





Determining the digital divide among people with disabilities in KwaZulu-Natal

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Background: About 1.3 billion people around the world are living with disabilities, facing challenges such as premature death, mental conditions and other diseases. In South Africa, over 3.5 million people live with disabilities, making up about 6.6% of the total population. People with disabilities face numerous challenges of prejudice, and increasingly, digital exclusion is also becoming a concern.

Objectives: The objective of this study was to determine the extent and challenges that People with disabilities (PwD) have in accessing digital technology, assess the level of the digital divide, and propose measures to narrow this gap. Data were collected using survey questions, and the target population were people with disabilities located in various districts of KwaZulu-Natal province, South Africa.

Method: The study utilised a quantitative approach and analysed the findings using the Statistical Package for the Social Sciences (SPSS).

Results: The results indicated that people with disabilities are marginalised and have limited or no access to technology. The research concludes that there needs to be a targeted approach towards assisting people with disabilities, and stakeholders involved need to combat the digital divide for disadvantaged individuals to promote positive social change.

Conclusion: More needs to be done to increase society's sensibilities towards people living with disabilities. Technology penetration seems to be a challenge and individuals with disabilities are left with a significant gap that needs to be addressed.

Contribution: This article contributes to bridging the technology inequality for people with disabilities in historically disadvantaged societies.

Keywords: digital divide; people with disabilities; exclusion; equality; marginalisation.

Introduction

According to the World Health Organization (WHO 2022), people with disabilities (PwD) experience various challenges, including exclusion from education and employment, poverty and unemployment, stigma and general discrimination, and the lack of access to health facilities. These factors worsen the already difficult PwD conditions as a marginalised group. The world is undergoing a digital revolution that will profoundly affect global economies and lives in general. Digitalisation is the social transformation triggered by the massive adoption of digital technologies to generate, process, share and transact information. People with disabilities do not use the Internet and related technologies because of varying barriers that make the technology unfriendly to the many kinds of disabilities (Lazar & Jaeger 2011). With the world moving to digitisation, PwD are increasingly being left behind in technology adoption and important decisions regarding the use of technology. The adoption of digital technologies and services by the government, private sector and citizens has been identified as a fundamental element of economic development that contributes to economic growth and facilitates job creation. Digitalisation has played an essential role in assisting governmental policies to stimulate employment and economic development. However, unlike job creation, global digitisation is transforming not only the structure of an economy but also the social life (Aghimien et al. 2021). While digitalisation offers industries and societies great economic opportunities, its benefits are not currently shared equitably by all segments of society (OECD 2015). South Africa is regarded as a highly unequal country. Evidence points to the fact that South Africans who are vulnerable because of their age, gender, [dis]ability, race, ethnicity, origin, religion, economic or other status are at a disadvantage when it comes to access to digital technologies (Plagerson & Mthembu 2019; Pinet, Sanyu & Youn 2021). The coronavirus disease 2019 (COVID-19) global pandemic has had a catastrophic impact on PwD around the world, and it is crucial to take action to address

this issue (Mladenov & Brennan 2021). It has shown that vulnerable groups in society, especially people with disabilities lag in basic access to technology, healthcare facilities and other basic services (Brennan 2020). This study aims to demonstrate the magnitude of the digital divide among individuals with disabilities. The study was carried out in the province of KwaZulu-Natal (KZN), South Africa. The results indicate a growing disparity among individuals affected by disabilities. The state must formulate targeted plans aimed at closing the gap in technology adoption across all segments of society, particularly among the vulnerable.

People with disabilities and technology

According to the World Health Organization (WHO 2001:03) International Classification of Functioning, Disability and Health (ICF) (2001), disability can be defined as:

[A]n umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between a person's health condition(s) and that individual's contextual factors (environmental and personal factors). (p. 03)

The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) (Disabilities 2006) defines disability as a developing concept and a condition resulting from the interplay between people with disabilities and social and physical barriers. The UNCRPD defines PwD as people with long-term physical, mental, intellectual or sensory impairments that, in combination with other obstacles, restrict their equal and full participation in society. White Paper on the Rights of People with Disabilities (2016) defines disability in South Africa as the loss or removal of opportunities to participate in community and daily life activities on an equal basis with others, experienced by people with physical, sensory, psychological, developmental, learning, neurological or other impairments. This may be permanent, temporary or periodic, resulting in activity constraints and participation restrictions within mainstream society. According to Handicap International (2015), there are two main types of onsets or causes of disability: these are congenital or hereditary, and acquired or environmental. Hereditary disabilities are inherited by genetics; the affected individual might be born with a disability, or the disability could emerge later in life. In contrast, congenital disabilities are disabilities that a person develops from birth, such as those that arise in pregnancy or at birth, as well as hereditary disorders (Careerforce 2015). Acquired disabilities occur later in life because of illness or injury, such as arthritis or a stroke.

The challenges faced by individuals with disabilities

Pervasive inequality

Disability is frequently overlooked as a possible cause of digital inequality and exclusion (Johansson, Gulliksen & Gustavsson 2021). Around the world, individuals with disabilities face challenges that prevent them from

participating equally in social or economic life. They may face inaccessible physical environments, barriers to vital services and information, a lack of essential assistive technologies and negative societal attitudes towards disability, among other challenges. The consequences of such barriers can be severe. Individuals with disabilities face higher poverty rates and drastically higher unemployment rates (Darvishy, Eröcal & Manning 2019). According to the International Labour Organization (Stoevska 2022), the participation rate of people with disabilities in the labour force is very low. Globally, 7 in 10 people with disabilities are inactive (i.e. neither employed nor unemployed), whereas only 4 in 10 people without disabilities are inactive. Disabilities can place heavy financial demands on individuals and their families, often contributing to a cycle of poverty as resources and time are strained. In addition, children with disabilities are less likely to receive primary or secondary education, further limiting their employment opportunities when they reach adulthood (Darvishy et al. 2019). Such disparities tend to be even more significant for women, ethnic and racial minorities, communities in remote areas and other marginalised groups (Graham et al., 2014).

According to Statistics South Africa (2017), there are massive inequalities across African population groups living with disabilities compared to Indian and East Asian population groups. According to statistics, approximately half of every 10 black African persons with disabilities (44.7%) were concentrated in the 40% lower quintile, representing poor households. In contrast, less than 5% of persons with disabilities from the mixed race, Indian or East Asian, and white population groups were concentrated in the 40% lower quintile, representing poor households. Statistics also revealed that Western Cape and Gauteng provinces had the highest proportion of persons with disabilities in the upper quintile, representing well-off households (40.7% and 34.9%, respectively). In contrast, Eastern Cape, Limpopo and KwaZulu-Natal provinces had the highest proportion of persons with disabilities concentrated in low socio-economic status households (40.7%, 30.1% and 29.9%, respectively) (StatsSA 2016).

Challenges about access to quality healthcare

According to World Health Organization (WHO 2022), people with disabilities encounter various barriers when attempting to access healthcare services. Recent studies confirm this assertion; for example, a survey conducted by Vergunst et al. (2015) looking at access to healthcare for people with disabilities in rural areas revealed that people with disabilities face several barriers to quality and affordable healthcare. These barriers are organisational (inaccessible buildings, lack of access to assistive devices, shortage of staff and shortage of resources), attitudinal barriers (stigma attached to disabilities), and transport barriers (people with disabilities had to travel very long distances and sometimes access to public transport is a challenge) (Vergunst et al. 2015). A study by McKinney,

Mckinney and Swartz (2021) revealed that, during the COVID-19 global pandemic, many people with disabilities in South Africa were unable to access healthcare facilities, including intensive care units (ICU), beds and ventilators, therapeutic interventions or rehabilitation, and medication (Mckinney et al. 2021). This was a significant challenge considering that people with disabilities were at a high risk of contracting the virus because of pre-existing comorbidities and communal living spaces such as residential or institutional facilities. The World Health Survey conducted by World Health Organization (WHO 2009) identified different reasons for the lack of care for individuals living with disabilities. These include the costs of healthcare visits, poor equipment, unpleasant encounters with healthcare workers, insufficient skills among healthcare professionals and direct marginalisation (denied care).

Limited access to education

Evidence demonstrates that individuals with disabilities in diverse developing environments struggle to access education either through mainstreaming or special needs methods (Organisation 2001). Statistics from South Africa's Department of Basic Education (DBE) (2019) derived from the General Household Survey (GHS) revealed that over 800 000 children with disabilities aged 7–18 were not enrolled in school in 2002. In 2018, this number decreased to approximately 474 000 children. The lack of infrastructure necessary to ensure that the atmosphere is conducive to the education of children with disabilities was identified as one of the obstacles preventing individuals with disabilities from having access to inclusive education. In 2012, the DBE reported that 98% of South African schools lacked ramps and 97% lacked accessible restrooms for children with disabilities. In addition, a recent study conducted by Ndlovu (2021) revealed that the digital divide among people with disabilities in South Africa is heavily pronounced in higher education. Consider this quote from Lazar and Jaeger (2011):

A student who uses a wheelchair may find that being able to take courses online makes education much easier. But if the course Web site is not designed to be accessible for students with limited mobility in their hands, participation in the course may be limited or impossible. Similarly, a Web-enabled mobile device with a touch screen may seem like a miracle to a user with a hearing impairment and a nightmare to a user with a visual impairment, if it is not designed to provide alternative methods for interactions. (p. 70)

This research indicates that the digital gap for students with disabilities includes inaccessible facilities, high entry-level requirements for educational programmes, a lack of willingness by educators to accommodate students with disabilities, and a lack of relevant and adequate assistive technology and assistive devices to bridge the digital divide. The study further reveals that some institutions cannot accommodate certain disabilities, such as hearing impairment, because of a lack of technological tools and insufficient funding (Ndlovu 2021). As a result, inadequacies

in access and success for all students, including those with disabilities, are an issue of concern in South African higher education.

Literacy among people with disabilities

The Global Education Monitoring report from 2016 found that people with disabilities had a much higher risk of not possessing even the most basic literacy skills. According to this report, in Uganda in 2011, almost 60% of young people who had not been recognised as having any kind of disability were literate. Contrastingly, only 47% of young people who had either a physical or hearing impairment and 38% of young people who had a mental impairment were found to be literate. The report further states in the United Republic of Tanzania, a survey found that the literacy rate for people with a disability was 52%, compared with 75% for people without a disability (Global Education Report Team 2013). Census South Africa (2014) revealed that in South Africa, just 5.3% of those with 'severe impairments' attained higher education, while almost 24% had no basic education at all. Statistics South Africa (2015) further revealed that the highest proportion of persons aged 20 years and older with no formal education was recorded in under-developed communities regardless of the type of disability, while those in urban areas had a better profile, and females were considered more disadvantaged compared to males, particularly females with disabilities (Stats 2014). Among the many other reasons for these disparities is that South Africa has no basic and higher education special education facilities, and academic material is seldom designed with disabled individuals in mind.

Poverty and unemployment

Poverty and disability coexist, contributing to increased vulnerability and exclusion. In developing countries, factors linked to poverty, such as the lack of access to healthcare, insufficient water and sanitation, malnutrition and poor living conditions, are both the cause and consequence of disability (Mitra, Posarac & Vick 2013). For example, according to a report by Christoplos and Kidd (2000), investigating social protection and disability in South Africa, food poverty rates among households with members with disabilities (44.5%) were found to be significantly higher than among households without a disabled member (29.3%). Further, households with members with severe functional limitations experience a higher food poverty gap than those without a disabled person (19.1% compared to 13.8%). Darvishy et al. (2019) posit that the reasons behind the overrepresentation of persons with disabilities in poverty statistics are because of societal constraints such as prejudice, restricted access to school and work, and exclusion from livelihood and other social programmes. The Statistics South Africa report profiling persons with disabilities in the country argued that persons with disabilities are often disadvantaged compared to those without disabilities regarding access to job market opportunities (StatsSA 2016). This is partly attributed to limited formal education and skills. As a result, persons with disabilities tend to have worse labour market

outcomes such as unemployment, partial employment or employment at lower wages than persons without disabilities. In South Africa, eight out of ten individuals with a disability were found to be unemployed, discriminating in the form of denied work opportunities and this was identified as one of the greatest obstacles faced by people with disabilities (Stats 2014). This is further confirmed by the Stoevska (2022) in their latest research, observing that in most countries, individuals with disabilities who are employed are more likely to be in precarious employment with inadequate income, poor productivity and difficult working conditions.

Stigmatisation and prejudice

Stigma emerges when labelling, stereotyping, negative labelling and prejudice contribute to status loss and discrimination for a person with a disability or group, leading to a sense of disempowerment and vulnerability (Scior 2016). Disabled people, particularly those in developing countries, continue to face widespread stigma, contributing to social isolation, economic disadvantage and low quality of life (Rohwerder 2018). According to Rohwerder (2018), different forms of disabilities carry varying degrees of stigma, as do the severity and cause of the disability. For example, intellectual disabilities, severe mental health disorders, albinism and sensory impairments are stigmatised more often than physical impairments. According to (Livneh et al. 2014), conceptualised from the viewpoint of physical and sensory disabilities, stigma is associated with marginality, devaluation, deviance, inferiority, and also a general set of negative attitudes and perceptions.

Stigma power concept and the mechanism of discrimination and prejudice

According to the stigma power concept, the people who stigmatise have a strong motivation to keep people down or away through means that are indirect but effective (Link & Phelan 2014). Many ways are available to put people down or negate their feelings. Link and Phelan (2014) state that there are four ways that this happens. The first form is direct person-to-person discrimination where one person directly discriminates or prejudices the other using attitudes and stereotypes. This form of stigmatisation can be easily identified. The second form of discrimination is known as structural discrimination which 'disadvantages stigmatised groups cumulatively over time via social policy, laws, institutional practices, or negative attitudinal social contexts' (Link & Phelan 2014:25). The third form is called interactional discrimination, which is wielded when a person interacting with the stigmatised person may behave differently from what they usually behave when interacting with other non-stigmatised groups. Finally, discrimination gets imposed on the stigmatised individual when they respond to societal stereotypes. The stigmatised individual then internalises societal stereotypes, acting in accordance with them and thus becoming complicit in their own oppression (Lazar & Jaeger 2011). Building on the previous points, the limited use of technology by people with disabilities may be influenced by these very factors.

Models of stigma

According to Livneh et al. (2014), stigma models can be classified into four categories. The first model is the moral model, which can be traced to traditions and religion. This position links disability to sinful and evil thoughts and acts. A recent study conducted by Thabethe (2022) revealed that marginalisation experiences are observed in how religion and culture construct people with disabilities. In religion, for example, people with disabilities are often perceived as in need of divine intervention, whereas in traditional African culture, they are often perceived as punishment or a curse resulting from transgressions from ancestors and therefore require ancestral intervention (Thabethe 2022). Furthermore, the association of disability with witchcraft is also prevalent in African societies. Researchers argue that this has resulted in delays in seeking healthcare and, thus, further exacerbating marginalisation (Rohwerder 2018; Venter et al. 1995).

The second model is the Biomedical model. This has links to scientific thinking that holds that disability reflects conditions traceable to biological deficiencies (Deacon 2013). This, thus can have negative consequences as those with disabilities or their parents may be pressured to take responsibility for the condition, they find themselves in. Third is the functional model which connotes that disability is not innately biological but is a result of the person's capacity to function as demanded by the current world. Last is the social model, which posits a continuum of failure to accommodate PwD but also creates new barriers that would affect their full participation (Lazar & Jaeger 2011). The most pressing issue regarding stigma is that it still prevails and the attitudes towards PwD still hold people back from fulfilling their lives as they want (Livneh et al. 2014).

Disability and the digital divide

Gorski and Clark (2002:28) described the digital divide as 'discrepancies in rates of physical access to computers and the Internet for people with and without disabilities'. According to Srinuan and Bohlin (2011), the term 'digital divide' was coined in the mid-1990s to describe the difference between demographics and regions that have access to modern technology and those that do not or have limited access. This technology can include mobile phones, television, personal computers and Internet connectivity. The digital divide remains an essential subject of discussion in public policy, as it involves many social, economic and political concerns (Srinuan & Bohlin 2011). According to Darvishy et al. (2019), there are no globally comparable statistics on Internet access or use for individuals with disabilities; nonetheless, research suggests that individuals with disabilities have lower overall Internet access than the general population. One contributing factor to this is that people with disabilities have lower employment rates and average incomes, making it more probable that the costs of Internet subscriptions and technological devices will be prohibitive for them. Another major challenge identified

by Darvishy et al. (2019) includes language barriers. Many open-source materials and assistive information and communications technology (ICT) devices for people with disabilities have been developed in recent years; however, they are mostly accessible in English or other European languages. This makes it difficult for other nations or linguistic minorities to utilise or modify these technologies. A study conducted by Grazi and Vergara (2012) revealed that English, Chinese and Spanish were the top three languages on Internet use in the world; it is also estimated that about 80% of online content is in English. This may pose a significant obstacle to ICT adoption in developing countries for various reasons. Firstly, the web and software information are not readily available in local languages. Secondly, familiarity with the English language, the popular language of the Internet, is typically low and heavily concentrated among educated and affluent population segments, widening the digital divide. Although there are no statistics on ICT access to people with disabilities, evidence suggests that vulnerable groups are disproportionately affected by the digital divide because of a lack of affordability, access to digital infrastructure and skills, or meaningful and quality access. Narasimhan et al. (2012) note that people with physical or mental impairments are often unable to access electronic devices because the equipment lacks the requisite accessibility features or because the cost of adapted phones and services remains exorbitant. Demographic variables such as income and literacy do affect the adoption and accessibility of mobile devices for individuals with disabilities. Other factors that hinder the accessibility of technological devices such as computers, laptops and mobile phones include the unavailability of assistive technology in regional languages, the lack of infrastructural and human support (while the market for electronic devices is likely to expand rapidly over the next few years, most users with disabilities may not be able to access and learn how to use them without support), cost of broadband connections and the lack of awareness about assistive devices/solutions (Narasimhan et al. 2012). A study conducted Lomahoza (2021), in the city of Johannesburg in 2021 revealed that many people who live with disabilities do not own a mobile telephone (the figure was about 49% in 2018). This indicates that close to half of the population with disabilities is disconnected. This suggests that the issue of digital divide is a national concern, rather than just a geographic problem.

Digital divide and the people with disabilities

People with disabilities suffer the triple burden of digital exclusion, distorted access to essential services, societal discrimination and prejudice. It is therefore crucial that in this era of the digital revolution, inclusion and social justice be at the centre of the current developmental agenda to ensure that the digital revolution does not further exacerbate the already existing inequalities, especially for vulnerable groups (Aranda-Jan & Shanahan 2020). In essence, vulnerable groups, including individuals with disabilities, already encounter substantial disparities in accessing education and healthcare, and they are also disproportionately impacted by

poverty and unemployment. The COVID-19 pandemic further highlighted the obstacles and prejudice they encounter in accessing ICT, and even medical assistive technology, as they were not considered a priority in accessing ventilators (Engelman et al. 2022). This calls for decision-makers and policymakers to invest special efforts in overcoming these barriers and ensuring that all citizens are afforded the same opportunities to participate in the economy.

Many studies have demonstrated how the use of technology in society may depend on various factors such as biology, economics, and social status (Johansson et al. 2021). Most research studies examining the digital divide among people rarely included persons with disabilities in the targeted populations, thus ignoring disability as a potentially excluding in digital use (Scholz & Ingold 2021).

Hamraie and Fritsch (2019) posit that, progressively, the field of disability studies is getting entangled with science and technology and that this may lead the world into a more socially just reality. In the last decade, there has been an increase in studies looking at the use of technology for disabled people, although the digital divide has not been extensively researched. Macdonald and Clayton (2017) looked at PwD's social exclusion in general in the United Kingdom and correlated it with the digital divide and found many similarities. Vicente and López (2010) conducted a multidimensional study on the relationship between ICT and disability and found that there was an internet digital divide. This was similar to a study conducted by Mavrou et al. (2017) where it was discovered that social constraints, a lack of accessibility and limited digital skills all contribute to the lagging internet usage among PwD, thus perpetuating the digital divide. Sachdeva et al. (2015) proposed a framework to look into the digital divide in order to assist those who are working in the space to understand and frame their response to the challenge. The framework includes social (cultural, environmental, societal and governmental), technological (assistive, medical, information and communication), financial and motivational (attitude, education, and knowledge and skills). Raja (2016) is also more positive in their outlook as technology advances can enhance the experiences of PwD, because:

[W]hen multiple modes of communication are available, an individual with a disability can choose the one most suited for their functionality without additional financial burden on the demand or supply side. (p. 07)

Scanlan (2022) found that even after the advent of the COVID-19 virus, the digital gap between PwD and others persisted. Dobransky and Hargittai (2016) explored the digital divide by looking into Internet access and its use among people with six different disabilities and discovered that technology usage among the PwD depends on the type of disability (Johansson et al. 2021). Dobransky and Hargittai (2006) concluded, in an earlier study, that there is a disability digital divide, but all disabilities are not equally

disadvantaged. The authors remarked that people with hearing or walking impairments were more likely to use the Internet than other disabilities. Furthermore, the most disadvantaged nature of disability were those people who are blind, have difficulties leaving home, and those who have multiple disabilities. The study showed how web design can be optimised for people with learning difficulties (Johansson et al. 2021). Hence, the main objective of this study was to determine the challenges faced by PwD in relation to accessing digital technology, ascertain the extent of the digital divide in KwaZulu-Natal and recommend measures to bridge the digital gap.

Research method

In this study, data were collected using a quantitative research approach. Data were collected in all 11 district municipalities in the KwaZulu-Natal province, South Africa. The target group for this study was people with various forms of disabilities in KZN who were 10 years and older. The aim was to determine a specific age at which marginalisation and the digital divide become evident.

Recruitment strategy

The data were collected using a survey questionnaire and face-to-face interviews. The questionnaire comprised of 20 questions addressing the demographics, types of disability, challenges faced by people with disability and the digital divide. Data were collected from the target group which was people with various forms of disabilities located in schools for learners with a disability, non-profit organisations (NPOs) that look after people with disabilities and public facilities. This recruitment strategy was adopted to facilitate adequate data collection from PwD. Additionally, it eased access to as many people with disability, which could have been difficult considering the sample size for this study.

Sampling strategy

Subjects of the research were randomly selected to participate in this research using a simple random sampling technique. The simple random sampling technique is a widely used method in scientific studies (Noor et al. 2022). According to Bhardwaj (2019), a simple random sampling technique is selected for populations which are highly homogenous where the respondents are randomly selected to participate in the research. The total population for this study was 470588 people with disability in KZN (Statistics South Africa [Stats SA], 2001). The sample size was 3384 respondents, which was calculated using the *Raosoft* sample size calculator with a 99% confidence level and a 3.5% error margin.

Reliability and validity

Price et al. (2015) asserted that reliability refers to the constancy of a metric. Psychologists distinguish three types of consistency: across time (test-retest reliability), across items (internal consistency) and among researchers (inter-rater reliability). Whereas validity refers to how well a

measure's scores represent the variable for which they were designed (Price et al. 2015). In this study, item content validity (ICV) was used, where three subject experts were given the questionnaire to rate each question using the Likert scale. The ICV rating obtained for the questionnaire was 0.9.

Data analysis

The data collected from respondents was analysed using the Statistical Package for Social Sciences (SPSS) to provide descriptive statistics. The research relied on frequency tables and charts to show trends in each of the data categories provided in the questionnaire. An interpretation of each data type was then supplied, allowing researchers to draw conclusions from the data.

Ethical considerations

Ethics are of utmost importance when conducting research involving human subjects. This study took into account several ethical considerations, such as transparency, confidentiality, integrity, informed consent, and anonymity. Furthermore, written consent was obtained from the parents, guardians, and caregivers of participants who were under 18 years old.

Results and discussion

Demographic representation

Race and gender of the research participants

The race of the respondents was as follows: 94% black people, 4% white people and 1% Indian people and mixed race people, respectively (Figure 1). Similarly, Stats (2014) reported that black Africans had the highest proportion of persons with disabilities (7.8%), followed by the white population group (6.5%). This could be attributed to both the fact that over 80% of people are black and that over 64% of black South Africans live in poverty compared to other race groups (Nqola 2021). In developing countries, factors linked to poverty, such as the lack of access to healthcare, insufficient water and sanitation, malnutrition, and poor living conditions, are both the cause and consequence of disability (Mitra et al. 2013).

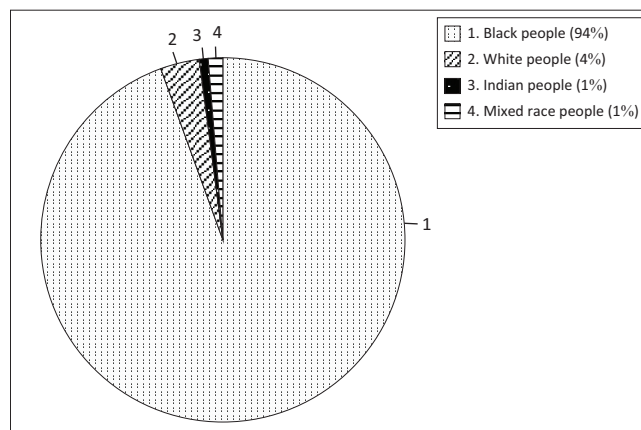


FIGURE 1: Race of the research participants.

In terms of the gender of the respondents, this survey found that 53% of respondents were male and 47% were female (Figure 2). The difference in gender distribution was only 6%. The results are incongruent with the report by Statistics South Africa (Stats SA 2019) that asserted that the prevalence of disability in South Africa varies significantly between genders. In 2018, 6.4% of men had a disability, compared to 8.9% of women. This was also confirmed by Lee et al. (2022) who reported that disability incidence rates are greater for women than for men. The findings of this study suggest that women with disabilities face numerous challenges, including being denied access to education, neglected, and disproportionately affected by gender-based violence. Additionally, they are excluded from participating in economic activities, unlike their male counterparts.

Marginalisation of people with disability

On the extent of the disability and marginalisation, it is apparent from the findings of this study that people with disabilities are marginalised (Figure 3). This was confirmed by 66% of the participants that they are marginalised because of their disability. Consistent with the findings of this study, Owens (2013) found that disabled people are severely marginalised and are among the poorest in developing countries. Moreover, Johansson et al. (2021) reported that hearing impairment increased the odds of access to the Internet as compared to the general population. This was also noted by Dobransky and Hargittai (2006). Additionally (Peters et al. 2009), asserted that people with disability are severely marginalised. There is repeated stigmatisation including negative narratives and stereotypes from older people as well as peers in the learners' lives and this leaves them holding onto these stigma realities (Mueller 2019).

Nature or type of disability

Most of the respondents who participated in this study had a physical disability (33%), followed by intellectual disability (18%), mental health conditions (14%), vision impairment (11%), and some of them were deaf (10%), as highlighted in Figure 4. A study conducted by Hinman, Peterson and Gibbs (2015) discovered that the number of pupils with a physical disability was less than 5%, with most individuals having

sensory impairments. According to Adnams (2010), there is a higher prevalence of intellectual disability in Africa than in high-income countries. High levels of intellectual disability in South Africa are associated with high levels of poverty, malnutrition and poor or inaccessible healthcare services (Kromberg et al. 2008). According to Lazar and Jaeger (2011), PwD, especially those who are blind or have low vision, are often the most affected when it comes to accessing technology.

Literacy among people with disabilities

It is encouraging that 64% of people with disabilities who participated in this study are literate. Whereas only 36% are unable to read or write. Consistent with the findings of this study, Groce and Bakhshi (2011) reported that most PwD do not have access to education and training. This contributes to the elevated level of illiteracy among people with disabilities. Similarly, the Global Education Monitoring Report (Global Education Report Team 2013) indicated that only 47% of young people in Uganda who had either a physical or hearing impairment were literate, compared to 60% of young people with no disability. In terms of the educational level of PwD, 794 had grades 10–12, 649 had no formal education, 580 had grades 1–3 and 544 had grades 7–9.

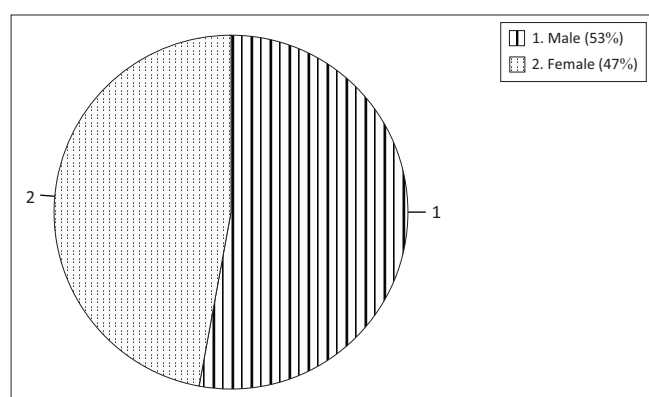


FIGURE 2: Gender of the research participants.

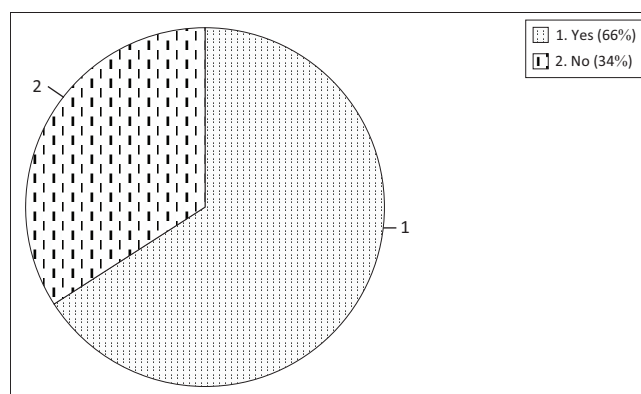


FIGURE 3: Marginalisation of people with disability.

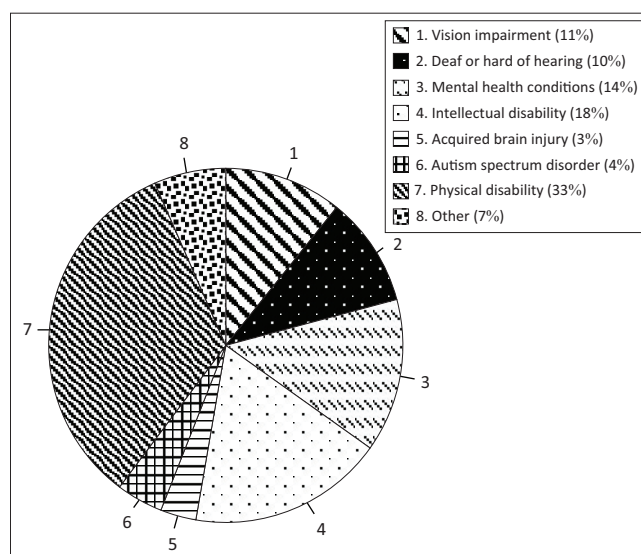


FIGURE 4: Nature or type of disability.

Only 201 had a Diploma/Degree (Figure 5). These results indicate that strategies must be developed to make education more accessible to PwD. Consistent with the findings of this study, Statistics South Africa (Stats SA 2014) revealed that, in South Africa, just 5.3% of those with severe impairments attained higher education, while almost 24% had no basic education at all. Statistics South Africa (Stats SA 2015) further revealed that the highest proportion of persons aged 20 years and older with no formal education was recorded in under-developed communities regardless of the type of disability.

Challenges faced by people with disabilities

It is apparent from the results of this study that people with disabilities face numerous challenges, including, but not limited to, a lack of employment (946), feeling of being incompetent (898), access to facilities (818), being unable to go to school (662), being teased and abused (568) and the feeling of being ignored (Figure 6). Similarly, the International Labour Organization (Stoevska 2022) observed that there is an extremely low labour-force participation rate among people with disability. Globally, 7 in 10 people with disabilities are inactive (not employed or unemployed), compared to 4 in 10 people without disabilities. Individuals

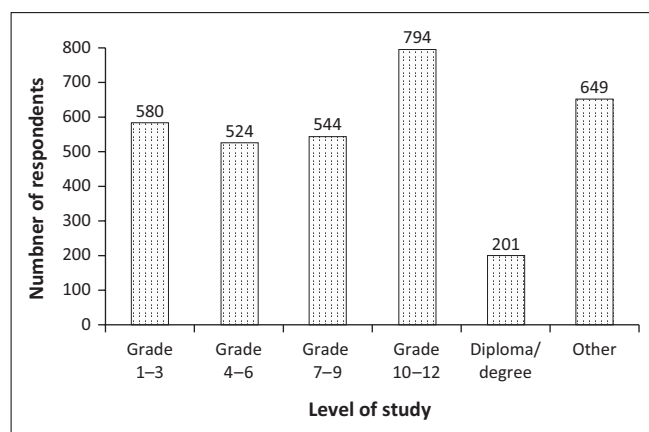


FIGURE 5: Educational level of the people with disabilities.

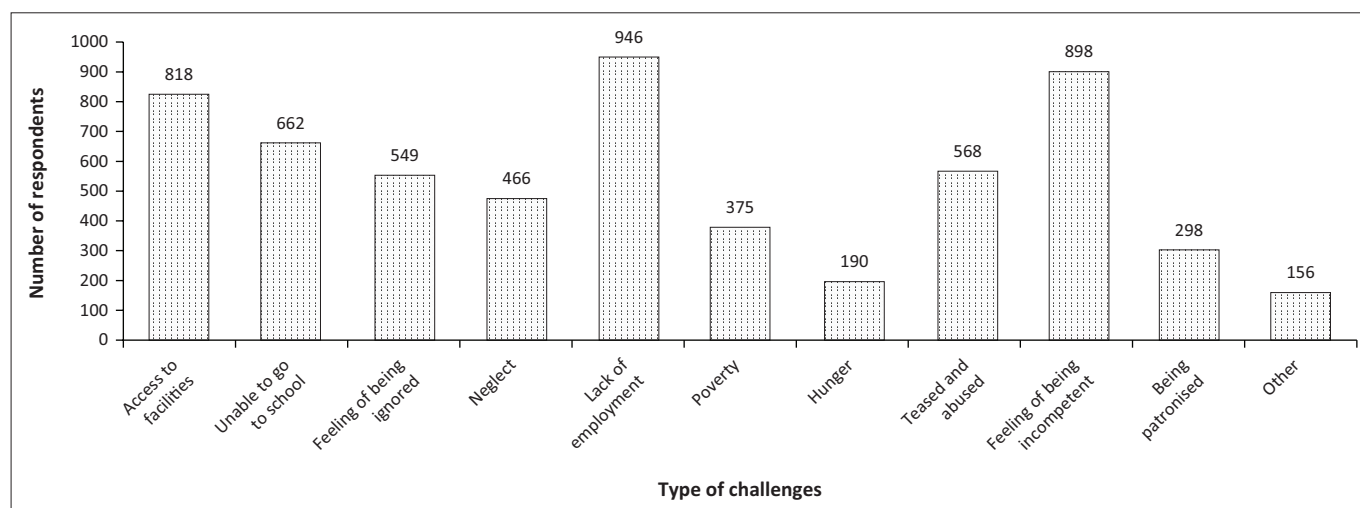


FIGURE 6: Challenges faced by people with disabilities.

and families with disabilities can face significant financial challenges, sometimes contributing to a cycle of poverty because of the lack of essential resources. Furthermore, it is estimated that the unemployment rate for people with disabilities in South Africa exceeds 90%, and it approaches 100% in rural areas (Employment Services Bill, 2011). These results are consistent with the report by the Department of Basic Education (DBE 2019) that showed that over 800 000 children with disabilities aged 7–18 were not enrolled in school in 2002. In 2018, this number decreased to approximately 474 000 children. Moreover, in 2012, the DBE reported that 98% of South African schools lacked ramps and 97% lacked accessible restrooms for children with disabilities. This highlights the magnitude and the extent of exclusion of PwD from accessing education. Similarly, Stats SA (Statistics South Africa [Stats SA] (2014)) reported that 8 out of 10 individuals with a disability were found to be unemployed. Consistent with the findings of this study, Baladerian, Coleman and Stream (2013) found that abuse of people with disabilities is a hidden epidemic with a huge number of invisible victims. Additionally, Robinson (2015) confirmed that children and young people with disability experience violence, abuse and neglect at a higher rate than their peers.

Access to electronic devices among people with disabilities

Fifty-seven per cent of the respondents had access to electronic devices, while 43% had no access (Figure 7). Access to digital devices does not necessarily translate to being able to use it. Similarly, studies have found that Internet adoption and use among PwD were lower compared to people without disabilities (Aubin & Abbatt 2007; Bridgmon & Martin 2012; Duplaga 2017). Additionally, Internet usage was less likely among people with severe disabilities when compared to people with mild disabilities (Duplaga 2017; Fox 2008). According to Duplaga (2017), there are no globally comparable statistics on Internet access or use for individuals with disabilities; nonetheless, research suggests that individuals with disabilities have lower overall Internet access than the general population.

Regarding the type of devices that PwD had access to, the majority of them had access to a smartphone (1765) than did a laptop (368), computer (315), or tablet (218). Similarly, Duplaga (2017) found that users of mobile phones used the Internet more frequently than non-mobile phone users. Thus, mobile phones may be viewed as a driving element behind Internet use among people with impairments. The lack of access to digital devices and training widens the digital divide among PwD. According to Compaine (2001), the digital divide separates those who have access to information and communication technologies and the ability to utilise them and those who do not. Similarly, the International Telecommunication Union (Narasimhan et al. 2012) reported that people with physical or mental impairments are often unable to access electronic devices because the equipment lacks the requisite accessibility features or because the cost of adapted phones and services remains exorbitant. Therefore, income and literacy do affect the adoption and accessibility of mobile devices for PwD. Other factors that hinder the accessibility of technological devices such as computers, laptops and mobile phones include the unavailability of assistive technology in regional languages, lack of infrastructural and human support, cost of broadband connections and lack of awareness about assistive devices/solutions (Narasimhan et al. 2012).

Ability to use electronic devices by people with disabilities

The results showed that only 41% of the respondents could use electronic devices independently, with no assistance. Whereas 36% could not use electronic devices at all (Figure 8). To note, the respondents who could use electronic devices are those with mild disabilities compared to respondents with severe intellectual disabilities. These results are consistent with those by Duplaga (2017), who reported that Internet usage was less likely among people with severe disabilities when compared to people with mild disabilities. People with disabilities do not use the Internet or similar technologies because of several constraints that make the technology unsuitable for a wide range of disabilities (Lazar & Jaeger 2011). Similarly, Brennan (2020) reported that people with disabilities lag in basic access to technology, healthcare facilities and other basic services.

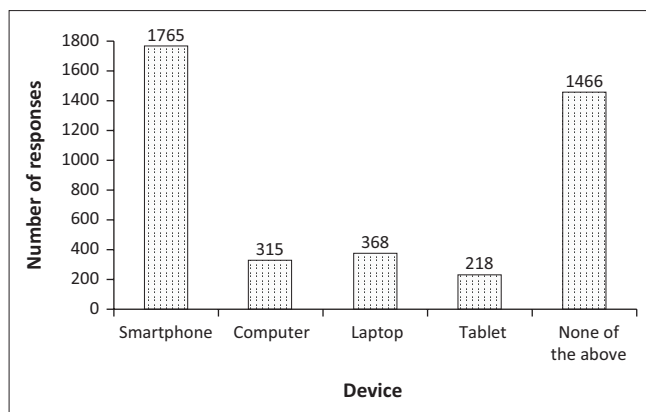


FIGURE 7: Types of devices that people with disabilities have access to.

Training to use electronic devices and desire to be trained

Most PwD have not received training on how to use electronic devices (Figure 9). This was confirmed by 85% of PwD that they have never received any formal training on how to use electronic devices. Only a handful (15%) of the respondents have been trained. This highlights a need for prioritisation of PwD in terms of digital training. This will assist in bridging the digital gap. Julka and Vyas (2014) discovered that teachers' attitudes towards students with disabilities, as well as presumptions about their skills owing to a lack of sensitivity training and resources such as technology, had a significant impact on student retention rates and successful learning outcomes. Furthermore, even teachers who recognise the importance of ICT for students with disabilities may lack the necessary knowledge and skills to create accessible content and promote the use of accessible technology for learning (Mavrou 2011; Wong & Cohen 2012).

Requirements to lessen the effects of the disability

The results of this study showed that PwD need love, support, understanding and patience. They also need employment opportunities and to be treated as equals. Acceptance and access to education and training, including technical and soft skills, are also crucial for them (Figure 10). Consistent with the findings of this study, Uvodić et al. (2023)

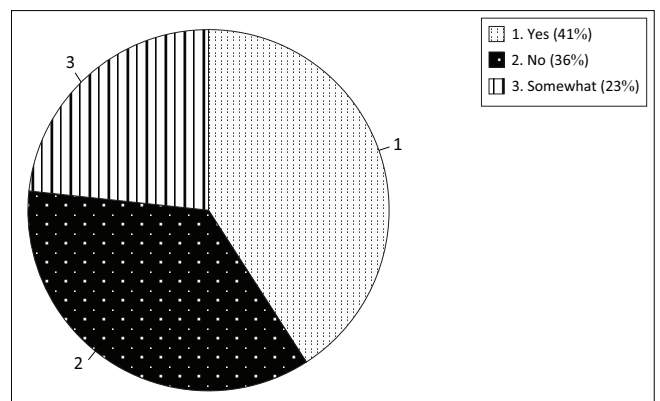


FIGURE 8: Ability to use electronic devices by people with disabilities.

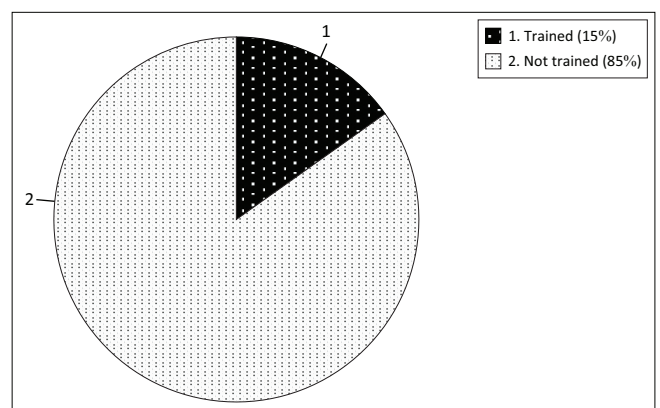


FIGURE 9: Training received to use electronic devices.

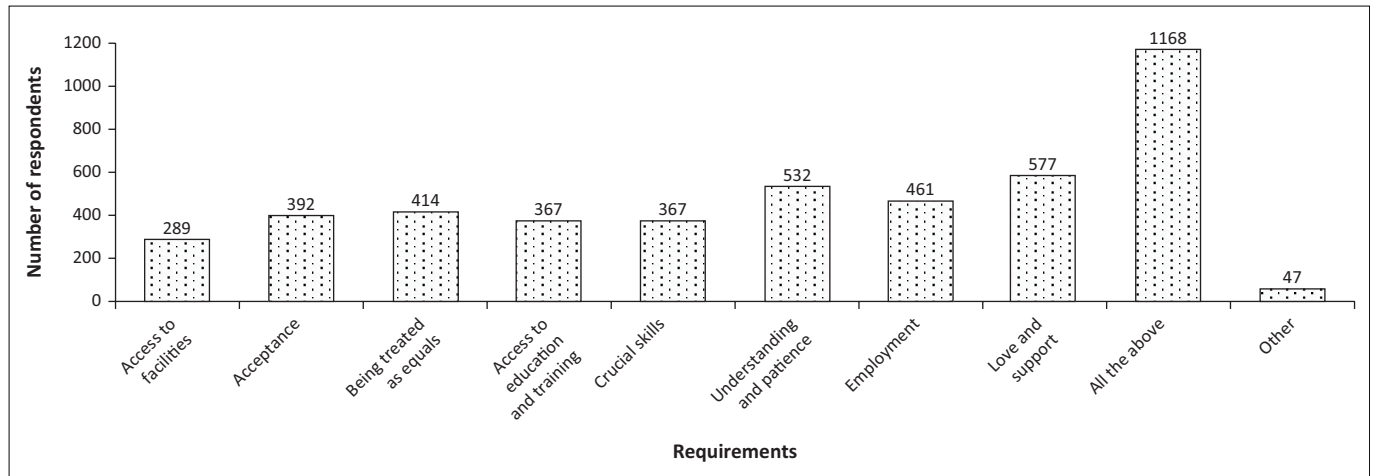


FIGURE 10: Requirements to lessen the effects of the disability.

postulated that there are various strategies that can be employed to address the digital exclusion gap. These strategies include designing inclusive digital transformation strategies, providing affordable access to technology, awareness creation, and developing digital content that is relevant to people's lives and context. This shows that the people who live with disabilities seek just a bit more empathy for some of their travels and are looking for a helping hand in terms of bridging the digital gap.

Conclusion and recommendations

This study sheds light on the challenges faced by PwD in the digital age. These challenges include, but are not limited to, a lack of employment opportunities, feelings of incompetence, limited access to facilities and education, stigma, prejudice and a sense of being ignored. Stigma devalues and discredits the people living with disabilities and will need to be dealt with if the PwD have to be assisted. This is because, if there has to be positive social change, there will have to be a curb on othering PwD and offer them an equal playing field with empathy and justice. In addition, this study identified measures that should be put in place to curb the digital divide among people with disabilities. These measures include improving access to digital technologies, ensuring access to affordable and quality healthcare, funding for technological assistive devices, and enhancing access to education and training. This will result in equal participation in the general economy. The findings of this study further highlight an urgent need for special schools that will support and train PwD, especially at the grassroots level. Additionally, adaptive policies and strategies should be developed to curb the abuse and marginalisation of PwD to promote equality and acceptance.

Recommendations

It is recommended, therefore, that:

- Public facilities should be favourable to PwD by ensuring that they have programmes and assistive technologies to enable access and usability of digital technologies and ICTs.
- There is a need for special schools that will support and adequately train PwD, especially at the grassroots level.
- Improve accessibility to assistive technology by reducing the cost of the electronic devices that cater for PwD. This would ensure that everyone has equal access to online or digital resources and information.
- Development of specialised, user-friendly electronic devices for PwD in a native language.
- Promote courses that focus on digital literacy among PwD; these courses should target everyone who has a disability.
- People with disabilities should also be prioritised for employment opportunities.
- There is a need for digital centres in the province that will cater for PwD.
- People with disabilities need to be included and encouraged to participate in the economic sectors, and they need to be exposed to educational and economic opportunities.
- The province of KwaZulu-Natal should strive to address the marginalisation of people with disability and promote equality and acceptance.
- Government should provide disability grants and social workers should regularly check on their well-being as some of the respondents feel neglected and isolated. Furthermore, there is a plea for empathy and understanding when working with PwD; private technology vendors need to be trained in exercising patience when dealing with PwD as they need assistive devices.
- Promulgate policies that will somehow make it mandatory for companies to prioritise people with disabilities for leadership and employment opportunities.
- Decision-makers and policymakers must invest special efforts in overcoming barriers that have been highlighted in this study by ensuring that all citizens are afforded the same opportunities to participate in the economy.
- There needs to be community awareness around different types and forms of disability in order to create positive social change and fight stigmatisation.

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Authors' contributions

S.P.B. contributed to the conceptualisation and supervision and was instrumental in writing the articles first draft. N.M.Z. contributed to data gathering and writing up the responses and contributed to writing the first draft. L.T.M.N. assisted in the conceptualisation, data capturing and write-up of the study. M.V. contributed to the analysis and review of the research as well as the write-up of the study.

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Data availability

The data that support the findings of this study are available on request from the corresponding author, M.V. This study was extensive, and the Moses Kotane Institute possesses the complete report.

Disclaimer

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