012) *Research on promoting accessibility to ICT services for PWDs. E-Accessibility Workshop for People with disabilities*. Laico Regency Hotel, Nairobi Kenya 10-11th May, 2012
- Ogubala, A. R. & Kiarie, M. D. (2014). Factors Affecting Procurement Planning In County Governments in Kenya: A Case Study of Nairobi City County, *International Journal of Economics, Commerce and Management*, 2 (2), 1-34
- Ogula, P. (2005). *Research Methods*. Nairobi: CUEA Publications.
- Ong'eta, W. & Nyambura, S. (2012). *Use of ICT to Promote Access and Participation of Students with Disabilities in Higher Education: Benefits and Challenges*. Department of Educational Foundations, Kenyatta University
- Osman, O. M. (2015). *ICT Competency and Employment among Malaysian PWDs (People with Disabilities)*. Proceeding of International Conference on Information Technology & Society 8-9th June, Kuala Lumpur, Malaysia
- Owens, L. K. (2002). *Introduction to Survey Research Design*. [Online]. Available: <http://www.srl.uic.edu/seminars/intro/introsrm.pdf> accessed May 23, 2016
- Palmer, S. B., Wehmeyer, M. L., Davies, D. K. & Stock, S. E. (2012). Family members' reports of the technology use of family members with intellectual and developmental disabilities. *J. Intell. Disabil. Res.* 56, 402–414.
- Parsons, S., Daniels, H., Porter, J. & Robertson, C. (2008). Resources, staff beliefs and organizational culture: Factors in the use of information and communication technology for adults with intellectual disabilities. *Journal of Applied Research and Intellectual Disability*, 21, 19–33.
- Petrie, H., Hamilton, F., King, N. & Pavan, P. (2006). *Remote Usability Evaluations with Disabled People*. In Proceedings of CHI '06 Proceedings of the SIGCHI

- Conference on Human Factors in Computing Systems, Montréal, Québec, Canada, 22–27th April pp. 1133–1141.
- Pilling, D., Barrett, P. & Floyd, M. (2004). *Disabled People and the Internet*. York, UK: Joseph Rowntree Foundation
- Saunders, M., Lewis P. & Thornhill, A. (2007). *Research Methods for Business Students* (5th edition). New Jersey, NJ: Prentice Hall.
- Sen, A. K. (2002). Why health equity? *Health Economics*, 11, 659–666.
- Shapiro, R. J. & Rohde, G. L. (2000). *Falling through the Net: Toward Digital Inclusion; A report on American's access to technology tools*. Washington, DC: The Secretary of Commerce
- Singh, J. (2013). Exploiting ICT for Empowering People with Disabilities (PWDs), *Indian Journal of Inclusive Growth*, 1 (1), 113-119
- Toboso, M. (2011). Rethinking disability in Amartya Sen's approach: ICT and equality of opportunity, *Journal of Ethics and Information Technology*, 3 (2), 107-118
- UNCPRD (2010). The United Nations. Convention on the Rights of Persons with Disabilities. [Online]. Available: <http://www.un.org/disabilities/convention/conventionfull.shtml> accessed June 7, 2016
- UNESCO (2009). *Empowering persons with disabilities through ICTs*. [Online]. Available: <http://www.unescobkk.org/education/ict/online-resources/databases/itc-in-education-database/item/article/empowering-persons-with-disabilities-through-icts> accessed June 3, 2016
- UNESCO, T., Societies, K., Age, S., & Skills, E. (2011). *UNESCO Institute for Information Technologies in Education*. Paris. UNESCO.
- Vicente, M. & López, A. (2010). A Multidimensional Analysis of the Disability Digital Divide: Some Evidence for Internet Use. *The Information Society*, 26 (1), 48-64.
- Vygotsky, L. S. (1978). *Mind in Society*. Cambridge, UK: Harvard University Press
- Warschauer, M. (2008). Demystifying the digital divide, *Scientific American*, 289, 42–48.
- Webster, F. (1995). *Theories of the information society*. London, UK: Routledge

- Wehmeyer, M. L. (1998). National survey of the use of assistive technology by adults with mental retardation. *Mental Retard*, 36, 44–51.
- Wehmeyer, M. L. (1999). Assistive technology and students with mental retardation: Utilization and barriers. *J. Spec. Educ. Technol.*, 14, 48–58.
- Wehmeyer, M. L., Smith, S. J., Palmer, S. B. & Davies, D. K. (2004). The effect of student-directed transition planning with a computer-based reading support program on the self-determination of students with disabilities. *J. Spec. Educ. Technol.*, 19, 7–22.
- Weiner, B. (2003). *Disabled Village Children*. New York, NY: Palgrave Macmillan
- WHO, World Bank (2011). *World Report on Disability*. [Online]. Available: (www.who.int/disabilities/world_report/2011/en/index.html accessed May 27, 2016
- Williams, P., Jamali, H. R. & Nicholas, D. (2006). Using ICT with people with special education needs: what the literature tells us, *Aslib Proceedings*, 58 (4), 330 – 345
- World Bank (2007). *Disability & Development in the World Bank: FY 2000–2007*. Washington, DC: World Bank

Appendices

Appendix 1: Consent Letter

Dear Participant,

I invite you to participate in a research study entitled *ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY (ICTs) AMONG PERSONS WITH DISABILITIES (PWDs) IN NAIROBI COUNTY, KENYA*. I am currently enrolled in Degree of Master of Arts in Communication Studies (Development Communication), School of Journalism and Mass Communication at the University of Nairobi.

Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately 30-45 minutes to complete.

If you have any questions about this project, feel free to contact through:

Rose Njuguna

Mobile: 0721510577

Email: wambuirn@gmail.com

Appendix 2: Questionnaire for Persons with Disability

Section A: Demographic Information

1. What is your gender?

Male Female

2. What is your age?

18-24 years 25-34 years

35-44 years 45-54 years

Above 55 years

3. What is your highest education level?

None Certificate

Diploma Degree

Postgraduate Other (*Specify*)

4. What is your employment status?

Employed for wages

Self-employed

Out of work and looking for work

Out of work, not currently looking for work

A homemaker

A student

4. Type of disability

Blind

Speech impairment

Deaf and Dumb

Hearing impairment

Seeing impairment

Physical impairment

Other (*Specify*)

5. Use of information communication technologies

Yes No

Section B: ICTs that are adopted by PWDs in Nairobi County

6. In this section, there are several ICTs that are listed. Please indicate which ICTs that you use in your day to day activities?

- | | | | |
|--------------------------------|-----|--------------|-----|
| Television | () | Radio | () |
| Computers | () | Laptops | () |
| Smartphone | () | Mobile phone | () |
| Other (<i>Specify</i>) | | | |

7. What are some of the other ICTs have you had access to?

.....

.....

8. What are some of the ICTs that you would wish to use in your day to day activities?

.....

.....

Section C: Barriers facing PWDs in Accessing ICTs in Nairobi County

9. The table below highlights some of the barriers and constraints to accessibility of ICTs among PWDs. Please ask the respondents to indicate what extent these barriers affect accessibility and of ICTs among PWDs.

Barriers/Constraints	No Extent	Little Extent	Moderate Extent	To An Extent	Great Extent
low incomes and limited educational opportunities					
Cultural factors such as pity and shame and stereotypes					
limited availability of information communication technologies					
Lack of awareness by community at large					
Literacy levels of PWDs					
limited training on device use and rehabilitation services					
Physical accessibility in buildings					

10. What other barriers have you faced in access and use of ICTs?

.....

.....

Section D: Interventions to Ensure PWDs Access and Use ICT in Nairobi County

11. The table below highlights some of the Interventions to ensure PWDs access and use ICT accessibility of ICTs among PWDs. Please ask the respondents to indicate what extent these barriers affect accessibility and of ICTs among PWDs.

	No Extent	Little Extent	Moderate Extent	To An Extent	Great Extent
Mouse alternatives and replacements					
Keyboard modifications and alternatives					
Voice recognition					
Accessible buildings and workstations					
Augmentative and alternative communication					
Accessibility of buildings at Institutions					
Affirmative action and waiver of policies on PWDs					
Granting of privileges and existence for PWDs					

12. What other suggestions can you make to enhance PWDs access and use ICTs?

.....

.....

.....

Thank you for your cooperation

Appendix 3: Key Informant Interview Guide

1. What are some of Current Policies, Legislation and Programmes for Persons with Disabilities in Kenya?
2. The ICT Policy and Regulatory Framework in Kenya for PWDs access to ICTs?
3. How would you describe the Accessibility standards of ICTs for PWDs in Kenya?
4. What are the Barriers to Internet Access for PWDs in Kenya?
5. What are some of the challenges facing persons with disabilities in accessing ICTs?
6. What measures have been put in place to enhance PWDs access to ICTs in Kenya?
7. What recommendations and suggestions can you give to enhance PWDs access to ICTs?

Appendix 4: Certificate of Fieldwork



**UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES & SOCIAL SCIENCES
SCHOOL OF JOURNALISM & MASS COMMUNICATION**

Telegram: Journalism Varsity Nairobi
Telephone: 254-02-3318262, Ext. 28080, 28061
Director's Office: 254-02-2314201 (Direct Line)
Telex: 22095 Fax: 254-02-245566
Email: director-soj@uonbi.ac.ke

P.O. Box 30197-00100
Nairobi, GPO
Kenya

REF: CERTIFICATE OF FIELD WORK

This is to certify that all corrections proposed at the Board of Examiners' meeting held on 10/07/16 in respect of M.A/Ph.D final Project/Thesis defence have been effected to my/our satisfaction and the student can be allowed to proceed for field work.

Reg. No: K50/74984/2014

Name: ROSE WAMBUI NGUGUNA

Title: ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

AMONG PERSONS WITH DISABILITIES (PWDs) IN NAIROBI COUNTY, KENYA.

Dr. Mashia Muluwa
SUPERVISOR

Dr. Samuel Siringi
ASSOCIATE DIRECTOR

Dr. Ndetei Ndetei
DIRECTOR

[Signature]
SIGNATURE

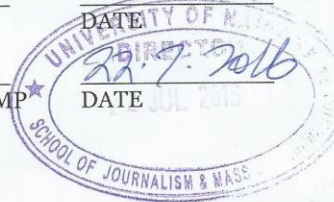
[Signature]
SIGNATURE

[Signature]
SIGNATURE/STAMP

22/07/2016
DATE

22/07/2016
DATE

22.7.2016
DATE



Appendix 5: NACOSTI PERMIT



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No.

Date:

NACOSTI/P/16/44151/13292

31st August, 2016

Rose Wambui Njuguna
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Accessibility to Information and Communication Technology (ICTs) among Persons With Disabilities (PWDs) in Nairobi County, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **30th August, 2017**.

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

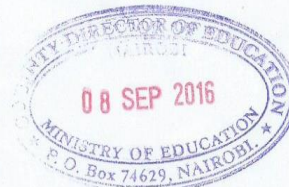

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341006

The County Director of Education
Nairobi County.



Appendix 6: Certificate of Correction



**UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES & SOCIAL SCIENCES
SCHOOL OF JOURNALISM & MASS COMMUNICATION**

Telegram: Journalism Varsity Nairobi
Telephone: 254-02-3318262, Ext. 28080, 28061
Director's Office: 254-02-2314201 (Direct Line)
Telex: 22095 Fax: 254-02-245566
Email: director-soj@uonbi.ac.ke

P.O. Box 30197-00100
Nairobi, GPO
Kenya

REF: CERTIFICATE OF CORRECTIONS

This is to certify that all corrections proposed at the Board of Examiners meeting held on 28TH OCT 2016 in respect of M.A./~~Ph.D.~~ Project/Thesis Proposal defence have been effected to my/our satisfaction and the project can now be prepared for binding.

Reg. No: K50/74984/2014

Name: ROSE WAMBUI NJUGUNA

Title: ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY

AMONG PERSONS WITH DISABILITIES IN NAIROBI COUNTY

Dr. Mathira Mulwa
SUPERVISOR

[Signature]
SIGNATURE

09/11/2016
DATE

Dr. Samuel Sirinj
ASSOCIATE DIRECTOR

[Signature]
SIGNATURE

10/11/2016
DATE

Dr. Ndeti Ndeti
DIRECTOR

[Signature]
SIGNATURE/STAMP

10.11.2016
DATE



Appendix 7: Plagiarism Certificate

11/10/2016 Turnitin Originality Report

Turnitin Originality Report

ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY (ICTs) AMONG PERSONS WITH DISABILITIES (PWDs) IN NAIROBI COUNTY, KENYA by Rose Wambui Njuguna K50/74984/2014

From Mass media and Technology (MA Communication theory)

- Processed on 03-Nov-2016 17:58 EAT
- ID: 731461886
- Word Count: 10804

Similarity Index
12%

Similarity by Source

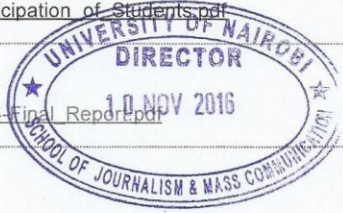
Internet Sources: 9%

Publications: 5%

Student Papers: 6%

sources:

- 1 1% match (publications)
[Khetarpal, A., "Information and Communication Technology \(ICT\) and Disability". Review of Market Integration, 2014.](#)
- 2 1% match (student papers from 02-Jul-2015)
[Submitted to International Islamic University Malaysia on 2015-07-02](#)
- 3 1% match (Internet from 06-Dec-2012)
http://cck.go.ke/consumers/consumer_protection/downloads/pwd-presentations/Policy_and_Regulatory_Framework_for_PWDs_in_Kenya.pdf
- 4 1% match (Internet from 12-Jan-2014)
http://www.era-comm.eu/anti-discri/kiosk/pdf/background_docu_EN.pdf
- 5 < 1% match (publications)
[Mitra, Sophie. "The capability approach and disability.", Journal of Disability Policy Studies, Spring 2006 Issue](#)
- 6 < 1% match (Internet from 28-Feb-2014)
http://www.cck.go.ke/consumers/consumer_protection/downloads/pwd-presentations/Use_of_ICT_to_Promote_Access_and_Participation_of_Students.pdf
- 7 < 1% match (Internet from 06-Jul-2016)
http://www.tdsi.org/media/topic_documents/D10-WTDC14-Final_Report.pdf



file:///C:/Users/Daizy/Downloads/Turnitin%20Originality%20Report%20rose%20Njuguna.html 1/1

Appendix 8: Declaration of Originality

UNIVERSITY OF NAIROBI

Declaration of Originality Form

This form must be completed and signed for all works submitted to the University for examination.

Name of Student ROSE WAMBUI NJUGUNA

Registration Number K50/74984/2014

College CH.S.S - HUMANITIES AND SOCIAL SCIENCES

Faculty/School/Institute SCHOOL OF JOURNALISM


Department SOJ

Course Name MA IN COMMUNICATION STUDIES

Title of the work ACCESSIBILITY TO INFORMATION AND COMMUNICATION TECHNOLOGY AMONG PERSONS WITH DISABILITIES

DECLARATION

1. I understand what Plagiarism is and I am aware of the University's policy in this regard
2. I declare that this MA PROJECT (Thesis, project, essay, assignment, paper, report, etc) is my original work and has not been submitted elsewhere for examination, award of a degree or publication. Where other people's work, or my own work has been used, this has properly been acknowledged and referenced in accordance with the University of Nairobi's requirements.
3. I have not sought or used the services of any professional agencies to produce this work
4. I have not allowed, and shall not allow anyone to copy my work with the intention of passing it off as his/her own work
5. I understand that any false claim in respect of this work shall result in disciplinary action, in accordance with University Plagiarism Policy.

Signature 

Date 10/11/2016



Appendix 9: Table of Recommended Sample Size (n) for Finite Populations (N)

<i>N</i>	<i>N</i>		<i>N</i>	<i>n</i>		<i>N</i>	<i>n</i>
10	10		220	140		1,200	291
15	14		230	144		1,300	297
20	19		240	148		1,400	302
25	24		250	152		1,500	306
30	28		260	155		1,600	310
35	32		270	159		1,700	313
40	36		280	162		1,800	317
45	40		290	165		1,900	320
50	44		300	169		2,000	322
55	48		320	175		2,200	327
60	52		340	181		2,400	331
65	56		360	186		2,600	335
70	59		380	191		2,800	338
75	63		400	196		3,000	341
80	66		420	201		3,500	346
85	70		440	205		4,000	351
90	73		460	210		4,500	354
95	76		480	214		5,000	357
100	80		500	217		6,000	361
110	86		550	226		7,000	364
120	92		600	234		8,000	367
130	97		650	242		9,000	368
140	103		700	248		10,000	370
150	108		750	254		15,000	375
160	113		800	260		20,000	377
170	118		850	265		30,000	379
180	123		900	269		40,000	380
190	127		950	274		50,000	381
200	132		1,000	278		75,000	382
210	136		1,100	285		100,000	384