

What difference does tech make? Conceptualizations of Disability and Assistive Technology among Kenyan Youth

Conceptualizations of Disability and AT

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Most research which investigates stigma towards people with disabilities and the use of Assistive Technology (AT) are based in the Global North and focus on the experiences of people with disabilities and the consequences that stigma has on choices surrounding AT. However, stigma is a societal construct rooted in the attitude and beliefs that people without disabilities hold on disability and AT. Furthermore, the portrayal of people with disabilities and AT is dependent on the social context. In this paper, we examine how young Kenyans without disabilities view people with disabilities and AT users. Findings show that while the portrayal of disability is often shaped by negative emotion, participants felt that many of the barriers affecting people with disabilities were created by society. Perceptions of AT differed – devices were not only seen as a mark of disability but also as a sign of access to resources. Therefore, what we see is an emergent picture where social barriers can be reinforced by poverty, and where poverty reinforces social barriers faced by people with disabilities. We conclude that access to appropriate technology alongside societal interventions tackling incorrect beliefs about disability can help to overcome the stigma faced by people with disabilities.

- Human-centered computing • Accessibility • Empirical studies in accessibility

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1 INTRODUCTION

Disability stigma is one of the most widespread and pervasive barriers that has a hugely negative impact on the lives of millions of people with disabilities worldwide [5,37,58,76]. Stigmatizing views of disability are often at the root of many of the barriers that limit access to healthcare, education, employment, society participation and other fundamental human rights [12,44,49,58].

Over the years, the concept of stigma has been defined in multiple ways. For example, Goffman describes it as a phenomenon by which society labels an individual on the basis of one "*attribute that is deeply discrediting*", as a consequence of this labeling the individual is devalued "*from a whole and usual person to a tainted, discounted one*" [32]. Another influential definition was provided by Crocker et al [22] who stated that "*stigmatized individuals possess (or are believed to possess) some attribute, or characteristic, that conveys a social identity that is devalued in a particular social context*". These definitions highlight two important defining characteristics of the concept of stigma. The first is that stigma is rooted in the social context in which it forms and manifest, as it is a byproduct of the beliefs, values and rules of a particular society. The second is that stigma resides in the stigmatizer rather than the stigmatized, although occasionally both roles can be played by the same person. The actions, and the real attributes, of the person who is the victim of stigma often play a marginal role in the construction of stigmatizing views and the discriminatory behaviors that often result from them. Stigma is fed by the beliefs that are held in relation to certain individuals or groups and the characteristics and attributes that are assigned to them, independent of the fact that these are effectively real or just perceived.

Despite acknowledging that context plays a huge role in how people conceptualize disability, forming beliefs that are often conducive to stigma and discrimination, the large majority of studies investigating the portrayal of disability and the factors that shape disability stigma are often carried out in the Global North [1,40,44,53,91]. This disparity of research interest is highly problematic as, according to estimates from the World Health Organization, over 80% of people with disabilities live in the Global South [97]. Furthermore, in contrast to many other minority groups who are commonly victims of stigma such as, people from minority ethnic groups, members of the LGBTQ+ community, refugees or people with a history of substance abuse, the ways in which society portrays people with disabilities is not solely based on personal characteristics attributed to the person, but it is often intertwined with the Assistive Technologies (ATs) that they use in different life situations [7,40,45,68,85].

Although in recent years an increasing number of studies have begun to investigate the societal views of disability and unpick the factors that shape the portrayal of people with disabilities in various countries of the Global South, these studies are relatively few and far between [52,58,76,87,90,95]. Moreover, despite the fact that several studies carried out in the Global North have shown that the conceptualization and portrayal of AT has a huge impact on how people with disability are perceived by others (and sometimes perceive themselves), this issue is virtually unexplored in countries outside the US, Europe or Australia [4,11,28,75,85]. To our knowledge, only a handful of studies have examined the relationship between AT and the identity of people with disabilities in the Global South [9,42,43]. Furthermore, the focus of these studies is primarily on the opinions and reflections of people with disabilities themselves rather than on examining how AT influences the portrayal of disability in the minds of individuals without disabilities who are more likely to develop stigmatizing beliefs and engage in discriminatory behavior [23,59].

In this paper we examine how young Kenyans between the age of 18 and 26 without disability understand and conceptualize disability and AT as separate but connected concepts. Through a series of digital focus groups involving 25 participants across different regions of Kenya, we seek to disentangle the portrayal of individuals with disabilities from the one of AT to better understand how the characteristics that people without disabilities attribute to both influence their beliefs and how these individual elements might interact with each other to potentially enhance or reduce stigma. Although further studies in different regions of the Global South should be carried out to allow for a more detailed and nuanced picture, the location of the presented study also offers the opportunity to draw some novel comparisons between the conceptualization of disability and AT that might differ between the Global North and Kenya and the implications that this has for both researchers and practitioners working in the field.

In summary, the current study makes the following contributions:

1. The first HCI study comparing the knowledge and beliefs concerning disability and AT amongst young Kenyans without disabilities;
2. The identification of the attributes that shape the portrayal of people with disabilities and AT in Kenya and a discussion on the implications of the interactions between these factors in the context of accessibility research;
3. A reflection on the similarities and differences between the portrayal of disability and AT in Kenya in comparison to the Global South with an exploration of how these differences would affect the development of new context appropriate technologies and participatory research strategies.

2 BACKGROUND

The work presented in this paper builds on three different areas of existing research: the conceptualization of stigma in relation to disability, the perception of disability in the Global South and the perception of AT in the Global south.

2.1 The conceptualization of stigma in the context of disability

The modern English word stigma originates from the Ancient Greek *stizein* “to tattoo” and the Latin *stigmat* “brand”. This concept of stigma as a visible or invisible mark used to label someone on the basis of some specific characteristics is well captured in many of the definitions formulated by scholars throughout the years [47]. Although definitions might vary depending on the disciplines of the researchers studying the phenomenon and the circumstances in which it has been studied [29,39,88], two crucial aspects remain consistent. First, stigma is a social construct, meaning that the selection of attributes which are subject to negative judgements is largely governed by the mainstream beliefs of a certain group [51]. Second, stigma is not linked to the particular attribute supposedly borne by the individual, but it is generated by the judgement that the others make when interacting (or not) with the person [32]. According to Link and Phelan [47], stigma is a process that occurs through the combination of five different components: labeling, stereotyping, separation, status loss, and discrimination.

Diversity is an inherent part of humanity but, as highlighted by Link and Phelan [48] labelling occurs when the differences that set us apart are deemed relevant according to a social selection process. In the case of disability, this is often done by reducing the whole experience of disability solely to a biological variation that is described as a deviation from an ideal norm [36]. Stereotyping involves the attribution of a negative judgement to the different characteristics that has been identified and, at the same time the creation of a strong mental connection between

the individual and the undesirable characteristic [48]. Stereotyping is arguably the key step in the process of stigma development and, possibly the most widely researched [24,67] [ref]. Schneider describes stereotypes as "*the common cold of social interaction – ubiquitous, infectious, irritating and hard to get rid of*" and this is certainly true when it comes to disability [81].

Disability is surrounded by stereotypes that are often deep rooted in the medical model, which leads to define disability solely on the basis of loss, being this of physical or sensory functions, of body parts, health or cognitive abilities [74,94]. This loss is of course painted in tragic tones, creating a narrative where the achievement of any sort of life goal, or in many cases simple day-to-day existence, are translated into epic stories in which the individual manages to overcome their disability thanks to sheer determination and bravery [26,70].

The third component of the stigma development process is separation, which occurs in response to the negative judgement of the individual based on the selected socially unacceptable attribute. This judgement is followed by the creation of a group-based distinction between Us and Them [47]. Othering and group-based exclusion are pervasive issues when it comes to disability. In some cases, this can take more subtle forms such as when the domination of able-bodied norms in the workplace causes employees with disabilities to adopt adjustments that require them to increase their own workload, in a manner that is rarely perceived, in order to comply with the overall workflow of their team [16]. A common trait of othering is also the tendency to cluster all people with disabilities in a unique group regardless of their differences [89]. In some cases, this can become even more extreme and even individuals from other minority groups who do not identify as persons with disabilities (such as people from non-dominant ethnic groups or members of the LGBTQ+ community) are included in the "other" group, despite the fact that their only common trait is to be, in fact, part of a minority [55].

The final step of the stigma process is loss of status and subsequent discrimination, which occurs as a result of the devaluation of the individual. This devaluation is perpetrated as a result of a cognitive process that rationalize and justifies social oppression [48]. Discrimination, devaluation and social oppression towards people with disabilities take many forms and are, unfortunately ever-present issues. Significant examples of this which are reported in relevant literature include: the resistance to change inaccessible teaching practices, resulting in students with disabilities being told that their access needs create a burden to the instructor [84]; the lack of consideration for equally qualified work candidates who have disclosed their disability during the hiring process [46]; and the epistemic violence experienced by scholars with disabilities who frequently see their own experience dismissed in favor of dominant paternalistic narratives [98].

As highlighted by Link and Phelan [47], stigma is ultimately dependent on the exercise of power. Stigma can only really flourish in a situation in which the stigmatizer has greater power than the stigmatized [47]. An easy-to-understand example in relation to disability can be linked to the planning and development of the built environment. People who use a wheelchair as a primary means of mobility could easily begin to label walking as a negative characteristic, creating stereotypical images of all pedestrians being very slow on urban footways and separating themselves from these walkers. However, as wheelchair users as a group do not represent the majority in city planning and development, they lack the power to enforce significant discriminatory consequences.

Power is also felt at regional and global levels. When assessing global disability stigma, power differentials, the comparison between the Global North and the Global South is crucial. Despite the majority of people with disabilities in the world currently living in the Global South [97], current narratives of how disability stigma develops and unfolds are largely built on social norms and research carried out in the Global North, creating an imbalanced representation that only captures one version of reality [30,35,54].

2.2 The perception of disability in the Global South

When describing models of disability in the Global North researchers often refer to two distinct conceptualizations that emerged over the years: the medical model of disability, which states that disability occurs as a result of functional limitations of the individual [19], and the social model of disability which argues that disability is constructed through a collection of barriers and oppressive practices perpetrated by society towards the person with disability [82]. Although both models, and even more nuanced conceptualizations of disability do exist in the Global South, many researchers have found evidence of a persistent presence of a moral model of disability, which states that disability occurs as a punishment for one's, or one's parents, sins or misdeeds [50,52,76,80]. How individuals understand and conceptualize disability plays a significant role in how they will relate to people with disabilities. The ethnographic research carried out by Masanja et al [52] for example, shows how the belief that albinism occurs as a result of a curse, which is still prevalent amongst many people in the rural communities of Tanzania, leads to the complete rejection, abandonment and in extreme case murder of albino children, and potentially their mothers. Similarly, testimonies collected by researchers in West African countries showed that children with disabilities are often victim of abuse as a result of cultural beliefs that see them as an incarnation of the devil or the manifestation of a curse [62].

Interestingly, although religious and spiritual beliefs are often only considered to be negatively associated with distorted portrayals of disability, several researchers have debated on both the positive and negatives implications of spirituality and religion in the context of disability [27,31,33,63,71]. For example, Ojok, & Musenze [63] highlights how some traditional African spiritual beliefs revered certain visible disabilities and considered them a manifestation of divine spiritual attributes. Less mystical in its interpretation, Gona et al [33] also points out how religious organizations can provide advocacy and support for many people with disabilities and their families. On the other hand, Ngubane-Mokiwa [61] highlights how both religion and traditional African belief such as the concept of "Ubuntu" (which can be interpreted as a value of connectedness between humans) can be distorted and misinterpreted to justify exclusion and abuse towards people with disabilities. Furthermore, Rajohane Matshedisho [71] points out how the creation of a benevolent narrative towards inclusion creates tensions with more progressive models of disability that see access as a right for people with disability, hampering the development of appropriate policies and legal frameworks.

Links between poverty and disability are also significantly stronger in the Global South compared to the Global North [13]. As shown by the evidence gathered by Groce et al [38] the relationship between poverty and disability is multidimensional and sustained throughout the life of the individual in a vicious cycle, where the lack of opportunities and the societal barriers that are associated with one, compound and worsen the outcome of the other. In this context, it is possible to see how the inability to enter the workforce is often seen as one of the worse aspects of disability, shaping the portrayal of people with disabilities as those who cannot work and hope to lift themselves out of poverty [31]. However, Grech [34] argues that in the Global South western concepts of independence and self-reliance become considerably less relevant and that people with disabilities in the Global South have access to social capital in the form of bonds and connections that can provide support and closer connections, promoting acceptance and integration. Similar dynamics were also witnessed in the studies involving Kibera residents with disabilities, who leveraged their social networks to take full advantage of both their mobile phones and more traditional assistive technologies, hence unlocking additional capabilities though the mediation of their social capital [6,8].

Ultimately, as shown by the extensive thematic analysis carried out by Bunning et al [20], the portrayal of disability in many countries in the Global South is shaped by a plurality of beliefs which co-exist, often in contrast with each other, showing a complex and nuanced picture that is influenced by a multitude of contextual factors which are significantly different from the ones that characterize the portrayal of disability in the Global North.

2.3 The portrayal of AT in the Global South

In the last decade, several researchers both within and outside the HCI community have begun to investigate how ATs are perceived by people with and without disabilities and how this perception is influenced and influences the portrayal of disability [28,40,85,86]. However, these perceptions are shaped by societal factors that might be radically different depending on the context. For example, the study carried out by Li et al [45] involving 26 people with disabilities in China highlighted that some of the misperceptions surrounding ATs in China were similar to the ones observed in studies based in the US and Europe others, such as the belief that ATs should overcome inaccessible social infrastructures; that ATs represented markers of permanent disabilities; and that multi-functional AT were preferable to ones who had a single purpose, were specific to the context [45].

The comparative survey between young adults without disabilities in the UK and Pakistan conducted by Asghar et al [2] showed that both groups associated the image of a manual wheelchair with a stigmatizing portrayal of a person with disability. However, participants from Pakistan expressed more positive opinions about the AT device itself compared to participants from the UK [2]. In a follow-up study that analyzed the gaze fixation pattern on specific areas of interest of the wheelchair, researchers reported that participants from Pakistan seemed to have a more holistic view of the device when evaluating different characteristics of the device, whereas participants from the UK were more prone to focus their gaze on a specific area of interest [3].

In the ethnographic accounts collected by Jones & Pal [42] from people with disabilities in Sierra Leone, participants described competence with ATs and ICTs as something they could leverage to challenge stigmatizing views that depicted them as incapable of being productive members of society. Furthermore, as also reported by Barbareschi et al [6] and somehow in contrast with Shinohara & Wobbrock [85] participants felt almost fully dependent on their ATs and ICT devices due to the (insurmountable) barriers created by the surrounding environment [42]. At the same time, travelers with disabilities from Rwanda and Uganda highlighted how the use of ATs not only constituted a visual marker of their disability, but also represented a barrier to accessing public transport as it would cause them to be denied the ability to board a bus or would mean being asked to pay additional fare for the space occupied by their devices [43].

Finally, the five-month study carried out in Kenya by Barbareschi et al [9] highlighted how the way in which both wheelchair users and service providers conceptualized wheelchairs, and attributed meaning to them, encompassed not only functional aspects but also values of agency, empowerment and self-expression that were associated with the device itself and the service delivery mode used to enabled provision.

These studies show that the portrayal of ATs in the Global South is complex and multifaceted. Furthermore, although the portrayal of AT is linked to the people with disabilities who used them, this research shows that conceptualization is also somehow separate from the individual which can increase or decrease stigma depending on the situation.

3 METHODS

3.1 Study settings: Kenya

With an estimated population of 51 million and a total surface of 580.367 km² Kenya is neither the largest nor the most populous country in East Africa. However, thanks to its fast economic development which is largely driven by a thriving tech sector, Kenya represents the strongest economy in East Africa and one of the largest in the whole African continent [99]. Unfortunately, despite the positive overall economic trends, rates of inequality are still extremely high in Kenya with many people living below the poverty line [93].

As is the case in many countries, the estimates concerning the number of people with disabilities in Kenya varies significantly between surveys conducted by different agencies and organization. The national housing census conducted in 2019 reported a national prevalence rate of disability of 2.2% [92] [ref], whereas the national survey of persons with disabilities carried out in 2007 reported a prevalence rate of 4.6% [60]. People with disabilities are amongst the most disadvantaged groups in Kenya with poverty rates being as much as 15% higher amongst people with disabilities compared to people without disabilities [56,60].

Young people between the ages of 15 and 24 years represent one of the largest groups in Kenya, accounting for 20% of all Kenyans [78]. This, so called, “youth bulge” represents both a potential asset for the country to become a more equitable society and a risk for economic and social stagnation if young people are not provided opportunities to access education and jobs and full participation in society [78]. This group also represents the future leaders of communities and the country. Within this context, understanding how young people in Kenya conceptualize disability and AT and how they develop stigmatizing beliefs is key to ensure we can develop strategies to tackle stigma and discrimination and promote a more inclusive society.

3.2 Study procedure

This study was conducted as part of a larger campaign that aimed to develop innovative and impactful strategies to tackle stigma and discrimination towards people with disabilities amongst young Kenyans. The studies were co-developed by the Global Disability Innovation Hub, University College London and Sujaaz Inc. and the campaign led by Shujaaz Inc. as part of the larger AT2030 programme funded by UK Foreign Commonwealth and Development Office. The study featured a series of digital focus groups with Kenyan youth without disabilities to understand their attitudes and beliefs towards people with disabilities and AT. As the study took place between October and November 2020 all focus groups were conducted remotely.

3.2.1 Participants

Study participants were young people who lived in different regions of Kenya. In total we conducted 5 focus groups with 5 participants in each. The only requirement for participation was to be between the age of 18 and 26 years old and living in one of the following regions of Kenya: Nairobi and Central Kenya, Coast region, Rift Valley, Nyanza and Western Kenya. These regions were chosen based on the results of the Kenya National Survey on Persons with Disabilities [60] as regions that combined higher rates of disability and various levels of poverty in the attempt to recruit young people with different experiences and backgrounds. Participants were recruited through a series of calls posted by Shujaaz Inc. on social media and other channels. We purposefully did not require participants to have had extensive contact with people with disabilities, as we wanted to understand the perceptions and attitudes of young people across the whole spectrum, from youth who might have a family member with disability to other

who might have had only superficial encounters. All participants received a small compensation in the form of airtime bundles for their mobile phones for taking part in the study.

Table 1 shows a broad overview of age and self-identified gender of participants enrolled in each of the 5 focus groups which were organized according to the region in which participants lived. We chose to use a regional allocation of participants, rather than a random one, as the socio-economic characteristics of different areas of Kenya can be substantially different, especially between urban and rural areas and we believed that this could have an influence in youth's experiences and their level of stigma and misconceptions concerning disability and ATs.

Table 1 Summary of age and self-identified gender of youth who took part in the 5 focus groups organized according to the different regions in which they lived in

	Nairobi & Central Kenya	Coast Region	Rift Valley	Western Kenya	Nyanza
P1	Male, 20	Female, 26	Female, 23	Female, 19	Male, 24
P2	Male, 20	Female, 20	Male, 24	Male, 18	Female, 23
P3	Male, 21	Male, 20	Female, 22	Female, 23	Female, 22
P4	Female, 20	Male, 25	Female, 22	Male, 22	Male, 24
P5	Female, 20	Female, 22	Male, 21	Male, 24	Female, 21

3.2.2 Materials and procedure

Virtual focus groups were carried out using the WhatsApp messaging platform. All participants were explained the purpose of the research and asked for their consent on a separate chat before the start of the focus group. After consent was obtained, participants were added to the same chat group and greeted by the moderator (second author) who guided the discussion. Questions asked throughout the focus group explored a variety of different topics, from their knowledge and understanding of different types of ATs (including crutches, hearing aids, braille books, ramps and spectacles) to their interactions with people with disabilities in local communities and their reactions when considering people with disabilities as friends or partners. As we were interested in capturing the language that young people used naturally to talk about disability and AT, rather than artificially imposing a language that we believed to be correct, we used pictures to introduce both devices and individuals. For example, to assess knowledge and perception of a wheelchair, participants were shown a picture of a wheelchair and asked "How do you call this? What is it used for? Have you seen one in your community? What do you think about when you look at this picture?". Finally, reactions about potential friends and partners were also introduced using pictures and introduce participant to a potential scenario such as "Your best friend is dating the guy in the picture, what do you think about it?". WhatsApp focus groups were organized with the aim to remain as close as possible to engaging in-person conversation that Shujaaz Inc. frequently uses to connect with young people to discuss a variety of relevant subjects to design appropriate media campaigns. As in a traditional focus group, all participants did not know each other before taking part in the study and, although they were from the same geographical area, they did not live in the same villages or communities. Conversations lasted between 2h and 2h 30m with the moderator inviting participants to remain active in the chat and soliciting responses by individuals who appeared more "silent". Overall, all participants across the five groups remain active throughout the chat

The study obtained ethics approval from the University College London Research Ethics Committee.

3.2.3 Data analysis

Focus group transcripts were extracted from the platform. Focus groups were carried out mainly in English. However, participants occasionally used terms or expressions in Kiswahili, Sheng Slang (common language among youth that mixes Kiswahili and English) and Luo which were translated to English. When these expressions were translated to English, local researchers at Shujaaz Inc. ensured that the original meaning was preserved. Focus group transcripts were analyzed with thematic analysis using a bottom-up inductive approach in an iterative fashion until saturation was reached. The analysis focused on not only on the semantic meanings of opinions expressed by participants, but also on our interpretation of their latent meaning [17,18]. Throughout the analysis and interpretation of the data we attempted to separate the elements that characterized how Kenyan youth portrayed people with disability from the ones that shaped ATs more specifically, capturing both positive and negative connotations. The initial coding was mainly carried out by the first author with frequent consultations with the second author, who is Kenyan, to ensure the correct interpretations of cultural and social aspects that emerged from the analysis. To check the consistency of the coding process, categories were also discussed against the coded transcripts with the third author as the analysis progressed. The conceptualization of themes was discussed amongst the wider team to ensure that there was agreement in the interpretation of the data and that the themes provided a nuanced and comprehensive picture of the beliefs of young Kenyans surrounding people with disabilities and ATs.

4 FINDINGS

The findings presented in these sections are organized according to the elements that shaped the portrayal of disability and the portrayal of AT amongst Kenyan youth.

4.1 The portrayal of disability

4.1.1 The language of disability

When asked to think about an individual with disability, Kenyan youth immediately pictured people with physical disabilities such as "*A person suffering from immobility*" (P2, Coast Region, Female 20) or "*Someone without feet*" (P3, Rift Valley, Female, 22), occasionally participants mentioned people with visual impairment, but never someone with a hearing or cognitive impairment. However, when prodded further participants mentioned that they had seen people with other types of disability frequently, as they were present in their communities.

The language of disability was often charged with emotions of pity and sympathy as participants felt the negative impact that disability could potentially have on their own lives.

"When I see this stuff [pictures of people with disabilities] I just start to imagine how my life would have been if I was using this stuff [crutches] to walk" – P5, Nyanza, Female 21

When participants talked about or described people with disabilities, they used language that had largely negative connotations. The use of derogatory or mockful expressions such as *lame*, *crippled*, or *muzungu* (literally "someone who roams" which is usually used to refer to white foreigners but is occasionally used mockingly towards albinos) was extremely rare amongst participants, despite still being reported as common in many communities. However, participants almost always described people with disabilities as people who faced a life full of sufferance

and struggles. Occasionally, in their definitions participants acknowledged that an individual with disability might be attempting to live their life like everyone else, but they seemed to see little hope of success.

"It's depressing having to wake up knowing that you can't do anything with ease and knowing that you have to depend on people" – P4, Rift Valley, Female, 22

Disability was seen as a permanent condition, despite the fact that at least two participants described episodes in which a family member had to use a mobility aid for a few months after a surgery or an accident. Furthermore, persons with disabilities were always described in reference to the activities and functions that, allegedly, they could not do such as walking, seeing or hearing. The only examples of the use of positive language in relation to disability were linked to the beliefs that people with disabilities, in particular blind people could acquire almost supernatural senses that could compensate for their visual impairment.

"And those people [people who are blind] are sharp, I don't know how their senses are that good, they can hear everything" – P4, Western Kenya, Male 22

4.1.2 Disability challenges: Society vs Impairment

Despite describing disability as an individualized experience of sickness and inability, when young participants talked about the challenges faced by people with disabilities and the factors that could contribute to improve inclusion and wellbeing, they attributed more responsibility to society than they did the individual. Many youths felt that the inability to enter the workforce, which was largely attributed to discrimination and lack of adequate opportunities for training and education, represented the biggest barrier to the inclusion of people with disabilities as it condemns them to a future of inescapable poverty. This was seen as a problem that society needed to address, as access to work was described as a universal right. The charity model of employment was vehemently rejected as youth argued that people with disabilities were often already qualified for many jobs and hiring them should not be seen as a benevolent act.

"The society needs to empower them through funding their projects, giving them access to jobs and education" – P1, Coast Region, Female, 26

"When they finally get one [a job] it always looks more like a favor than them being qualified if not overqualified" – P4, Nairobi and Central Kenya, Female 20

The right to a more accessible environment was also mentioned by several participants who felt that environmental barriers severely hindered the mobility of people with disabilities and made it impossible for them to be independent. Access to AT was also seen as an important step to ensure that people with disabilities could fully access life opportunities. Young people felt that society, and the government in particular, was letting people with disabilities down by neglecting their needs for ATs because of lack of interest and dishonesty.

"To make it worse some people don't have access to equipment we mentioned in the beginning and corrupt leaders who are supposed to take care of the needy are busy helping themselves to funds allocated for the people living with disability" – P5, Nairobi and Central Kenya, Female 20

Normalization of people with disabilities was also seen as one of the main responsibilities of society and communities to ensure that inclusion became a reality. Many young Kenyans stated that they had limited contact

with people with disabilities, which made encounters awkward, as they felt unsure of how to behave. On the other hand, participants who had a family member with disabilities or who had interacted extensively with people with disabilities in school or at church felt comfortable around them. Based on his personal experience, one participant from the Rift Valley group was also able to provide some advice to other group members on how to interact with a person with disability.

"Be natural and talk with a person who has a disability just as you would talk with anyone else. Don't be patronizing in your questions or your actions. And don't ask questions that you would not ask a person without a disability. Not everyone with a disability wishes to discuss their unique abilities or limitations"
– P5, Rift Valley, Male 21

Beyond mere exclusion, Kenyan youth also talked about several instances in which people with disabilities were exploited, oppressed and abused and stated that this should require not only education, but also corrective action to protect the human rights of people with disabilities, especially in case of children who could not defend themselves.

"Some parents even lock their children inside the house because they are abnormal. The society should do something against those parents because they are bad to their children" - P4, Nairobi and Central Kenya, Female, 20

Amongst many progressive interpretations there were also few instances in which participants described the challenges of disability as solely related to sickness and impairment. Youth who felt that disability resided exclusively in the individual believed that the only responsibility people without disabilities had was to provide essential help and support, rescuing people with disabilities which were seen as totally helpless.

"They [people with disabilities] have to be assisted in anything they want to do. They need someone to give them hope that everything will be fine despite the challenges" – P1, Nyanza, Male 24

4.1.3 A partner with disability: Yes, no, depends

When faced with scenarios that pushed them to consider people with disabilities as a potential romantic partner for themselves or a close friend, several participants did not think that disability could represent a barrier to a relationship. Some young people cited positive examples of couples they knew where a person without disability dated or was married with someone with a disability and felt that they would not consider the partner's disability a problem. Others mentioned that the relationship might require some adjustment in relation to practical circumstances, but nothing that could not be easily faced together.

"There could be a problem in case they want to go up a building, but the building has no lifts. A little difficult on the movement but apart from that they go through what everyone goes through. The difference is that they face them with their condition" – P2, Western Kenya, Male, 18

A number of participants felt that their decisions about dating would depend on the type of impairment that their potential partner had, as they fear that dating someone with a certain type of disability, especially blindness, could involve significant caring responsibility. Interestingly, young people stated that, in some cases, technology

such as mobile phones could help bridge the communication gap between people with and without disabilities who were interested in dating.

"If the guy has a hearing aid or cannot speak, but I like him, we could communicate with the phone. His disability is not complicated, and we could just text instead of talk" – P5, Coast Region, Female, 22

On the other hand, almost half of the participants stated that they could not date someone with a disability. Some of them believed that a partner with disability would be dependent on them, whereas others had superstitions about particular groups of people with disabilities, especially albinos, which made them afraid to engage with them ("I grew up knowing that Albinos don't die they just disappear. I am still afraid of them" – P3, Western Kenya, Female, 23). However, the biggest barriers that young people perceived could prevent or ruin the relationship with a person with disability had nothing to do with their own or their potential partner's circumstances, but were linked to negative societal attitudes. Negative judgment from friends, parents and society as large, combined with the fear of social exclusion were a huge deterrent to considering engaging in a romantic relationship with someone with a disability. Participants feared that continuous pressure from everyone around, would cause the couple to break up and leave them with stigma that would persist even afterward.

"People can sympathise with you because you are dating a disabled person till you think you are marginalized. With so much judgement people break up, but then you will still be famous because of it" - P3, Nairobi and Central Kenya, Male 21

4.2 The portrayal of AT

4.2.1 The language of AT

In contrast to what we observed when participants talked about people with disabilities, the language used to describe ATs was largely positive and very rarely had an emotional connotation. Most young Kenyans were able to name multiple simple ATs such as crutches, wheelchairs, canes, and spectacles, but encountered significantly more problems with more complex or less common devices such as hearing aids, ramps, prosthetic legs or other ATs such as braille books. In some cases, such as ramps and prosthetic legs, even when participants were not familiar with these devices were able to understand their function without it being explained. However, a few participants were confused about the function of Braille and many mistook hearing aids for wireless headphones. None of the participants could name or describe any ATs for people with communication or cognitive disabilities.

"At first I thought a child had played with a paper [referring to the image of a braille book] ... It's like 3D writings which pop outwards, but I don't know why you would use it" – P4, Rift Valley, Female, 22)

Interestingly, for some ATs, specifically crutches, wheelchairs, spectacles and canes, participants knew both the English name but also the names in either Sheng, Kiswahili or their own local language. On the other hand, all other ATs that they felt less familiar with were only known by their English name. Local names of ATs were generally descriptive and had no negative connotation associated to them. The only exceptions were the wheelchair, which in Kiswahili was referred to as either "*Kiti cha magurudumu*" (literally: thing with wheels), but also "*Kochi ya vilema*" (literally: seat for the lame), and spectacles which were called "*macho nne*" (literally: four eyes) in Kiswahili.

Overall participants seemed to associate the use of AT mainly with the purpose of enhancing a person's mobility. For example, when asked about ATs that could support individual with visual impairments participants could only

name white canes and, even when prompted, did not mention other ATs such as braille slates and stylus, screen readers or even mobile phones. Moreover, as most participants were unfamiliar with the term "*Assistive Technology*", when asked for a term that could capture all the pictures of devices that they had been shown mostly referred to them as "*mobility aids*" or "*mobility equipment*". Once they had been reminded that some of these devices had functions that were completely unrelated to mobility, some participants chose to use more general terms such as "helping aids", whereas others established a clear link between ATs and people with disabilities by using terms such as "equipment for people with disability" or "*handicap aids*".

Moreover, participants also made very specific mental associations between different kinds of ATs and the individuals who might use them. For example, canes and walking sticks were exclusively seen as devices that an old person would use for walking ("*This one is an old man's staff*" - P1, Coast Region, Female 26). Similarly, hearing aids were reserved to deaf people, braille books and white canes to the blind and wheelchairs to individuals with spinal cord injuries. In a similar fashion to what we observed in relation to disability, the use of ATs was described as permanent, and ATs were often seen as the only tool that could allow people with disabilities to gain "normalized" capabilities.

"These gadgets are for those with disabilities, they help them feel close to being normal, like the rest of us"

- P4, Nyanza, Male, 24

4.2.2 *The visibility of AT: From direct interactions to theoretical knowledge*

As we expected, based on their ability to easily recognise them, most young participants stated that they were very familiar with basic mobility aids. ATs such as crutches, canes and wheelchairs were described as both highly visible and used by many people in their communities.

"This is a walking stick, our neighbor has hurt one leg and he uses it. Many people do, especially fathers and you can see when they walk with them" - P3, Coast Region, Male, 20

Others, although less common, could still be encountered in specific environments. For example, participants stated that in their local neighborhood there were no ramps that could help wheelchair users negotiate height differences or access one's home. However, they could all think of public buildings in larger urban areas which featured ramps for accessibility.

Devices such as braille books, prosthetic legs and hearing aids were considerably less common. A small number of participants mentioned seeing braille books or braille machines at school or in a library, and a few were able to interact with them directly. On the other hand, participants were very uncertain about the visibility of hearing aids. In part this was due to the perceived low profile of the device, but largely it was attributed to the fact that participants felt they could not discern between a hearing aid and a pair of Bluetooth earbuds.

"Once in school I was asked to help carry this heavy machine to a class that had a blind boy then I got the opportunity to see how it worked and I have even touched the paper" - P2, Western Kenya, Male, 18

Most participants did not have any real interaction with AT and whatever knowledge they had was either based on observation, usually from a distance, or through occasionally watching videos or other relevant media available on the internet. Many young people felt that the lack of interactions with AT was something negative that prevented them from understanding their function completely and appreciating their value.

P3: "I just come across a friend who can play using Braille. It has symbol dots which represent a letter when typing you can feel them [the dots]"

P5: "At least you've had a chance to see it. It's hard to understand if you don't see these things. I thought it's a paper with holes punched on it, but it is useful" - Rift Valley

Finally, although they describe many ATs as visible and they clearly classified them as devices that were exclusively used by people with disabilities, young Kenyans did not perceive any stigma attached to them. On the contrary, ATs were seen as a sign of resources, mostly economical, indicating that a person with disabilities had some tool at their disposal to help manage the challenges that they faced.

"[When I see someone using a wheelchair] What comes to my mind is to learn to thank God because there are those who cannot have a wheelchair and those are in much worse situations" - P1, Nyanza, Male, 24

"[Name of a local politician with albinism] would face less challenges. If he needs technology to help him do things he has a good job so he can buy them" - P5, Rift Valley, Female, 22.

4.2.3 ATs as functional panacea

As they discussed their ideas and impressions of different ATs, what emerged was that participants considered AT as an almost universal tool that could compensate for a functional impairment affecting a person with disabilities. According to their descriptions, a person with disabilities who had access to an appropriate AT could leverage it to manage, at least in part, many of the challenges that one would face in everyday life. However, without AT, people with disabilities were largely seen as incapable to accomplish anything.

"Most accident victims are given aid in movement, and the first thing is the crutches. They help people to walk and get jobs. If you don't have them you are stuck" - P4, Nyanza, Male, 24

Many of the participants overestimated the power of ATs could have to support individuals with disabilities. Moreover, many ATs were seen as almost a magical "fix" that could work to bridge functional gaps in any circumstances and without any active input from the user with disabilities.

"This is a hearing aid. When the deaf people use it, they can hear and communicate" - P4, Coast Region, Male, 25

These interpretations had not only the effect creating unrealistic expectations on the potential of AT, but they also denied that people with disabilities could have significant personal skills and resources without AT or that they needed any sort of skill in order to use them. An example of this was P5 in the group from Nairobi and Central Kenya who described the Braille code as a "*language that you know if you are blind so that you can read and be educated*". This sentence is quite iconic as it depicts understanding Braille as possible only if one was to be blind. Furthermore, rather than be described as a learning process, it is depicted as something that a visually impaired individual would acquire, automatically, as a consequence of disability. Finally, being able to understand Braille, and potentially the availability of Braille books and ATs that allow to write in Braille, is implicitly described as the only way for an individual who is blind to gain access to education.

5 DISCUSSION

This paper explores the attitudes and beliefs that young Kenyans without disabilities have in relation to both people with disabilities and AT. Furthermore, throughout the analysis we highlight the both the similarities and contrasts in how participants understand these two these two different but interconnected elements. In this section we discuss how the interplay between conceptualizations of disability and ATs generates a series of complex tensions that have important implication for accessibility research in the Global South. Moreover, we highlight how differences in how young Kenyans relate to disability and ATs creates a space for context-appropriate and participatory technologies and strategies that could help tackle stigma and discrimination towards persons with disabilities. Finally, we propose some reflections on the importance of language in shaping the portrayal of disability and ATs and speculate on ways in which language could be constructed as and through technology to convey more progressive ideas about disabilities and AT.

5.1 The portrayal of disability and AT, overlaps, discordances and interactions implications for accessibility research

From the stories and opinions shared by participants it was clear that, although related, the portrayal of disability and ATs could be at times radically different. When first asked to describe disability, young people depicted it as a permanent affliction, solely residing in one's body, that made a person hopelessly dependent on others. As previously hypothesized by Cohen-Rottenberg [21], participants appeared to do this as a result of the fact that they self-projected their own fears of loss of capacity, social rejection and poverty on their idea of a person with disability.

People with disabilities are seen as completely resourceless on their own and their only hopes to be able to tackle big and small life challenges are linked to either the use of ATs or the support of people without disabilities in their families and communities. As a consequence, the perceived importance of ATs, of which participants rarely have direct knowledge, is greatly magnified as ATs become not just a tool to enhance one's capabilities, but a potential solution to the problem of disability. The perception of people with disabilities being helpless without AT and beliefs about ATs being able to functionally eliminate disabilities have been described before [45,85]. However, what clearly emerged from our study is that young Kenyans without disabilities seem to completely overlook the skills and capabilities that persons with disabilities develop in order to take full advantage of their ATs. When people spoke positively about AT, it was implied that the user had a high level of proficiency and that the skills they possessed had been somehow effortlessly acquired. However, developing these skills takes time and resource as well as dedication by the AT user and their allies [10,15,65,73].

This highlights the importance for accessibility research and practice in the Global South to focus on approaches that highlight the capabilities of individuals with disabilities both in relation to the use of AT but also beyond them. Frameworks such as Ability Based Design [96], or the Competency framework by Reyes-Cruz et al [73] could be further explored in this context to understand how the design of technology itself or the development of targeted stigma interventions could focus on conveying a more realistic portrait of how people with disabilities develop and leverage their own skills to tackle everyday challenges both with and without ATs.

Although initial thoughts about disability had strong negative emotional connotations, when participants were asked more specifically about the challenges faced by people with disabilities and, more importantly, the factors that could improve inclusions and promote wellbeing, their answers showed a much more nuanced and social understanding of disability. Stereotypes, stigma and discrimination towards people with disabilities, especially in relation to access to work and education were seen as the main barriers to a fulfilling life for people with disabilities.

Moreover, even in the context of personal and romantic relationships, one of the main deterrents that prevented youth from wanting to date a person with disability was the fear of societal judgment and stigma by association [69].

What we believed it was particularly positive was the fact that participants felt that society had the responsibility to change the status quo, rather than expecting people with disabilities to prove themselves or conform to the standards dictated by mainstream society. To date, much of the accessibility research in the Global South has focused on technological interventions that target people with disabilities with the aim of improving their life outcomes [41,57,79,83]. However, as suggested by participants in our study, many of the changes that need to be made to create more inclusive societies are a responsibility of people without disability, as they are both the perpetrators of stigma and the party who holds the power to make significant changes. Efforts to tackle these barriers should be undoubtedly guided by people with disabilities, but not necessarily target them.

It should also be brought to attention that the complexities created by the intersections of contrasting beliefs that align at one time with the medical model of disability, and in other respect with the social model of disability, highlight the need for more nuanced approaches that help to reconcile both dimensions. The ability of participants to apply the social model to service provision while maintaining many negative beliefs towards people with disabilities, shows that interpretations can be more complex and that progressive opinions don't necessarily translate to universal positive consequences.

Ultimately, we believe that future accessibility research in the Global South, and globally, should seek to deconstruct many of the barriers facing people with disability by examining both how these barriers are created and who has the powers, and the responsibility, to overcome them or break them down. A research agenda that remains mindful of these power dynamics and that sees inclusion as a shared effort will be more effective in promoting accessibility as a form of social justice rather than as the benevolent act of researchers, institutions and funders.

5.2 Conceptualizations of AT and disability in Kenya vs the Global North, opportunities for context-appropriate technology

As previously reported by relevant research carried out in different countries in the Global South [42,65], our participants had very limited awareness of ATs. The only type of ATs that young Kenyans were familiar with were mainly simple mobility devices, which were often strongly associated with specific types of disabilities. Unsurprisingly, ATs were only conceptualized as special devices developed for people with disabilities and used only by people with disabilities. None of the participants mentioned how, mainstream devices such as mobile phones or computers could become key ATs for many people with disabilities, nor they considered circumstances in which a person without disability might learn to read a braille book or need to use a pair of crutches after a surgery.

This rigid categorization of ATs creates two main issues. First, as ATs are perceived as exclusively being used by people who have a permanent disability, they become the visible identifier of disability, overshadowing any other characteristics of the individual [9,31]. Second, the lack of association between accessible mainstream ICT devices and people with disabilities creates incorrect expectations concerning who can and cannot use these technologies, which generates additional barriers to access [8,64]. Furthermore, the tendency to over focus on visibility of both disability and AT indicates that hidden disabilities were not readily identified or understood by our participants. In this context, as observed by Rush & Becker [77] in relation to access to mental health services, these structural

discriminations and external barriers become more relevant barrier compared to self-stigma which might be a more significant element in the Global North.

Interestingly, although ATs were seen as a mark of disability they were also somehow interpreted as a sign of privilege, as they indicated that the individual had access to some measure of resources, often financial, necessary to acquire the device in the first place. This was a result of the fact that in the Global South poverty stigma is often seen as worse than disability stigma [25]. In the eye of participants, the burden that disability places on the person, and those who associate with them, is directly proportional to the level of access the person with disability has to technological solutions that might improve their lives. A person with disability who has access to AT is hence seen as a person of means, which automatically elevates their social status.

The visibility of appropriate AT can be a symbol of wealth and be a reducing factor in stigma within the community. The clear appropriacy and effectiveness of the AT would be paramount in promoting a positive image of the user. Our findings here support previous research which demonstrated the increased value given to appropriate, bespoke AT (wheelchairs) in Kenya, which went beyond the usual functional improvements to a person's life. Participants of this study spoke of their pride in their AT which were seen as a sign of agency and empowerment [9]. Bespoke designs allowed for an improved fit to user needs, this is in contrast to ill-fitting AT which is sometimes provided through the charity model of AT provision. The charity model of provision promotes a passive, and often demeaning image of persons with disabilities as someone which should be pitied or fixed, somehow akinly to the medical model of disability. On the other hand, empowering approaches that lead to the co-creation of bespoke devices, such as the one used by authors in [9], allows for an ability-based design lens to be taken to AT provision and aligns with a more positive and realistic view of disability.

Given the strong link between disability and poverty [14,56,66], this makes a further clear case for the importance of appropriate technology in the Global South. If charitably or state provided AT is to have a positive effect on stigma it must be a desirable choice of technology, not second rate, and certainly not second rate in the eyes of a layperson. Otherwise, a substandard AT will exacerbate the image of a PWD as a person who is less able and less able to look after themselves. Some of these beliefs connecting the presence of AT to financial resources could not be exclusive of Kenya and the Global South, but be also present in poorer areas of the Global North. Further research should attempt to disentangle the influence of cultural, social and economic factors on beliefs surrounding disability and ATs.

However, in countries where provision is expected through state medical or care services, the relationship between AT vs perceived wealth might not necessarily be as connected. The quality of device would in this case reflect firstly through the social model of disability and display the level of achievement of society as much as of the individual. Furthermore, some people with disabilities might prefer more unobtrusive devices which do not attract attention, neither positively or negatively, and some might even prefer to use more worn looking device as they convey the idea of something that might be provided by a healthcare facility for temporary rather than temporary use [28,72]. In the Global South, while the state's failings may be considered, the lack of service provision is to be expected, and therefore the quality of AT acquired by the user directly reflects their finances or importance in the community.

5.3 Limitations

The findings presented in this paper help to paint a rich and detailed picture of how young people without disabilities in Kenya perceive people with disabilities and what role does AT plays in the portrayal of disability.

Although these findings are extremely important to help us understand how disability stigma develops within the Kenyan context and how research and initiatives around AT and accessibility can either mitigate or exacerbate stigma, there are some limitations that need to be considered in the interpretation of the results. Firstly, although the themes described in the paper emerged from all five focus groups, it is necessary to remember that participants recruited for the study did not include any young person from the Eastern and North-Eastern regions of Kenya. Saturation was hence reached within our sample, but the addition of participants from different geographical regions of Kenya could have led to the emergence of new themes. Secondly, young people seemed comfortable discussing the proposed topics surrounding disability within the WhatsApp group, and everyone remained respectful of others opinions throughout the conversation. However, it is possible that some participants might have refrained from expressing particularly negative opinions of people with disabilities that they thought could be unpopular with other members of the group. We believe this risk to be minimal as participants were unknown to each other and there were no unbalanced power dynamics amongst members of the group. Finally, beyond age, gender and geographical location we did not screen participants for any other characteristic, which made it impossible to attempt to unpick the influence of personal socio-economic factors (such as education and income level) on their beliefs about disability.

6 CONCLUSIONS

The attitudes and beliefs that people without disabilities hold towards people with disabilities and in relation to the use of AT are largely shaped by the context in which they live. Moreover, the conceptualization of disability is both separate and connected to the conceptualization of AT in a complex web of interactions that can respectively enhance or reduce stigma. In this paper we present result from a series of digital focus groups aimed at exploring how young Kenyans without disabilities portray people with disabilities and the use of assistive technologies, how these the concepts are connected and the impact that this has on stigma. Our results show the portrayal of people with disabilities often negative and disability is largely seen as a source of struggles and suffering. This overinflates the expectations towards ATs which are often seen as a panacea that allow people to overcome their disabilities in with little input on their part. At the same time, participants acknowledged that most of the barriers affecting people with disabilities are generated by society rather than their own impairment, which calls into question who and what should be the target of interventions which aim to improve inclusion. Finally, it emerged that although ATs were seen as an identifier of disability they were also considered as a mark of ability to access resources. This caused them to be described in largely positive terms as ATs became a sign of wealth and poverty stigma was perceived as worse than disability stigma.

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