Counteracting Dampeners: Understanding technology-amplified capabilities of people with disabilities in Sierra Leone

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ABSTRACT
This paper presents an ethnographically-based account on the impact of technologies appropriated in the livelihood strategies of people with disabilities (PWDs) in Sierra Leone, West Africa. In contrast to other developing countries, Sierra Leone presents a situation where people with disabilities are socially marginalized but not necessarily wholly disadvantaged. Through a lens of *technology-amplified capabilities* we show how PWDs leverage information and communication technologies (ICTs) to counteract social *dampeners* they regularly experience that prevent their participation in society. We discuss the role of the war experience and its impact on services and attitudes towards people with disability and how disruptive contexts can open up opportunities to support and amplify existing life skills towards development goals.

Author keywords
Disability; marginality; Africa; amplification; capability; mobile; education; accessibility; assistive technology

ACM classification keywords
D.3.3 Human Factors

1. INTRODUCTION
Sierra Leone provides a unique setting in which to examine the sociotechnical environment of disability. It is a post-conflict country in the Global South, rebuilding after a decade-long civil war that spanned the 1990s and early 2000s and destabilized internal infrastructure and external exchange. The issue of disability was often at the forefront of discourse about the war in Sierra Leone as stories of amputation used as a weapon of war featured prominently in reporting on the conflict [2]. Research has suggested that the war's effects, and the visceral images of amputation as an act of war, brought the rights of people with disabilities to the forefront of national interests as activists sought inclusive agendas in their country's reconstruction efforts [9].

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In Sierra Leone, the post-war period has brought one major development in the recognition of the rights of persons with disability – in 2005, the country ratified the U.N. Convention for the Rights of People with Disabilities (UNCRPD). The convention is a broad document that considers inclusion for people with disabilities in a range of contexts including judicial and electoral rights, economic opportunities, and social inclusion. The convention specifically mentions the role of assistive technologies in enabling inclusion, and encourages signatory states to invest in creating an environment of easy access to various forms of assistive technologies (AT).

During the period of this study (2013), organizations were fighting for the implementation of legislation for inclusion inspired by the UNCRPD [18]. ICT assistive technologies were only beginning to come into use, with only a few token people possessing even basic tools like a screenreader for their mobile phone. Thus, we study the use of everyday ICT devices, particularly mobile phones, as they are appropriated for assistive use to enable access to society in a reconstruction context.

1.1 Capabilities and disability
The capabilities approach to development, associated with scholars like Martha Nussbaum and Amartya Sen [14], describes value in society as a measure of the opportunities a person has to achieve particular states of being or to undertake particular activities. Economist Tanya Burchardt applied the capabilities approach to disability studies by arguing its similarity to the social model of disability [4]. The social model distinguishes impairment, a physiological condition, from disability, a state caused by a social response to impairment. Burchardt makes three points relevant to the discussion of this study. First, the capabilities approach, in line with the social model, proposes that the key to resolving the disadvantages related to impairment lies with creating opportunity for people with disabilities to participate fully in society.

Second, the framework supports the guarantee of autonomy, or the ability to freely make choices about how to live one's life, as an important measure of advantage or disadvantage in society. For PWDs, disablement is reinforced when those who have the capacity to make decisions are hindered from exercising that right.

Third, the capability framework defines poverty as circumstances produced by a lack of opportunity in society. In this paper we call attention to how individuals considered impoverished by traditional measures can actually be quite capability-rich, and thus prime beneficiaries of the advantages of technology use. In particular, we examine the role of AT in the context where the relationship of disability with multiple forms of structural marginalization engender lack of opportunity.

1.2 External capability

A key expansion of the capability approach is the notion of *external capabilities* [8]. External capability considers both the innate abilities of an individual and the functions a person gains through relationship with another person.

External capabilities are important to consider in this context. The Western ideal of individual independence typically exists where a strong infrastructure of public institutions can enable such independence. However, in Sierra Leone, interdependence with those in one's social network is normal and expected [1].

Among our participants, ICTs were not primarily a means of emancipation, but were perceived as a means to increase one's usefulness to others or to increase opportunities to contribute to society. Thus the notion of external capabilities is necessary to fully understand how ICTs contribute to livelihood strategies of PWDs in this context.

1.3 Amplification theory

According to the amplification theory of ICTs in development, technology itself cannot increase a person's innate capacities but can multiply the existing human capacity and intent [16]. In his critique of ICTD projects for marginalized groups, Toyama argues that benefits of technologies are greater for people who are already more competent and well-intentioned, i.e. the privileged social majority.

The perspective of this paper acknowledges that technology interventions may only be a starting point for social inclusion. Yet, we find that ICT access and use, even the most basic devices, was seen by PWDs as a means to overcome some forms of marginality and facilitate their greater achievement and participation in varied aspects of society.

In interviews, participants were confident in their innate capacities, with many being highly regarded within their communities and successful in their achievements, yet, only within the limited spaces allowed them. In light of the apparent paradox, we were challenged to consider what ways technologies could amplify the capacities of these disenfranchised individuals above the apparent social privileges of their counterparts.

1.4 Our contribution: Social Dampeners

We propose the concept of *dampeners* to reconcile perspectives of technologies-as-amplifiers with the apparent usefulness of ICTs to marginalized people with disabilities. To tease apart this question, we examined the impact of ICTs at the level of an individual's existing capability set, focusing on the use of ICTs in activities and contexts where PWDs typically face exclusion and discrimination.

Definition

In our lens of technology-amplified capabilities, features of a particular environment that are supportive are considered amplifiers, and restrictive features are conceptualized as *dampeners*. Dampeners are counter forces to amplifiers, and in this paper, take the form of the social forces that reduces the power and effectiveness of a person's abilities in a given situation. We use the terms "dampener" and "dampening forces" in this paper interchangeably, highlighting the fact that, especially for PWDs, the source of a restriction may be complex, multi-dimensional, and irreducible to a single discrete cause. In the context of this study, a dampener is operationalized as any disabling force that acts against a person in a setting where they would otherwise be able to perform to an expected level.

2. RELATED WORK

2.1 Capabilities as choice

The capabilities approach has received increased attention in ICTD. In a notable approach, Kleine operationalizes the capabilities approach with the concept of individual agency, focusing on how people can use their agency and resources to obtain choices to live a life they value [10]. With this framework, Kleine criticizes the trend of evaluating ICTD projects solely on the basis of economic outcome, arguing that evaluation should instead focus on increasing choice.

We seek to broaden this emphasis on holistic outcomes to be viable for those with little or no perceived agency in a society. We show that technologies can amplify the life skills and coping strategies people develop to navigate difficult social circumstances as well as the more recognized learned or professional skills. This approach shows that ICTs can support otherwise marginalized populations in making choices that are important to the populations as well.

2.2 Technologies and disability in ICTD

There is a growing body of work on the impact of access to ICT assistive technologies (ICT-AT) in the developing world, with a strong focus on access for people with visual impairments. A series of multi-country studies in India, the Middle East, and Latin America found that access to ICT-ATs empowered individual users beyond simple functionality [13]. Assistive technologies enabled people

with disabilities to access information independently, increasing learning and their sense of accomplishment. They also allowed workers to participate in and accomplish a wider variety of tasks in increasingly digital workplaces. In its absence, people with disabilities experienced "truncated aspirations," with low social expectations of their ability limiting their goals and dreams.

A related study examined the impact of assistive technologies on the workplace participation of PWDs using an amplification lens, making two points critical for this study [12]. First, technology was a central, critical component in enabling participation in society, and the lack of technology was a fundamental barrier even in the presence of other inclusion features, such as welcoming attitudes and other accommodations. Assistive technologies were credited with creating a different world for people with disabilities, elevating aspirations and opening up opportunities that would otherwise be unavailable. Second, although AT inspired and enabled greater participation in the workplace, negative social attitudes still existed as an insurmountable social barrier to full and equal participation.

This study adds to this body of work by examining the case of people with disabilities successfully using ICTs in Sierra Leone to overcome dampeners that restrict their participation in society. Prior work has clearly shown that technologies play a central role in enabling access to opportunities to participate in society, and that the outcome of these efforts can reach beyond the economic sector to increase choice in all aspects of life. In the findings, we show how technologies are used to enhance people's abilities to challenge the remaining areas of resistance.

3. BACKGROUND: SIERRA LEONE

Sierra Leone is a small country on the coast of West Africa with about 5.7 million people and five major ethnic groups and languages, of which the lingua franca is Krio.

The country is emerging from its reconstruction phase following a devastating civil war from 1991 to 2001. Currently, about 53.2% of Sierra Leoneans live in extreme poverty, and only 43–48% are literate in at least one of its five major languages [5].

As of estimates in 2012, 1.7% of the population are Internet users, with access mostly through Internet cafes [5]. A household welfare survey conducted in 2007 noted that 26.4% of households owned to a mobile phone [11]. This is the most current survey that collected data on mobile ownership.

3.1 Disability estimates

There is no agreement on how many Sierra Leoneans live with a disability. The government national household welfare survey, conducted in 2007, estimated that 1.1% of people lived with a disability [11]; however, many people with severe disabilities are not included as members of a household and are thus not counted in a census (personal communication, Statistics Sierra Leone, June 2013).

An independent household survey conducted in Sierra Leone by Leonard Cheshire Disability in 2009 approximated the disability population as much higher, noting that 17% of randomly selected survey respondents reported some impairment that interfered with day-to-day tasks [17]. Relevant for this paper, the survey findings suggested that the marginalization and exclusion of people with disabilities were largely a result of social factors such as prejudice and negative social attitudes.

In fact, the Cheshire survey found there were no significant differences between the education and employment situations of PWDs and their non-disabled peers. Children with a disability were, perhaps, in a stronger position to build capacity as they more likely to receive training for a skilled trade if they left school than their non-disabled peers. PWDs were also just as likely to own their own business, which is the most significant sector of the urban economy in Sierra Leone. On a household level, the report found that material poverty did not differ significantly between comparable households with a disabled member and those with only non-disabled members.

In contrast to countries with more established infrastructure and social services, in Sierra Leone extensive urban and rural poverty is cited as a 'general leveler' that creates widespread disadvantage across various segments of society [17]. Unemployment and underemployment are high throughout society [11] and the general lack of access to higher education and opportunity created a context where even small advantages became highly significant. Among our respondents, those that were well-educated felt that despite their disabilities, they were more competitive in the job market than their non-disabled counterparts. In this environment, our respondents felt that the stigma and structural disadvantages they faced due to their disability were the primary factors diminishing their competitiveness, and access to technology was a means of reconfiguring their potential for social access vis-à-vis their peers.

3.2 Social environment

Post-civil-war Sierra Leone experienced drastic changes that greatly impacted how people with disabilities were regarded with respect to their role in society. Previously, traditional beliefs about disability, including being cursed, having committed some wrong, or being spiritually attacked, prevailed in large parts of the country. These attitudes led to people with disabilities becoming outcasts.

"In Sierra Leone, when you are visually impaired or physically challenged, the treatment they give you, a dog can be better. You are treated with no importance attached. As far as you are concerned you are non-existent. When they count people, they don't count you." –R1

For individuals with disabilities themselves, the availability or change in services for people, particularly through non-governmental organizations (NGOs) and disabled people's organizations (DPOs) were distinct from the broader social perceptions of people with disabilities. However there has been a gradual shift towards thinking more aligned with a social model of disability [3]. Prior to 2006, PWDs were primarily supported by charitable organizations and frequently lived in segregated communities. When emphasis internationally shifted to empowerment over inclusion, NGOs began to promote capacity-building through skills training and increased education. The phrase "disability is not inability" became the mantra for activists and NGOs to promote this ideological shift both within the disabled community and in the broader population.

Attention to ICT training as a means of empowerment followed the success of pilot programs in Sierra Leone and elsewhere (e.g., iLab Liberia) and was quickly taken up and promoted by disability advocates in the country [7]. As the legal and policy landscape shifts to support inclusion (such as the 2010 passage Disability Act), limitations to participate in society have become primarily an issue of prevailing social attitudes and presumptions [18].

3.3 'Disabled' as a contested identity

It is important to note here that, although combatants and civilians wounded in the war face similar disablement due to their injuries, many reject the label and identity of being "a disabled somebody." Many prefer the term "war wounded" and in this distinction do not share the same mindset and goals as those who consider themselves disabled [3]. The social category of a disabled person includes those with sensory impairments (i.e. blind, deaf) and physical impairments, usually from birth or acquired through illness or accidental injury. Because of the advocacy around capability and participation, the term "disabled" has also acquired the implicit assumption of being able to integrate into mainstream society given assistance.

4. METHODOLOGY

This ethnographically-based study took place in Sierra Leone over a seven-week period in 2013. The data for this study were collected using semi-structured and informal interviews. To add depth of understanding to these interviews, the first author also collected field notes as a participant observer in a local school for the blind and a local DPO working to help implement and assess accessible technology skills-training initiatives in the Freetown area.

Participants were recruited through contacts in DPOs in four major urban areas of each of Sierra Leone's provinces: Kenema, Bo, and Makeni, and the capital city, Freetown. Each province has a different cultural majority, so care was taken to get a representation of experiences from each area. Interviews were conducted in English, Mende, and Krio, with the assistance of a trained local translator.

A total of 45 interviews were conducted for this study. Participants were primarily people with visual and mobility impairments and came from many socio-economic backgrounds, from street beggars to students to leaders of DPOs. The history of participants ranged from those who had lifelong impairment to those who had recently acquired an impairment. All mobility-impaired interviewees had been so since childhood. Interviews ranged from 20 minutes to 1 hour, and topics focused on eliciting each interviewee's experience with disability, and whether and how technology played a role. Beyond formal interviews, many of the participants regularly interacted with the researcher in the course of their daily activities, and further shared anecdotes and perspectives from their experiences. To gather a range of perspectives, five of the interviews were conducted with non-disabled allies of the disability community, including teachers, leaders of NGOs that offered skills training to people with disabilities, and employee managers in organizations that had a disabled person on staff.

All interviews were transcribed in English and were supplemented by photo, audio, and video-recordings of participants engaging in technology-related activities (i.e. classes). The analysis uses a qualitative grounded theory approach to draw out themes and insights from the data [6]. Themes were derived using open coding and reflective memoing to situate the author's field notes and observations in relation to participant narratives. Several theoretical frameworks were considered to best interpret the insights from the data. The following section relates the major themes we drew out using the lens of technology-amplified capability.

5. FINDINGS

We present findings from interviews and fieldwork to illuminate how technologies were used to amplify the capabilities of people with disabilities and overcome the social dampeners that prevented them from participating in society. We start by discussing how PWDs leveraged their skills with ICTs to change negative social attitudes. We then turn our attention to understanding technology's role in amplifying external capabilities. To conclude we discuss how technologies are used to overcome dampeners on freedom and choice.

5.1 Leveraging technical knowledge into social advantage

Attainment of desirable ICT skills was seen as an important factor to compete in the job market; however these skills were also a means to "compete with modern society." Although people with disabilities have been traditionally excluded from participating in the formal economy in Sierra Leone [17], several participants had enrolled in computing classes with the express hope of furthering their education and increasing their employability. Gaining computer skills was not simply a means to enhance a resume, but also one

way to demonstrate a disabled person's worthiness to enter the broader competition.

5.1.1 Using technology skills to dispel negative attitudes

ICTs were viewed as allies in helping change perceptions and create opportunities for people with disabilities. With access to the Internet in Sierra Leone at just more than 1% and the basic IT literacy rate even lower, computer skills were viewed as a superior quality that could be leveraged to increase access to opportunities in society. An interviewee, Mohamed (R58), who was mobility-impaired, noted how his computer skills had overridden much of the discrimination and prejudice he experienced related to his disability:

"In my office, I am the second in charge after my immediate boss.…[The other employees] admire me. Admire me in a sense, some of them that are physically able, do not have the qualification that I have. Right? … I have people who look up to me for answers. I have people who respect me! Because of my achievements."

Mohamed had achieved an advanced IT certification that was quite rare in Sierra Leone. To him, it was this unique certification that made him superior *enough* to other candidates to escape the discrimination usually accorded to him because of his disability. He emphasized that the respect and admiration of his coworkers was a result of his ability to attain qualifications that they did not have. He did not merely equal them, he had surpassed what they had accomplished.

"So the environment, their concept, their perceptions of disability is gradually changing. … I always believe, I have caused you to change, because of what I do. If I can go up to that level, and you are able, and cannot go up to that level, you have no option but to respect me. Right? For what I am." –R58

By acquiring IT skills, he challenged the perception that his impairment made him inferior or unqualified in some way to a non-disabled person.

5.1.2 Technology use as proof of competency

In the above example, Mohamed's advancement was based on demonstrating proficiency in skills coveted and rare in the workplace. However, people also cited how they used technology in their everyday encounters with non-disabled people as a means to challenge stereotypes.

In a commonly recounted scenario by blind interviewees, sighted people would notice their various ICTs and question what they could possibly be doing with it. "*From their perspective, they think you're not capable, so they admire you."(R26)* When approached by an incredulous sighted person, interviewees would demonstrate using the device, shattering notions of some all-encompassing incompetency.

"When you are moving around and the phone rings in your pocket, [they say], 'Eh! Can a blind person use a phone?' They only think you use the phone with your eyes! They even put you on test. They say, 'Let me give you my number and you text me to see.' So I send them a blank text to show them I can." –R23

Participants who were well-respected professionals and DPO leaders held the similar opinion to those who were young students or unemployed: they credited their technology use with dispelling the myths and perceptions held by non-disabled people about their relative lack of ability. In the above examples, technology skills helped earn the respect of employers and coworkers in the formal economy and challenged stereotypes of inability in everyday life.

5.1.3 Adaptation strategies lead to ICT skills

Visually impaired students were taught to work with available tools such as typewriters and voice recorders to prepare them to integrate into mainstream classrooms, where few teachers had any experience educating students with special needs. Proficiency in these tools was requisite for blind students for promotion from primary to secondary school.

This early familiarity with skills needed for effective use of ICTs became advantageous for blind people when mobile phones and more recently computers were introduced. For example, teachers explained that it was easier to teach blind students basic computing, compared to sighted students in their classes, because they had learned to easily navigate the keyboard when young and only needed to learn convenient shortcuts to master screenreaders.

"Most of them have never laid hands on a computer…. Typing gives an advantage to them because I do not have to teach it all over again to them. They learn it in their other class." -P1

Although ICTs were primarily used by blind students as assistive devices, those skills translated into valuable capabilities the students were able to leverage in mainstream settings as an advantage. We note here that while education at a well-resourced school for the blind in early childhood was fairly rare--and limited only to those who were blind as children-- the experiences of those who did progress through this system indicate the benefits of the ICT-based capabilities taught as adaptation measures in these settings.

5.1.4. Resistance to change

For respondents who became blind as adults or did not have access to education, the decision to work towards ICT skills was a difficult one since it involved not just the time investment, but a willingness to alter a familiar status quo. Although computing skills were acknowledged as valuable and profitable, it took time and considerable effort to acquire these skills and to attain the education level

required for ICT jobs. For some, begging was still seen as a lucrative and low-threshold option for people with disabilities to support themselves. Attempts by DPO leaders and NGOs to persuade some to give up begging for skills training and employment were described at times like "beating a dead horse."

"They think begging will earn them more. The elderly find it difficult. The young ones adapt easily. … We have meetings in their hideouts and discussions with them. It's not instant but eventually they change. If a person stops begging, no organization says stop, so here's money. There is information but the inner man doesn't accept, it is still a duel." -R3

Some participants cited age as a factor in this resistance; however our sample included a wide range of ages among those enthusiastic about gaining ICT skills to improve their livelihood. The common sentiment among these enthusiastic interviewees was that begging was shameful and gaining ICT skills was a promising strategy to avoid resigning oneself to dependence on charity.

5.2 Transcending dampeners through external capabilities

"With no phone, I no cope." –R4 (in Krio)

For people with visual and mobility impairments in Sierra Leone, a mobile phone became more than a simple communication medium. Interview respondents described their mobile phone as a lifeline that amplified their communicative and social capabilities in numerous areas of their life. The sense of general inaccessibility throughout society increased the sense of dependence on the technological artifact, particularly in those tasks where one faced daily vulnerabilities.

"It helps me with shopping. I call and ask the price, then I send somebody to go and get it from them. Or when you want to travel, call and make sure the person is ready to meet you. In banking, ask the accountant if you have money in the bank. It connects you so quickly to the rest of the world." –R25

Blind people used mobile phones, primary basic feature phones, in the same functional ways that sighted counterparts would — to call other people. However, this amplified ability to communication over a distance was much more than a convenience. Before mobile phones, basic activities were predicated on the willingness of members of the blind person's household or close neighbors to complete tasks for or with them. In addition, due to prevailing notion of infantilization present in the society, PWDs might be confined to their homes and denied the freedom to act freely of their own accord. With a mobile phone, PWDs were able to enlist armies of people in their social networks beyond immediate family towards attaining their goals, making aspects of society such as shopping, travel, and banking available and accessible to them whenever they chose.

Perhaps because of their reliance on their social networks for everyday survival, the PWDs in Sierra Leone were quick to recognize and capitalize on the power of mobile phones for extending and strengthening their connectedness with others. Students recounted how they were taught as children to value the importance of social ties to help them navigate the various environments they would encounter, learning *"strategies to force you to be a friend" (R39).*

These social networks provided access to external capabilities, and, as argued by Foster and Handy [8], networks were enhanced by the increased connectivity afforded by ICTs like mobile phones. Participants recognized the necessity of this amplified network and were vigilant about maintaining constant access to it. Going without a mobile phone was unthinkable for most interviewees, in much the same way it would be for non-disabled people, even despite accessibility issues. Even those who had only owned a phone for a short time keenly felt its absence.

5.2.1 Collaboration in the classroom

Educational contexts were one of the most evident areas of life where external capabilities were necessary for people with disabilities to succeed. Students with all types of disabilities needed the support of their peers and teachers to succeed in the classroom, but blind students in particular used ICTs as a central component of their access to education.

As described earlier, blind students were required to learn ICT skills in order to be accepted into mainstream classrooms in secondary school and beyond. With limited access to modern technologies, typewriters were their main classroom tool, used to help them take notes during lectures and write assignments that were legible to teachers who could not read Braille. Audio recorders, when available, helped students capture the lecture to study for later when they could not take notes. Neither of these technologies was commonly available to other students, so access to recorded lectures and transcribed materials was a coveted enhancement. By sharing that asset with their sighted classmates, the blind students were able to create an external capability for their classmates and recruit them as friends.

Even when they did have the necessary tools to be successful, the usefulness of these tools depended on the cooperation of the teachers and fellow students. Some interviewees said teachers were unused to having blind students, or in extreme cases resented their presence, and did not create an accessible classroom environment. In these cases, sighted friends would step in to lend eyes and hands to take down text and images from the blackboard and share notes from the lecture. The necessary support, however, was neither free nor unconditional.

"The teachers don't want blind students. They write the lessons on the blackboard and forget to explain. [Now,] if I ask a question, the teacher will explain. But at first I had no notes. I had to prove myself when I came at first. Now, the other students help me." –R36

In the highly competitive school system, disabled students faced a dilemma with their friends. To justify their presence to the principals and teachers, they were required to demonstrate their worthiness to participate. One participant shared that he had been told explicitly by the school principal that if he did not score in the top of his class on every exam he would be kicked out. ICTs helped boost the students' speed of working and recall of the class material, amplifying strong determination and rigorous study skills instilled during their specialized education in primary school, enabling blind students to outperform their peers in mainstream classrooms and gain the acceptance of their teachers and school staff.

However, non-disabled students sometimes felt threatened by this high performance. A blind interviewee recounted his challenge with ICT-assisted academic success costing him the support of his classmate:

"*There are challenges with friends. Even if the blind person is doing extremely well. We are using a tape recorder in class. When the teacher is in class we record their lectures. Our performance is always good because we have the lectures direct. Whereas the other students depend on what they copy from the blackboard. So when we sit for the exams we have high performance, and the next time we ask the other students for help, they will not help."-R1*

Sharing the benefits of their assistive devices, as mentioned above, is one way to secure the friendship of other students. Leveling the technological playing field helped reduce some of the resentment sighted students felt. However, blind students still had to excel above their peers to prove their worthiness to participate in the class and to gain access to the next level of their education.

The technologies that students with disabilities used to participate in the classroom amplified the intellectual strengths of the students to a level where they could meet stringent performance requirements. They also provided leverage for creating and maintaining strong ties with classmates, by providing a capability they could share in exchange for sighted assistance. However, their unequal access to resources in the classroom also created dilemmas for their relationships with peers, fostering resentment among students without access to these amplifying devices. In the absence of peer support, the technology became of limited value.

5.2.2. Linking the social network for mobility

In addition to educational and professional advancement, part of the motivation for interviewees to expend the effort to learn and maintain ICTs was to gain, or regain, the ability to do the everyday tasks necessary to participate in life outside the home. Traveling was an especially essential activity that made it possible for PWDs to attend school, find work, and maintain vibrant social lives. Participants said that mobility would be impossible without their mobile phones. Using the ad hoc distance communication mobile phones provided, they turned their communication network into a travel assistance network.

Most Sierra Leoneans use public transportation as their sole means to travel to school and work. The country has robust urban and inter-urban public transportation systems, but their volatility, cost, and limited accessibility created issues for respondents. Mobile phones gave blind interviewees more confidence and security to use public transportation for increased mobility.

"If I get somewhere and I'm stuck, I can call someone to aid me. It increases my safety if I am alone… When I'm standing alone on the street, I call somebody nearby to rescue me if I'm alone without a guide."-R1

Before mobile phones, blind travelers had to be accompanied by a sighted companion in order to travel anywhere. Mobile, long-distance communication enabled blind travelers to arrange their distributed social network into waypoints, enabling them to get anywhere in the country without a constant guide, and expanding the flexibility and freedom to make decisions and conduct activities outside their home. For example, a blind college student recounted that his mobile phone made it possible for him to safely travel across the country to attend the university far from his home.

"I need no human guide to move from point A to point B. I call somebody at the next point to pick me up. Then I call somebody from where I come to pick me up again."-R10

Mobile phones helped reduce dependence on the availability and willingness of others to travel, especially for long distances or for extended trips. This was especially crucial because many interviewees used young family members as sighted guides when at home, usually nephews or cousins not attending school. When traveling for an extended time for school or work, they would not be able to take their young family members and would travel unaccompanied.

Technologies strengthened the internal as well as the socially provided external capabilities of participants. Technologies in the classroom, even outdated analog devices, provided a means to amplify intellectual and motivational capabilities to meet high expectations in challenging environments. ICTs also amplified the interpersonal capabilities of participants in recruiting and maintaining friends they could call on for help navigating inaccessible settings.

5.3 Overcoming dampeners on freedoms and choice

5.3.1 Expanding aspirations and self-esteem

DPOs and NGOs used the imagery of ICT use to fight against disempowering prejudices and assumptions. Sensitization campaigns with slogans such as *"blindness is not a loss of mind or reason"* were accompanied by photos of blind people typing on a computer, and *"disability is not inability"* was accompanied by narratives of disabled students excelling in higher education. Teaching computing to people with disabilities was also seen as a means to dispel disempowering attitudes, to show the public that PWDs were making a sincere effort toward gaining skills and competencies that would help them contribute to society.

Skills training programs also challenged the stereotypes that were sometimes internalized by PWDs, resulting in a diminished view of their own abilities and capacities. Two middle-aged men who recently lost his sight in a sudden disease recalled how his view of himself changed after becoming joining a local skills training program with a DPO:

"In 2008 I believed I was totally dependent on the people around me. People even want to think for you. You don't know what to eat. Now to some extent, I do what I want."-R24

"It is not really easy … Coming together is the way forward. I am encouraged by other colleagues, what they achieve through blindness. Through the lifelong blinds, I am empowered [and] through these skills, then we push."-R37

ICT training was incorporated into skills training initiatives as organizations emphases shifted to job readiness. The perception change was especially important for people who had acquired a disability later in life. Similar to Pal et al.'s [12] findings on the impact of ICTs on aspiration, exposure to ICTs coupled with examples of peers and leaders using these technologies to accomplish their goals, changed PWDs' perceptions of themselves and their abilities.

5.3.2 Enhancing business strategy and resilience

Technological enhancement of PWDs' ability to communicate and exchange information over distance, to travel easily, and to leverage external capabilities of their extended social network opened up financial opportunities they would not otherwise have.

Accurate and readily available information was crucial for interviewees' economic survival. Interviewees described their mobile phone as their primary medium for getting crucial information when they needed it. This, in turn, helped them avoid exploitation by dishonest and opportunistic suppliers.

"It gives you one of the most important information about what is going on. If your phone is around you, anything that happens you would know. Good or bad."-R17

A product salesman described how calling ahead for the prices helped him catch suppliers who tried to raise their ticket price upon noticing that he was blind. Similarly, a tailor who depended on crutches to walk recounted how thread suppliers would charge her extra for ordering colors that were out of stock knowing that it would be difficult for her to travel across town, farther from the bus route, to their competitors. The information and speed of conducting business facilitated by mobile phones helped people with disabilities overcome the disadvantages of their impairments in running a business.

Participants who operated businesses described how their phones enabled them to anticipate supply and demand, maximizing the tight margins that characterize product-oriented businesses in the informal economy.

"I use it to transact my business with customers. I sell cassettes and Nigerian films. I call customers to tell them what I have, and I use the phone to find out the stock of goods on sale. If they have it, then I go [sell] it." –R11

The speed with which cell phones allow people with disabilities to conduct business radically changed their practices and helped them to compete more readily in their respective markets. It takes time and resources to travel to markets and wholesalers to buy materials necessary for the business, especially for people traveling without companions or guides. Business owners were able to check the market price of materials for perishable inventory, allowing them to buy strategically and offer products when they would be the most profitable.

"It helps me with shopping. I used to have a small-scale business. When raw materials aren't in place, I call before I go there. So it makes me to spend less. I make soup, so when I want to [make it], I check the price of the palm oil [in the soup]." –R25

Mobile phones helped people with disabilities manage their businesses more efficiently with respect to managing resources, monitoring prices, and anticipating supply and demand.

In addition to business owners, a common and well-regarded career path for people with disabilities involved service to the community in religious or non-profit organizations. Interviewees who were community leaders drew their income from donations and stipends from grants. They used their phone to keep in contact with their membership for donations necessary for their personal support and the work of the organization.

Those who were unemployed or supported by family and friends also used their phones to keep track of the various funding sources they had access to. This was especially important for youth who lived away from home to attend

school. Using SMS-based fund exchanges also enabled them to call on friends for emergency funds and to make remote transactions instantaneously.

"When I'm seriously bankrupt, I have a few numbers I can just type. Tell the person I'm bankrupt, and have some money." –R13

In addition to supporting PWD's strategies to survive without a steady income, mobile phones enabled them to send and receive money without accessing a formal banking institution or exchanging forms of money amenable to theft. It was also a critical to the self-image of young interviewees to be perceived as financially secure and avoid reinforcing or participating in stereotypes of disabled people as beggars. Using a mobile phone for financial transactions enabled all people, not just those with impairments, to travel farther from their income sources and for longer periods of time than they could previously. For PWDs, this technology enabled them to interact in competitive business settings where they might otherwise be taken advantage of and afforded them the security to pursue aspirations and opportunities outside of their local sphere of support.

5.4 Summary of Findings

ICTs are important amplifiers of the diverse capabilities of people with disabilities. Modern and antiquated technologies were used in various settings, from formal classrooms to the informal economy to everyday life, as a means for people with disabilities to create and take advantage of opportunities in society they would otherwise be excluded from. ICTs have been appropriated by people to overcome dampeners to their participation, such as access and communication barriers, and to challenge negative attitudes and perceptions. With ICTs as amplifiers to their skills and abilities, people with disabilities in Sierra Leone have gained powerful tools to confront longstanding social inequalities.

6. IMPLICATIONS: DAMPENER-AWARE DEVELOPMENT

As the findings show, technology can be a tool for people with disabilities to amplify their capabilities and overcome dampeners on their participation in society. The examples in this study illustrate the potential of a technology-amplified capabilities approach to ICT.

The post-conflict reconstruction context constituted a "playing field" that, while still uneven for marginal populations, has also been completely rearranged. In Sierra Leone, the nationwide destabilization of existing social and institutions created a unique opportunity for PWDs to strategically advance their agenda regarding social access through accessibility and assistive technologies, which still reverberates today. The reconstruction phase of development exposed, and in some cases disrupted, deep-seated dampeners in society and the environment that impeded the autonomy and abilities of PWDs.

The concept of dampeners provides a means to conceptualize the multi-dimensional character of marginalization due to disability with respect to the impact of technologies in development. In the cases described above, people with disabilities faced unique social pressures because of their impairments, such as stigmatization and devaluation, as well as common social pressures, such as poverty and limited access of education, that were exacerbated by the additional social weight of being disabled. In the midst of these social pressures, and at times because of them, PWDs developed complementary social skills and acquired practical skills to confront and circumvent the pressures that prevented them from accessing opportunities that were available. ICTs were appropriated in an assistive capacity for those able to acquire them, amplifying their capabilities into assets they could leverage towards their goals.

A dampener-aware perspective draws attention to the peculiarities of this context of ICTD where ICT-enabled amplification supported the performative aspects of fighting against dampeners. This is most salient in the examples where PWDs were required to demonstrate their competency to those that held negative preconceptions and prejudices. In these cases, their capacity as individuals was not influenced by the technology, but rather reconfigured in the eyes of the beholder. The notion that PWDs were expected to provide demonstrations of competence has been noted in prior work, such as Pal et al's [12] findings that AT users in India and Peru reporting being required to submit to additional certifiers to vouch for their ability to work in office settings. Pal et al further notes PWDs' opportunities could also be limited to only those deemed suitable for the demonstrated competencies of their predecessors, seen in cases where PWDs were tracked into particular jobs and discouraged from pursuing others.

Our findings echo these prior findings and add ways in which technology itself was perceived and used as a certifying body in lieu of being vouched for by another person. To use two examples from the findings, students with disabilities were required to demonstrate their competency by outperforming their peers, a feat they accomplished with the amplifying powers of their classroom ICTs. In the workplace, computer programming skills were seen as something suitably rare and useful that justified PWD's inclusion in professional settings. In these cases, technology amplified the user's capabilities in a way that disrupted the attitudes that acted as social dampeners in those circumstances.

We are sensitive to the fact that there are certain dampeners that ICTs can help overcome, and some that must be addressed through other means. Social dampeners are directed forces that manifest differently in various situations and affect each individual uniquely. The cases of technology use by PWDs in Sierra Leone presented in this paper points us to those dampeners that ICTs do help

alleviate, and in turn help increase the quality of life of individuals with disabilities.

A dampener-aware perspective reveals that for PWDs, ATs play a more multi-faceted role in everyday lives than a capacity-focused perspective might reveal. Access to ATs is both a functional necessity for full participation in society, as previous work has emphasized, as well as a means to overcome socially driven impediments that still exist after physical barriers have been addressed.

7. CONCLUSION

This paper presented a study on the appropriation of technology in the livelihood strategies of people with disabilities in Sierra Leone. We found that technology was a crucial tool for combating social dampeners in everyday life and for supporting a primary goal of the UNCRPD: enabling full participation in society for people who have sight and mobility impairments. Achieving this goal requires an understanding of the context in which people with disabilities live and a nuanced account of the full range of capabilities they possess.

The implications for ICTD research and practice are that addressing social inequality should focus on identifying existing, and perhaps undervalued, capabilities that marginalized people possess. ICTs can help combat social dampeners by amplifying the skills and resources already available to people, thereby empowering them to reach their goals.

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