ICT Barriers for People with Disabilities in Namibia: Evidence from the 2011 Namibia Population and Housing Census

Nelago Indongo, PhD & Pempelani Mufune, PhD
University of Namibia

Abstract: Computer technology and the Internet have a tremendous potential to increase the independence of people with disabilities. We investigated the extent to which people with disabilities access information communication technologies (ICT) (focusing on access to computers, internet and mobile phone) and how their ICT access compares with the ICT access of the rest of the Namibian population. More specifically, we investigated factors that affect people with disabilities ICT access in Namibia. The study relied on the 2011 Namibia Population and Housing Census as the main data source for analysis. The results showed people with disabilities are disadvantaged in ICT access. The study reveals that education level, work status, age and place of residence are important factors associated with ICT access among people with disabilities. Results also show that there is less disparity between employed and unemployed individuals with disabilities than without disabilities. Additionally, the results show that those classified as "blind", "autistic", "hearing difficulties" and "mentally disabled" fair worse than people with other disabilities in computer, internet and/or cell phone access. There is a need to consider unique issues affecting ICT access for people living with disabilities to achieve Namibia's goal of equitable access for all as envisioned in its Vision 2030.

Keywords: ICT, Africa, accessibility

Introduction

According to the United Nations (UN), around 10 percent of the world's population, or 650 million people, live with a disability (UN, 2006). They are the largest minority group. People with disabilities (young and old) face many challenges in an African context. These include abuse, lack of education, illiteracy, and unemployment. They also face challenges around information and communication technologies (ICTs). ICTs can transform the lives of people with disabilities (PWD) in many ways. For example text to speech software enables people with sight problems to hear what others read and people with hearing impairments can access cell phone texts. Similarly, assistive devices have enabled students with severe physical disabilities to follow seminars and classes at many universities and schools. The potential for computer technology and the Internet to increase the independence of people with disabilities cannot be overestimated (Kaye, 2000). Kaye (2000, p.1) pointed to the fact that people with mobility difficulties "can log in and order groceries, shop for appliances, research health questions, participate in online discussions, catch up with friends, or make new ones." In general ICTs may enable people with disabilities to better integrate socially and economically into communities. Although ICTs hold great promise, it seems the computer revolution has left most people with disabilities in Africa behind. People with disabilities in Africa have an especially low rate of computer and Internet access (Furuholt and Kristiansen, 2007; Samanti et al 2013). Thus, African people with disabilities are at the short end of ICT discourses and discussions.

Recent years have seen much greater interest being paid to the rights of people with disabilities (Palmer, 2012; Eide and Ingstad, 2013). The 2006 United Nations Convention on the Rights of People with Disabilities that came into being in May 2008 (UN Enable, 2008) has particularly been instrumental in championing the rights of people with disabilities. The Convention places considerable emphasis on the accessibility of ICTs, and particularly in Article 9 requires signatories to: "Promote access for persons with disabilities to new ICTs and systems, including the Internet" (UN, 2006) and to "Promote the design, development, production and distribution of accessible ICTs and systems at an early stage, so that these technologies and systems become accessible at minimum cost" (UN, 2006).

The developed world has recognized the benefits of using ICT for socioeconomic development of people with disabilities, however little research has been done in Africa. Over the years, the focus has been on increasing penetration of basic services and meeting underserved demand in rural areas. However, usage of ICTs by people with disabilities has not been addressed specifically. This can be shown by design, environment and location of ICT points of access and facilities like Internet cafes which, for example, lack facilities that ease movement of persons with disabilities like ramps and screen reading software. The main purpose of this paper is therefore to establish a deeper understanding of ICT access by people with disabilities which may provide insight for practitioners and policy makers on how best they should support people with disabilities to access ICT in order for Namibia to achieve the goal of equality. Namibia adopted a Universal Access and Service Policy for Information and Communications Technologies in 2012. While mobile telecommunications access is relatively high, and includes many low-income households, it is not yet universal. Most Namibians over the age of 15 have access to mobile voice telephony, the mobile network having achieved 98% population coverage and most Namibian households listen to the radio, with the level of radio population coverage at 96%. There remains a substantial lack of access to fixed phones, television, the Internet and broadband. Further, analysis of access to all information and communications technology services, from mobile telephony to broadband, reveals that there remains a substantial urban / rural access gap, with considerable disparities in levels of access between urban and rural communities. For example, in 2011, only 46% of Namibians aged 15 and older living in rural areas had a mobile phone, compared to 77% of Namibians in urban areas (Namibia Statistical Agency –NSA- 2012). Only 3% of rural households had a fixed line phone, compared to 26% of urban households. With respect to broadcasting services, the picture is similar, with ownership of a working radio and television set reported by only 66% and 19% respectively of rural households, compared to 81% and 73% of their urban counterparts (NSA, 2012). Only 2% of rural households had Internet access, compared to 27% of urban households. This reflects an urban-rural divide in respect of access to ICTs, which is related to other urban-rural disparities. For example, only 22% of rural households have electricity- which is a key support infrastructure, enabling rollout of telecommunications, broadcasting, Internet and broadband networks - compared to 82% of urban households.

In view of the above, the study utilizes the Namibian Population and Housing Census, a nationally representative data source, to identify:

1. The extent to which people with disabilities access ICT technologies;

2. How their access of ICT compares with the ICT access of the rest of the Namibian population;
3. How having a disability relates to and interacts with other social statuses (e.g. socioeconomic status, age, gender) with regard to ICT access; and
4. An explanation of the observed differences.

These objectives will be achieved by answering the following main research questions:

1. How does access to ICT of people with disabilities compare to access by people without disabilities?
2. How does access to ICT differ by type of disability?
3. What factors predict access to ICT by people with disabilities?

Review of Related Literature

The advent and utilization of computers and the Internet has created unrivalled opportunities for people living with disabilities (Cheatam, 2012). Accordingly, individuals that have limited mobility, sight, speech, or hearing may now aspire and achieve previously unobtainable goals through the use of a computer and the internet. Opportunities include education (e.g. participating in online courses), health (e.g. searching for health information and telemedicine), employment and work (telemarketing), and enhancement of friendships and social participation (networking). ICTs however cannot overcome issues of impairment and disability. Suggestions to that end are exaggerations and will not materialize (Goggin and Newell, 2003). According to Dobransky and Hargittai (2006), despite the increasing use and spread of the Internet and despite its potential for increasing opportunities for people living with disabilities (PWD), there is very little evidence indicating that people with disabilities are benefiting from the spread of the internet and other information and communication technologies (ICT). Similarly, Vicente and Lopez (2010) show that the digital divide in many countries works to exclude elderly, women, the population with lower income, education attainment, those living in rural areas, ethnic minorities and especially those with disabilities. This is even more so in developing countries where people with disabilities face daunting barriers to socioeconomic participation (Samant et al 2013). According to Samant these barriers relate to personal and environmental (infrastructural) resource limitations. They include: high unemployment and poverty, poor attendance at schools, low literacy levels, lack of clean water and sanitation, inadequate access to transport and healthcare. Van Rooy et al (2012) specifically demonstrated that in Namibia people living with disabilities faced a lot of barriers to health care and many experienced bottlenecks in rehabilitation service delivery. The health delivery difficulties people living with disabilities faced in Namibia were compounded by lack of access to income and by generalized poverty. Accessible ICTs can eliminate or mitigate some of the barriers people living with disability face in various fields of endeavor (Samant et al 2013). In particular Samant et al (2013) demonstrate that ICTs can be utilized in low and middle income countries for such economic and social services as banking, health care, education, emergency management, and social participation. In this regard ICTs can help ensure more equal opportunities in social and economic participation and prevent further marginalization and exclusion of people with disabilities if correctly promoted and implemented. It is also in this regard that the *Convention on*

the Rights of Persons with Disabilities (CRPD) recognizes the importance of ICT in promoting the welfare and integration of people with disabilities (UN, 2006). Articles 9, 21, and 26 of this convention state that ICTs can help in the realization of rights of people with disabilities in regard to accessing justice, freedom of expression, political participation, education, health, rehabilitation, and employment. "However, the lack of attention to making ICTs accessible coupled with substantial barriers in accessing AT to use ICTs, continues to exclude persons with disabilities from the mainstream of social and economic development programs and significant ICT-based social opportunities" (Samant et al 2013: 12).

What barriers exist in preventing people with disabilities from accessing ICTs in low income countries? According to Jones (2004) education can present a barrier to accessing ICTs. He found that people that have not had any computer education in school, and as a result are in need of computer skills training to allow them to make use of computers in their work fail to access ICTs more than those that had. Internet café users in Africa are well educated (Furuholt and Kristiansen, 2007). According to Gilbert et al (2008:921) "in overcoming the digital divide, it is important to have access to computers and the Internet, but it is much more important to have knowledge of how to use computers and how to access the Internet". Therefore education is crucial.

Similarly poverty as represented by lack of resources and/or income can present an obstacle to ICT access. It is in this context that Graham (2011) argues, "The initial material divide concerns a lack of access to the entry points of cyberspace. This divide is almost entirely a question of resources. People need the hardware (computer, modem, router, etc.), software (i.e. browser and email client), and an Internet connection (either hardwired or a wireless access point). Without access to all of the above, there can be no entry into any cyberspaces". Thus Jones (2004) reported that the most frequently mentioned problem when teachers were asked about obstacles to their use of ICT was the insufficient number of computers available to them. "Wifi access points by their nature discriminate against the poorest members of society by requiring users to own a laptop computer" (Graham, 2011). In Namibia, where most people with disabilities are not employed (and do not have insurance coverage of any kind), the costs of ICTs and other services can be prohibitively high (Van Rooy et al., 2012). In Namibia financial barriers are crucial. Despite this Kvasny and Keil (2006) found that providing computers, Internet access and basic computer education was a necessary but not sufficient condition for reducing the digital divide experienced by poor people and people with disabilities in urban areas. They argue that this is the case because of the way in which digital inequalities intersect with such structural inequalities as a lack of access to decent schools and poverty.

Barriers in access can be in the form of product and/or service design. This is especially so in developed countries where ICTs are widely available. ICTs use "standard" designs that are fixed in some hypothetical notion of "normality" which create barriers to access. Thus people with disability get excluded from the content of web pages that are not accessible to the specific interfaces they utilize (Goggin and Newell 2003). For people with disabilities accessibility and use are not incorporated in the technology as designers seek to normalize people with disabilities. Watling (2011) suggests that access ICT consists of adaptations to standard 'off-the-shelf' computers enabling individuals with physical or sensory impairment to independently use them. Such adaptations consist of alternative keyboards, mice designs or navigation aids as well

as software supporting text-to-speech and speech-to-text conversion. They include increased text size and altering of colors and contrasts. For people with disabilities access technology offers genuine opportunities for inclusion (Watling, 2011).

Graham (2011) reminds us that a whole array of other factors related to the politics and practices of access (such as gender, class, and age) are as prohibitive to ICT access as financial barriers. Similarly, Furuholt and Kristiansen (2007) mention age, gender, education, employment and financial capacity as crucial variables in accessing ICTs. In this regard he argues that telecentres and Internet cafes are often highly gendered spaces that can be unwelcoming to women in many countries. Older individuals are less likely to engage with the technology, simply due to their advanced age (Jones, 2004). Geography seems to play a part in the digital divide. Thus many countries lack broadband data transmission to rural and poor urban areas (Graham, 2011). Within rural areas, those with disabilities are at the short end. Furuholt and Kristiansen (2007) found that for Tanzania the digital divide was greatest, "between better educated, affluent, younger, English speaking men in developed cities and less educated, poor older, non-English speaking women in underdeveloped rural areas." In rural Africa ICT deployment faces infrastructural bottlenecks such as electricity, IT penetration, teledensity, skills shortages and cultural resistance (Rao, 2005; Mosse and Sahay, 2005).

Data Source and Methods

This paper uses data from the Namibia 2011 Population and Housing Census as the main data source for analysis. The census collects background, demographic and socio economic information from all persons in the country. Information on disability status of individuals was collected under section B of the Census Questionnaire. Disability was defined as a long-term physical, psychological or mental condition that limits a person from carrying out everyday activities at home, work or school. It may be present from birth or develop during a person's lifetime.

The main question used to establish whether an individual is living with a disability or not is: "Does (NAME) have any type of long term disability or limitation?"

During the Census, all people in private households and institutions were asked about types of long-term permanent disability or limitation. Ten types of disability were identified for this purpose (this is actually the language used by the Census): "blindness, visual impairment, deafness, hearing difficulties, mute/dumb, speech impairment, and physical impairment of lower and upper limbs, mental disability, albinism and autism."

A total of 98, 413 persons in Namibia were living with disabilities. This paper will focus on a total of 95, 092 people living with disabilities who are aged 3 years and older to allow the analysis in relation with access to ICT. Descriptive statistics for variables of interest were computed. Cross tabulations were run to examine association and differences between variables of interest. These are presented in tables 1 to 4 and graphical form. A multivariate logistic regression analysis was performed to assess the probability effect of socio-economic and demographic factors on access to ICT. This is presented in Table 5. The results are interpreted in term of odd ratios. The logit model is of the form:

$$\text{logit (p)} = \log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + ... + \beta_k x_x$$

The odds of access to computer, internet or cell phone can equivalently be determined in terms of probability of access, p, as:

$$p = \frac{\exp(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k)} = \frac{1}{1 + e^{z}}$$

where $z = \beta_0 + \beta_1 x_1 + ... + \beta_k x_k$

A 5% level of significance was used as a decision rule on whether the variable is retained or not in the model through the backward ward model selection. Selection of independent variables was guided through the literature review.

Results

Table 1: Namibian population, aged 3 years and older, who have access to ICT services by type and area (Table contents explained in paragraph below)

	Namibia	Rural	Urban
	# (%)	# (%)	# (%)
Radio	1 316 565 (68.6)	707 623 (64.5)	608 942 (74.0)
TV	703 486 (36.7)	151 888 (13.8)	551 598 (67.1)
Computer	201 955 (10.5)	27 350 (2.5)	174 605 (21.2)
Cell phone	1 010 072 (52.6)	22 159 (2.0)	100 272 (12.2)
Newspaper (daily)	170 974 (8.9)	21 329 (1.9)	149 645(18.2)
Newspaper (weekly)	311 539 (16.2)	93 591 (8.5)	217 948 (26.5)
Internet (daily)	103 698 (5.4)	15 751 (1.4)	87 947 (10.7)
Internet (weekly)	64 303 (3.4)	12 599 (1.1)	51 704 (6.3)
Total	**1 919 438 (100)**	**1 097 098 (57.2)**	**822 340 (42.8)**

Of the 1.9 million Namibians aged 3 years and older, only 10.5 percent have access to computer, 5.4 percent have daily access and 3.4% have weekly access to the internet (Table 1). At 52.6%, access to cell phones is much more widespread. Access to computers, internet and mobile phones is much worse in rural areas than in urban ones (Table 1). The results show that overall people with disabilities are less than half as likely as their non-disabled counterparts to have access to a computer (5% vs. 10%) and the gap in internet access is even wider. There is a significant difference in access to ICT services for people with disabilities and their place of

residence (urban or rural) (Table 2). About 5 percent of people with disabilities in urban areas have access to a computer compared to only 1.0 percent in rural areas. Furthermore, 3.7 percent of people with disabilities in urban areas have internet access daily or weekly while only 1.3 percent in rural areas has internet access (Table 2). On the other hand the figures for people without a disability are 7.5% for urban areas and 1.5% for rural areas. However, a fairly high proportion of people with disabilities in rural areas have access to cell phones. This is not the case for urban areas where more people without disabilities (30%) have access to cell phones than people with disabilities (18%).

Table 2: Percentage distribution of population, aged 3 years and older, who has access to ICT services by disability status and area (Table contents explained in text above)

	Has Disability (%)		No disability (%)	
	Rural	**Urban**	**Rural**	**Urban**
Radio	43.3	21.1	36.5	32.3
TV	6.5	17.5	8.0	29.3
Computer	1.0	4.6	1.4	9.3
Cellphone	24.4	18.0	23.2	30.0
Telephone	1.1	3.6	1.2	5.3
Newspaper daily	1.0	4.6	1.1	8.0
Newspaper weekly	4.4	6.8	4.9	11.6
Internet daily	0.7	2.2	0.8	4.7
Internet weekly	0.6	1.5	0.7	2.8

$\chi^2 = 6799.122$ with $p<0.001$ for the relationship between whether a person had disability or not and place of residence.

Table 3: Percentage distribution of population, aged 3 years and older, who have access to ICT services by disability status and sex (Table contents explained in text below)

	Has Disability		No disability	
	Females	**Males**	**Females**	**Males**
Radio	32.6	31.8	35.8	33.0
TV	12.1	11.9	19.5	17.8
Computer	2.9	2.8	5.5	5.3
Cellphone	21.5	20.8	27.9	25.3
Telephone	2.4	2.3	3.4	3.0
Newspaper daily	2.7	2.9	4.5	4.6
Newspaper weekly	5.5	5.7	8.6	7.9
Internet daily	1.5	1.5	2.7	2.8
Internet weekly	1.0	1.0	1.7	1.7

$\chi^2 = 32.579$ with $p<0.001$ for the relationship between whether a person had disability or not and sex.

Although there is a significant relationship between whether a person has a disability or not and sex, the difference in access to ICT between male and females who have a disability is minimal (Table 3). To this end among females with disabilities 2.9% have access to computers while among males with disabilities 2.8% have access to computers. Similarly, access to daily and/or weekly internet for males with disabilities and females with disabilities is 2.5% (Table 3). The figures in Table 3 are much lower than those found in other parts of the world. For instance the statistics on world internet use show only 34.3% of the world population use the internet (InternetWorldStats, 2012). Internet penetration is 15.6% in Africa; 27.5% in Asia, 63.2% in Europe; 40.2% in the Middle East; 78.6% in North America, 42.9% in Latin America/Caribbean and 67.6% in Oceania/Australia. Among Americans living with a disability 54 % (compared with 81% of those without a disability) use the internet and 41% (compared with 69% of those without a disability) have broadband at home (Fox, 2011).

Table 4: Percentage distribution showing ICT Access Status for People with Disabilities by Core Activity Limitation (Table contents explained in text below)

(Terminology used by the Census)	Radio	TV	Computer	Phone (cell or fixed)	Newspaper (daily or weekly)	Internet (daily or weekly)
Blind	65.1	12.1	3.0	33.0	9.2	2.5
Visual impairment	68.1	27.7	8.6	50.3	20.7	7.6
Deaf	52.3	25.1	6.0	36.4	16.6	5.1
Hearing difficulties	56.3	17.7	3.2	33.8	12.3	2.8
Mute/dumb	59.8	29.2	6.3	41.8	17.2	6.0
Speech impairment	60.9	26.8	5.5	37.8	14.4	4.8
Impairment of arms	65.8	19.9	3.8	45.3	15.5	3.4
Impairment of legs	68.8	25.6	5.5	47.9	19.0	5.5
Mental disability	58.1	21.6	3.6	29.9	10.8	2.9
Albinism	63.9	26.2	7.5	47.5	20.5	7.4
Autism	59.3	23.4	4.1	31.4	11.6	3.2

There seem to be differences in access to computers, internet and mobile phone according to core activity limitation among people with disabilities (Table 4). People with disabilities whose limitations are classified as “visual impairment”, “albinism” and “mute/dumb” fare better than others with regard to access to computers. Those classified as “blind”, “hearing difficulties” and “mental disability” fair worse than others in computer access. For instance, it is important to note that 15% of those classified as “blind” have another disability. Most of them (26.3%) indicated that they also have hearing difficulties and physical impairment (25%) for the lower limb. The multiple disabilities may be compounding their disadvantage with regard to ICT. This pattern also holds with regard to daily or weekly access to the internet. On the other hand people with disabilities whose limitations are classified as “visual impairment,” “albinism” and

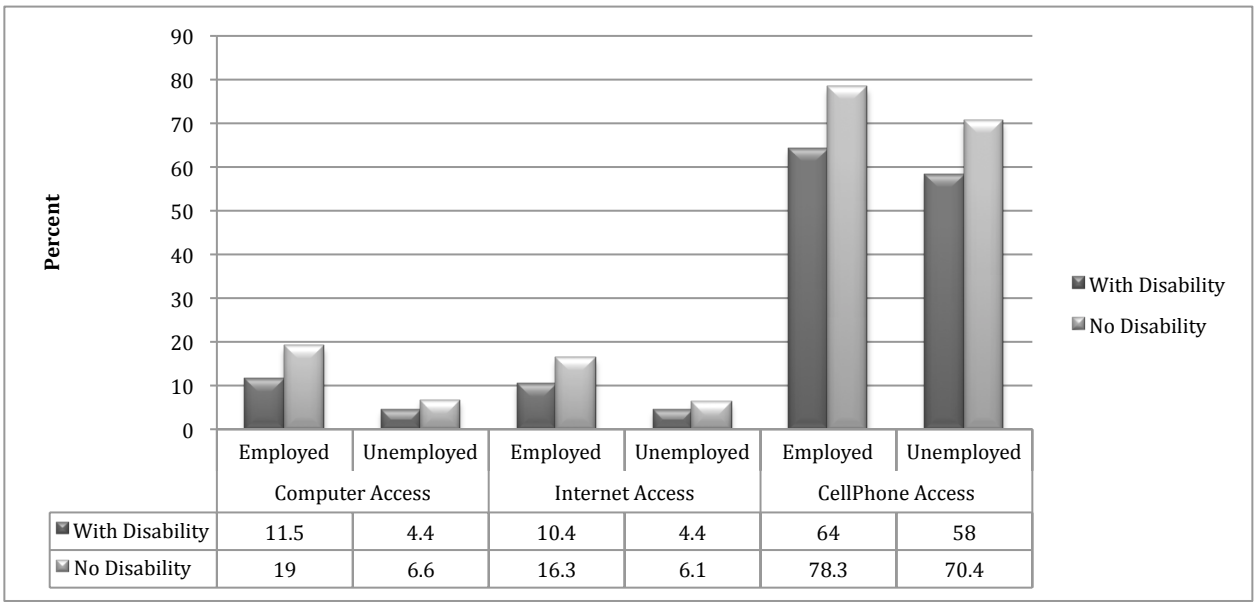
"impairment of legs" fare better than others with regard to access to cell and fixed phones. Those classified as "blind," "autistic" and having a "mental disability" fare worse than others in cell and fixed phone access.

Employment Status

For working age adults having a job can make it financially feasible to buy a computer; often, on the job, access to computers and the internet is also provided, along with training in how to use them. It is not surprising, therefore, that people with and without disabilities are more likely to have access to computers and use the internet if they are employed than if they are not (Figure 1). But even if they do have jobs, people with disabilities are significantly less likely to gain access to these new technologies than the non-disabled. Among employed people with disabilities 11.5 percent have access to a computer and 10.4 percent have access to the internet, compared to 4.4 percent of their non-disabled counterparts. All around, rates are significantly lower among those without jobs.

Cell phone access is widespread among employed and unemployed people in Namibia. About two thirds of employed persons living with disabilities have access to a cell phone. But even slightly more than half of the unemployed persons with disabilities have cell phones.

Figure 1: Computer, internet and cell phone access by disability and employment status



	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed
	Computer Access		Internet Access		CellPhone Access	
With Disability	11.5	4.4	10.4	4.4	64	58
No Disability	19	6.6	16.3	6.1	78.3	70.4

Figure 1
Table 1: Text Equivalent Table for 'Figure 1'

	Computer Access with Disabilities	Computer Access without Disabilities	Internet Access with Disabilities	Internet Access without Disabilities	Cell Phone Access with Disabilities	Cell Phone Access without Disabilities
Employed	11.5%	19%	10.4%	16.3%	64%	78.3%
Unemployed	4.4%	6.6%	4.4%	6.1%	58%	70.4%

Figure 1 shows that people with disabilities are less likely to be employed than people without disabilities. Having no access to computers and internet, makes all figures low, falling below 20%. There are fewer people with disabilities with cell phone access than for those without disabilities, but access to a cell phone greatly increases levels of employment for both groups.

Education Attainment

People who are well educated are more likely to have the skills and the financial resources necessary to buy and use computer technology. But, regardless of the level of educational attainment, people with disabilities have much lower rates of computer access and internet use than their non-disabled peers (Figure 2). Overall, computer, internet and cell phone access increases with the level of education attainment. This pattern is consistent for person with and without disabilities. To this end among people with disabilities that have no education only 1.4% have access to a computer. Among people with disabilities 2.4 percent of those with primary education have access to a computer, 12.1 percent with secondary education have access to computers and 51.8 percent with tertiary education have access to computers. The comparable figures for people without disabilities are 3.1% (no education), 4.6% (primary education), 16.0% (secondary education) and 61.5% (with tertiary education).

Age

Age is an important factor that determines the use of modern technology. Overall, the results show that young adults are more likely to have access to a computer, the internet as well as a cell phone (Figure 3). However, in all cases, those with disabilities are less likely than those without disabilities to have access to all the three modern technologies. For example, only 7.6 percent of people living with disabilities in the age group 35-54 years have access to computer compared to 15.5 percent without a disability. Persons aged between 35 and 54 years who have no disability are two times more likely than those with a disability to have internet access. Cell phone access is widespread among all age groups, but is lower among young people (aged below 15 years), and higher among young adults where more than 50 percent have access to a cell phone regardless of whether they have a disability or not and is decreased among those aged 55 years and older.

Figure 2: Computer, internet and cell phone access by disability status and education attainment

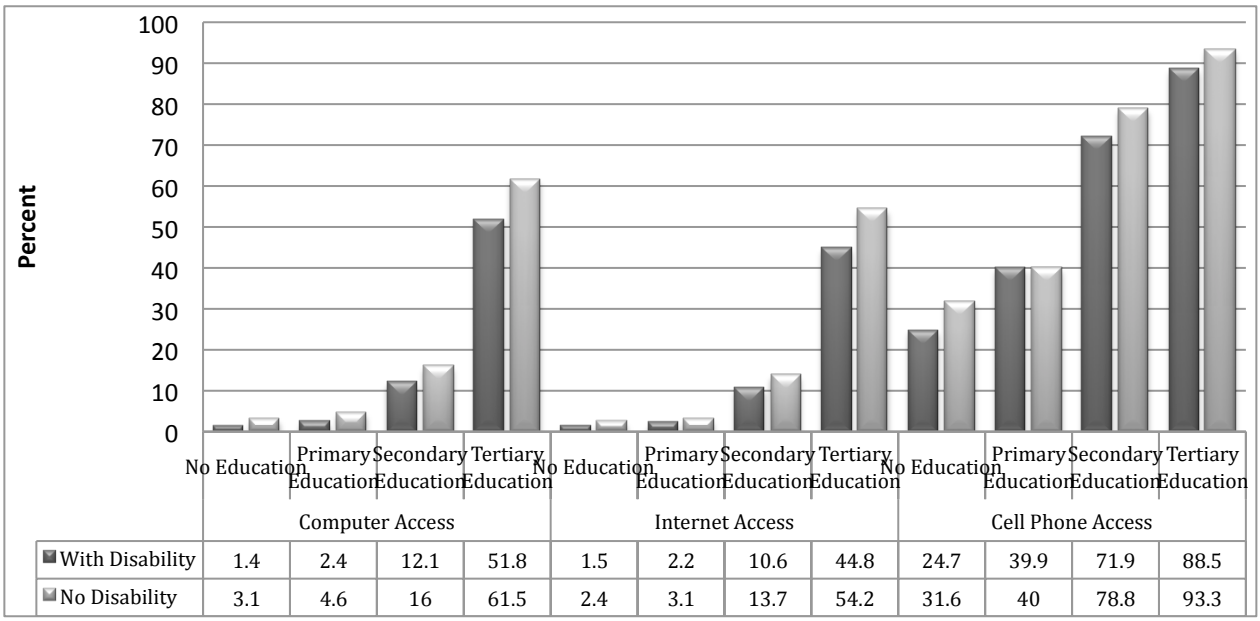


Table 2: Text Equivalent Table For 'Figure 2'

	Computer Access with disabilities	Computer Access without disabilities	Internet Access with disabilities	Internet Access without disabilities	Cell Phone Access with disabilities	Cell Phone Access without disabilities
No Education	1.4%	3.1%	1.5%	2.4%	24.7%	31.6%
Primary Education	2.4%	4.6%	2.2%	3.1%	39.9%	40%
Secondary Education	12.1%	16%	10.6%	13.7%	71.9%	78.8%
Higher Education	51.8%	61.5%	44.8%	54.2%	88.5%	93.3%

Figure 2 is a graph showing computer and internet access greatly increases chances for higher education, the figures indicating this is slightly less so for people with disabilities. Cell phone access improves education attainment for all education levels, with higher education spiking at 88.5% for people with disabilities and 93.3% for those without disabilities.

Figure 3: Computer, internet and cell phone access by disability status and age

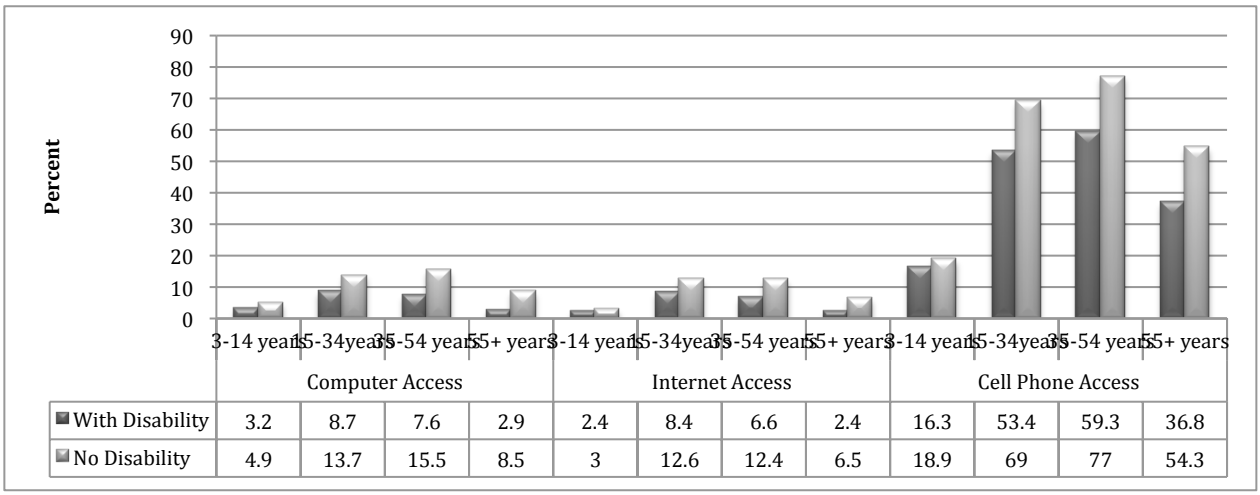


Table 3: Text Equivalent Table for 'Figure 3'

	Computer Access with Disabilities	Computer Access Without Disabilities	Internet Access with Disabilities	Internet Access without Disabilities	Cell Phone Access with Disabilities	Cell Phone Access without Disabilities
Ages 3-14	3.2%	4.9%	2.4%	3%	16.3%	18.9%
Ages 15-34	8.7%	13.7%	8.4%	12.6%	53.4%	69%
Ages 35-54	7.6%	15.5%	6.6%	12.4%	59.3%	77%
Ages 55+	2.9%	8.5%	2.4%	6.5%	36.8%	54.3%

Figure 3 is a graph showing that people of all ages lack access to computers and the internet, all figures falling below 16%. Access is even less for those with disabilities. Cell phone access is much higher for all ages, with and without disabilities, spiking at 77% for people ages 35-54. Though cell phone access is higher for people with disabilities than that of computer and internet access, it is still lower than access for people without disabilities.

Results from Multivariate Analysis

Computer access among persons with disabilities is associated with education level, age, place of residence, work status and region of residence (Table 5). The odds of having access to computer for persons with disabilities who are employed is 2.26 times that of those who are not employed. Additionally, access to a computer, the internet and a cellphone is positively associated with education attainment among people with disabilities. It is also important to note that access to a computer and the internet is negatively associated with age. The odds ratio for people with disabilities who are 15 years and older are less than 1.0, indicating that as a person with disabilities grows older, they are less likely to have access to a computer and the internet as compared to those who are young. Most young people with disabilities are likely to be attending compulsory school (primary & secondary), and remain challenged in accessing tertiary

education. Only 4.6% of people with disabilities had tertiary education. However, regardless of age, those who are employed are more likely to have access to computers and the internet. Living in rural areas is negatively associated with access to a computer and the internet. The odds of having access to a computer and the internet for people with disabilities who live in a rural area are 0.31 and 0.61 respectively. This is an indication that people with disabilities who live in rural areas have little access to computer and internet as compared to those in urban area. There are also regional differences with regards to access to computers, the internet and cell phones among people with disabilities. Notably, people with disabilities who live in Omusati region are less likely than those in Caprivi region to have access to a computer (OR = 0.92) but twice as likely to have access to cellphone. Furthermore, people with disabilities in Kavango region are less likely to have access to cell phones than those in the Caprivi region. The results in Table 5 also indicated that those who have access to a computer are highly likely to have access to the internet. It must be pointed out that Omusati, Caprivi and Kavango are all rural regions in Namibia that experience high levels of poverty.

Table 5: Factors influencing computer access, internet access and cell phone access, among people with disabilities, 2011 Namibia Population and Housing census (table below is explained in above text)

Variable	Computer Access	Internet Access	Cell Phone Access
Work Status			
Not Employed	1.00	1.00	1.00
Employed	2.26 (2.22 ; 2.29)*	1.51 (1.48 ; 1.54)*	1.31 (1.29 ; 1.32)*
Place of Residence			
Urban	1.00	1.00	1.00
Rural	0.31 (0.30 ; 0.32)*	0.61 (0.60 ; 0.63)*	0.49 (0.48 ; 0.50)*
Age Group			
3-14yrs	1.00	1.00	1.00
15-34yrs	0.65 (0.60 ; 0.71)*	0.74 (0.68 ; 0.81)*	3.48 (3.36 ; 3.60)*
35-54yrs	0.74 (0.68 ; 0.81)*	0.57 (0.51 ; 0.63)*	4.60 (4.44 ; 4.76)*
55+yrs	0.93 (0.85 ; 1.02)*	0.58 (0.52 ; 0.64)*	3.07 (2.95 ; 3.19)*
Education Attainment			
No formal education	1.00	1.00	1.00
Primary Education	0.77 (0.74 ; 0.80)*	0.77 (0.74 ; 0.81)*	1.77 (1.74 ; 1.80)*
Secondary Education	4.08 (3.94 ; 4.22)*	2.00 (1.93 ; 2.08)*	3.69 (3.64 ; 3.75)*
Tertiary Education	28.81 (27.77 ;	5.61 (5.39 ;	4.70 (4.53 ;

	29.90)*	5.85)*	4.88)*
Sex of Respondent			
Female	-	1.00	
Male	-	1.15 (1.13 ; 1.17)*	0.96 (0.95 ; 0.97)*

Discussion

This paper investigates access to ICT by people with disabilities vis-à-vis others in Namibia. In particular, we focused on access to computers, the internet and mobile phones. For each of these three indicators of ICT access, we investigated the main factors that predict differences. The digital divide in Namibia works to especially exclude those with disabilities. This also seem to be the case in many other developing countries (Vicente and Lopez, 2010; Samant et al., 2013). The study reveals that education level, work status, age and place of residence are important factors associated with access to ICT among persons with disabilities. Facer and Furlong (2001) also found an important socioeconomic gradient with respect to access to a computer. Gender inequalities also exist in access to the internet among people with disabilities, with males being more likely to have access to internet than their female counterparts. This result is consistent with findings from Kent and Facer (2004), who reported that boys were more likely to report being involved in playing games and using the Internet at school. Research has revealed that the mobile phone is, for adolescents, a medium which permits communication (Davie, Panting, Charlton, 2004), and is a means for social inclusion (Adams and Fitch, 2006). The results are also consistent with many findings (Furuholt and Kristiansen, 2007; Graham, 2011; Rao, 2005; and Mosse and Sahay, 2005) that in the African context where ICT deployment faces infrastructural bottlenecks, people with disabilities are even more disadvantaged. We conclude that increases in people with disabilities' education and employment in particular may prove useful in increasing their ICT access in Namibia. Policies should target people with disabilities' education and employment.

The results of this study seem to extend the literature in a few ways. The current study indicates that people with disabilities classified as "blind", "autism" and "mental disability" experience the greatest degree of ICT disadvantages. For people with these kinds of disabilities, achieving and maintaining employment remains a significant challenge in Namibia. So is having an education. For instance, among people who are classified as "blind" only 16.1% had attained secondary or higher education. Most of them either had no formal education (55%) or had only primary education (29%). Yet education and employment empower people with disabilities as citizens and are important elements in accessing ICT in Namibia. There also seems to be greater discrimination against people with these kinds of disabilities. It is in this context that they experience greater ICT disadvantages. It is also in this context that policies should also take into account type of disability for a "one size fits all" approach will miss people with certain disabilities. Chadwick et al., (2013) for instance argue it may be necessary to distinguish between physical and intellectual disabilities in order to ascertain how specific types of disabilities may influence access to ICT.

This study indicates (Figure 1) that there is less disparity between employed and unemployed individuals with disabilities than without disabilities. We do not know exactly why this is so, although in Namibia there are a variety of governmental programs that attempt to help people with disabilities. Prominent among these is the disability grant. An amount of N$ 600 per month (1USA $ = 8.5 N$) is paid to people 16 years or older that are medically diagnosed by a State doctor as being temporarily or permanently disabled every month. This may serve to reduce inequalities among people with disabilities that also affects access to ICT. As far as we know there no comparable schemes serving to reduce inequalities among people without disabilities in Namibia.

Nelago Indongo, PhD is the Director of the multi-disciplinary research center of the University of Namibia. Her major interest is in population and demographic issues.

Pempelani Mufune, PhD is a Professor of sociology at the University of Namibia. He has an interest in work and employment issues.

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