Marginality, Aspiration and Accessibility in ICTD

Joyojeet Pal[1], Tawfiq Ammari[1], Ramaswami Mahalingam[1], Ana Maria Huaita Alfaro[2], Meera Lakshmanan[3]

[1]University of Michigan, Ann Arbor
105 S. State St. Ann Arbor MI 41808
+1 734 764 1555
{joyojeet; tawfiqam; ramawasi @umich.edu}

[2]University College London
James Lighthill House
3 Penton Rise, London WC1X 9EN
+44 207 8376704
amhuaita@pucp.pe

[3]Independent Scholar
Flat No.G8, Esteem Classic
147/A Rajajinagar, Bangalore 56022
+91 99455 62866
meeragargi@gmail.com

ABSTRACT

We present narratives around the use of Access Technology (AT) by 176 people with vision impairments in Peru, Jordan, and India. Respondents note changes in their economic and social aspirations following access to AT, but experience multiple forms of exclusion from the public sphere due to persistent negative social attitudes disability. We argue that building theoretical frames that examine the nature of marginality is an important direction for ICTD to better understand ways in which individuals appropriate technologies, and use them to change their social environment they exist in.

Categories and Subject Descriptors

D.3.3 [Human Factors]

General Terms

Design, Human Factors

Keywords

Access Technology, Assistive Technology, India, Peru, Jordan

1. ASPIRATION

The DEV2012 sessions in Atlanta as a companion to ICTD2012 had a hotly debated topic on whether ICTs lead to an increase in human aspiration. In part, the debate was a reaction to critiques of technocentric approaches that have imagined ICT as being a vehicle of development rather than just a tool within a broader infrastructure. One of the key questions in the debate was whether individuals in the parts of the world where ICTD projects were active, were in fact aspiring for new things, and if so, whether this in itself could be considered a positive outcome.

There are several ways to consider this debate. Aspiration itself is a complex phenomenon and the idea of its expansion could range from a relational sense of self-actualization [1], a cultural sense of place and agency [2] to a consumerist sense of aspiration for goods and services [3]. The association of technology with aspiration has likewise been examined from multiple frames. Ethnographic studies of transnationalism and technology have discussed ways in which the international aspirational landscapes have informed identity formation and online activity [4, 5], management studies have looked at it from a lens of entrepreneurial aspiration in the technology industry [6]. In ICTD venues, the past few years have seen a growth of work on aspiration as an important means of viewing peoples' attitudes towards technology [7, 8] and proposed it as a means of creating a theoretical frame for ICTD as a whole [9].

ICTD assumes there is some form of marginalization – either in the physical terms of the individual user of a service or a technology artifact, or in the collective terms of an underserved community, which is so because of a systemic failure. Technology thus is an intervention to reconfigure that marginalization. The study of 'marginalized communities' as a subject of ICTD research has been a central part of much ICTD research, though the nature of marginality itself has received little attention.

At the risk of flattening a fairly complex space, we can argue that there are two generally oppositional views on the role of the technological artifact in ICTD. At one end is a set of theories that argue that with the right contextual application, technology in itself profoundly changes the ability, both of individuals and of larger collectives such as nation states, to improve socio-economic conditions [10, 11]. These theories may not necessarily propose a form of technological determinism, but they abide by the fundamental and actionable positive potential of technology, which could, and should be harnessed to reduce or eliminate the elements of marginality. We refer to these as a 'reconfigurist' body of work wherein technology is seen as having the potential to profoundly reconfigure individual and collective capacities.

On the other end of the spectrum are a group of works that suggest that technology does not have a transformative effect in the lives of people in Low and Middle Income Countries (LMICs) by itself, rather that it acts as a mere amplifier, which only works as an additional tool that is layered over the elements of social ascendancy such as one's access to social networks, education, geography etc. [12, 13]. In this view, technology is one amongst several other tools that can increase or decrease individuals' abilities to act in a complex global system. We refer to this work as an 'amplifier' perspective. Indeed there are alternative perspectives, but these two important viewpoints have played an extremely central role in shaping the discourse in ICTD. As mostly oppositional positions, these two offer interesting vantage points for the examination of aspiration and marginalization, the two key constructs in our study of access technology use among people with vision impairments.

2. MARGINALITY

In the past decade of ICTD research involving projects with human users (as opposed to work that deals with service delivery efficiencies), the question of technology and its impact on development has been tied a priori to some operationalization of marginalization relating to the subject's current condition. These have been defined through lenses of economic deprivation, gender, ethnicity, geographical separation from resources, lack of education, political exclusion, etc.

Marginalization derives from a certain set of structural relationships that impact individuals' ability to aspire, and those structural relationships serve as the primary impediments to the functional expansion of such aspiration. In a 1928 essay on marginality, urban sociologist Robert Park suggested that those who are in a marginalized social location can appropriate and integrate the marginal and dominant worldviews and create a new worldview that is creative, hybrid, innovative and empowering [14]. Over the years, the idea of marginality as a nuanced, evolving concept has undergone much examination from various disciplines that have often found it useful to examine the nature of exclusion within one population, or have turned to a growing interest in intersectionality of marginal populations, where multiple forms of marginality can act in not just as additive layers over each other, but by further problematizing the nature of exclusion.

Intersectionality theorists have argued that intersecting identities, such as race, class, gender and disability, simultaneously affect how marginalized community members negotiate their marginalized social status, and shape pathways to resilience [15] In the ICTD world, the idea of intersectionality has rarely been invoked, although in most ICTD situations, there are typically multiple, competing forms of intersectional marginality.

A useful take on marginality comes from social psychologists who find that the marginalized social location accentuates the need to construct positive self-identifies to negate stereotypes and discrimination. Participation in the public sphere in turn helps marginalized community members to construct a representation of themselves that is agentic, efficacious and challenges hegemonic representations of marginalized social identities [16]. Embodying a marginalized social identity restricts one's ability to participate in an activity or to have access to tools that have the potential to transform one's ability to reimagine their selves with possibilities for growth and accomplishment. Such "possible selves" refer to the cognitive manifestations of enduring goals, aspirations and dreams of individuals [17]. The intersections of identities and social contexts together shape the trajectories of future selves (i.e., as someone with talent with potential to be successful).

A lens on marginality is a much needed theoretical turn for understanding individuals and their "possible selves" in their participation and perception of ICTD projects. Access to technology is a means for individuals to both reimagine and negotiate their own futures. While ICTD practice and scholarship have been deeply introspective on context in recent years, we argue that there has not been adequate consideration of the intersection of marginalities, and that this has contributed to the cementing of universalizing, oppositional positions such as the 'reconfigurist' and 'amplifier' perspectives.

In this research, we examine the relationship between technology and marginality for the population of people with vision impairments in LMICs. A rich body of work in disability studies has scrutinized the nature of marginalization and exclusion in societies where 'medical models of disability' prevail in defining disability in terms of physical impairments rather than as a social construct of exclusion. [18] The resulting 'invisibility' of disability in the public sphere creates a complex intersectionality of marginalities where a discounting from popular consciousness is often made worse by additional layers of poverty, ethnic, or gender-based exclusions [19].

Our empirical case is a study of the use of Access Technology (AT) otherwise referred to as Assistive or Adaptive Technology by people with vision impairments, which we use to scrutinize the relationship of technology with aspiration in three LMICs. AT are used for access to wayfinding, computing, communications, and a range of other purposes by people with vision impairments. Without access to AT, it is impossible for persons with severe vision impairments to independently use computing tools.

Two things distinguish access to AT in LMICs – first, because of their optimization for primarily Western markets, they tend to be both expensive and inappropriately designed to handle language and network conditions. Second, because of the lack of access to AT through the institutional infrastructure, people with vision impairments often do not end up with access to AT well into their adulthood, unlike in industrialized nations where both the education system and accessibility legislation ensure that AT are made available to individuals much earlier in life.

These two factors make AT a unique case in the relationship between technology and development in LMICs. Due to the lack of narratives of the experience of disability in LMICS, the nature of marginalization caused by disability has not been adequately addressed. The condition of physical impairment in many parts of the world is accompanied both by structural impediments such as negative attitudes towards disability, channeling of people with disabilities towards certain occupations, the lack of accessibility in the public sphere, as well as particularized impediments resulting from the lack of institutions or technologies to aid the education and workplace ability of people with disabilities.

3. METHODOLOGY

Our research follows a grounded theory approach of qualitative research. We build narratives of aspiration around AT use in the three countries with a mix of qualitative and quantitative information. The three countries were selected to represent the diversity of regions in Low and Middle Income Countries (LMICs), and on the feasibility of conducting primary research. Since we restricted our work only to the population of adult AT users either actively in or near joining the workforce, we had to be strategic about partnerships that allowed us to recruit the right populations

We used two instruments – a survey with 34 questions with demographic modules and quantifiable information on individuals' places of access to technology, self-assessment of impact on independence etc. This was followed by an open-ended interview (176 surveys were conducted, 155 of those individuals were interviewed). The interview included a broad discussion of issues from childhood experiences to present-day use of technology, though our general focus was on AT and on workplace experiences. Questions for both the survey and the open ended interviews were constructed based on a small set of initial interviews with key respondents in India. The work was first started in Bangalore, India, followed by Lima, Peru and Amman, Jordan.

The three countries were selected to account for a regional variation among LMICs, as our goal is to build a narrative that can describe trends across other, similar regions. Our sampled population consists of adults with access to AT who are either in the workforce or are actively seeking employment. Identifying sizable respondents from this population represents challenges, as a result, we had to

balance between the goals of building geographical and contextual diversity and ensuring that the research was conducted at locations where we were able to identify partners and appropriate field resources. One of the initially identified sites, Sierra Leone, had to be dropped due to logistical difficulties.

The gender skew in Table 1 was in part because it was difficult to find female respondents who fit all the criteria defined in Jordan and India. Also, populations with vision impairments who can access AT tend to be comparatively better-off. Those who are extremely poor and disabled are often invisible in society.

Table 1. Respondents by gender and country

	Male	Female	Total
India	72	29	101
Jordan	17	8	25
Peru	26	24	50
	115	61	176

The quantifiable information from the surveys was overlaid with the interviews in qualitative research software to examine the key trends from the text. A typical interview ran anywhere from 15 minutes to 120 minutes. In figure 1, we have a word cloud of the key terms from the transcripts, after excluding commonly used terms. The word cloud helps us get a general feel of the kinds of the subjects covered. These subjects were then coded, a total of 3555 instances of codes were tagged in the data of 155 interviews. 100 interviews from India had an average of 18.6 nodes tagged in each interview, 30 interviews from Peru had an average of 34 nodes tagged per interview, and 25 interviews from Jordan had an average of 27 nodes tagged per interview.

The codes were grouped together to build themes. Of the various themes, we selected three around AT and social interactions, which were mainly informed by the codes noted in Table 2.

4. FINDINGS

In this section we provide narratives of the various ways in which people verbalized their relationship with AT in relation to their broader social experiences. We consider three key themes – AT and Institutions, AT and the Public Sphere, and AT and Aspiration.

In section 4.1, we examine the role of institutions in providing access to AT, and use narratives to highlight the ways in which a lack of institutional commitment or ability to provide AT in LMICs can be a setback to individual aspirations and social inclusion. We find that the lack of AT through the educational system in particular can create a dependence on civil society for access to services.

In section 4.2, we turn to the theme of AT in the Public Sphere, and focus primarily on the awareness of AT for individuals and for the social environment that they interact with. We find that limited awareness of AT can lead to a skewed perception of the potential for social and economic access for both the respondents and for their immediate social and professional spheres.

These two themes build up to the discussion of aspiration, which emerged as one of the most powerful and repeated themes in this research. Respondents frequently characterize of their interaction with AT as impacting their imagination of social and economic possibilities. Their aspirations are innately tied to structural factors in terms of artificially reduced aspirations due to lack of early access to AT (4.1), or challenges with turning aspiration into action in part due to lack of awareness of AT in the Public Sphere (4.2).

Figure 1: Word cloud of 100 most common words

Table 2. Key codes selected to inform themes in this study

Theme	Number of interviews where discussed	Number of times the code is discussed
Aspirations	115	173
Socializing	110	159
Independence	131	219
Discrimination	66	75
Problems with AT	82	109

4.1 AT and Institutions

In all three countries, but particularly in Jordan and India, we found that very few users had access to AT through institutional structures growing up. This meant that individuals with severe vision impairments grew up either spatially confined (particularly individuals living in rural areas), or had studied in segregated urban institutions. A large portion of sampled individuals noted never knowing that a blind person could use a computer until early adulthood. Several found out about AT only when they were applying for jobs either directly or through resource centers. Even in Peru, where the sampled individuals were comparatively more aware of AT at younger ages, the distinctions between AT awareness of urban and rural populations were evident.

> As soon as the parents get to know that the child is VI or cannot see, they just dump them into a hostel. It is not that they don't want to take care of the kid; it is just that they are not aware, our child should be brought to the main stream he should be put to a normal school and he should study with integrated like. They spend most of the time with the blind people in the hostel. It is like behind four walls like.
>
> *Respondent 50, India*

> I was introduced to computers during my PUC. But even there, though I could grasp the theory part of the curriculum, I could not practically handle the computers as there was no AT to support and I did not have knowledge...After I joined the computer course and started realizing that I can be on my own, I wanted to work in HR Department with technology support. And to a great extent, I can say that my

wish has been fulfilled. Using JAWS along with magnifier and the Magic software, things became easy and I became confident.

<div align="right">*Respondent 17, India*</div>

In India, there are multiple layers of exclusion. Culturally practiced exclusion and segregation of blind people typically led to the creation of separate institutions and a circumscribing of knowledge flows to the domain of those institutions. Thus, with the diminished capacity of such institutions to provide AT, individuals could (and still do) go through primary and secondary schooling without access to or even knowledge of AT. Such exclusion continued into the high school / college environment, where individuals were introduced to the general idea of AT, but not allowed functional access. Such marginalization typically manifests itself first with the restriction of employment and education options.

When I gave in to the fact that as a VI I cannot do much, I contended myself with studying English, which I did.

<div align="right">*Respondent 9, Jordan*</div>

For several Jordanian respondents, the truncation of aspiration and the consequent channeling to careers considered apt for people with vision impairments began early in life. An important part of this disaffection was the lack of access to AT training from in the education system.

Now, I want to be a bank employee. I mean to tell you the truth, I do not know why we cannot do it. It is all on the computer. But to tell you the truth, I think the most important thing at this point is to root the AT in education at lower levels so that when we reach the 10th grade, we can easily take part in the class through the computer.

<div align="right">*Respondent 18, Jordan*</div>

Even in Peru, where there was slightly better access to AT through institutional sources, there were geographical elements of exclusion. The localization of AT services to urban areas is also seen in various parts of the global North, but it is particularly true in LMICs, where functional access to AT, in particular things like technical support, higher education support, or a community of users can be hard to find outside of a major metropolitan area.

I would have liked to have this technology when I was at university, or during secondary school. During the Service in Cusco, I would have also wanted to have accessibility to information because in Cusco I learned many things and the experience was very useful for me but there wasn't accessibility to information because I didn't have the technology in that moment to do it.

<div align="right">*Respondent 22, Peru*</div>

This geographical exclusion is one of the reasons why ICTD research with people with vision impairments in LMICs is extremely challenging, as the population is virtually invisible due to exclusion from services. Basic knowledge and awareness of AT can be entirely lacking in rural areas, for individuals and their institutions alike.

I come from a rural background; through some of the friends who had moved to city, I came to know that even VI can use computers with the help of a talking button. I did not know that there was software for this; I was very curious to know about this. My parents also encouraged me to go the nearby town to

study and get introduced to computers. So I completed my 12th grade and moved to Chennai to join a college. While attending the college, I actually started to operate computers with AT.

<div align="right">*Respondent 63, India*</div>

(I learnt) even visually challenged can also lean computer and do something, that time I was in 7th or 8th standard, we were also dreaming about it, when I came to 9, 10th standard, once I get out of the school, I thought that I also should join some computer course, simultaneously I should learn computer with my studies. So once I completed my studies I can hope for some job.

<div align="right">*Respondent 84, India*</div>

This exclusion of access to AT led to a diminished sense of aspiration, wherein respondents referred to a growing up experience in which the idea of long-term economic and social dependence on a sighted person was often taken as the norm. An increased sense of independence was the single most important theme (219 nodes) and it emerged powerfully as a contrasting item to the educational experience, which frequently emerged as negative, primarily due to the lack of the tools required to deal with the learning material.

There was no accessibility whatsoever, there would be some volunteers and some people who were paid in order to record the books on cassettes. Some of these cassettes where 36-hrs long. Then, the real problem comes when there is a test. They will bring someone to write for you. This guy most probably knows very little about anything and in many cases, does not know basic spelling etc., you will have to enunciate the words and tell him how to write them, sometimes, they would start asking if you need a lot more time to finish up which was an additional pressure.

<div align="right">*Respondent 5, Jordan*</div>

I had to copy the books, I had to copy the offprints, there was nothing. Thus, between studying and copying, I spent my time copying.

<div align="right">*Respondent 5, Peru*</div>

But I did the M.Sc. Bioinformatics course; but it took me several years to complete the 2 years course; because there was no facility: no eBooks, no Assistive technology.

<div align="right">*Respondent 74, India*</div>

These difficulties in negotiating an entrenched system without access to technology serve as the starting point of our discussion on the role of AT in aspiration. AT let people envision themselves as capable of more than what their social experiences thus far had led them to believe. The prior lack of AT had thus created an altered state of normalcy, wherein some form of dependence was routine. The lack of appropriate facilities suggests a long term disadvantage caused by the lost time in negotiating materials designed for sighted users, and dependencies in a system that does not let print-impaired individuals self-pace their learning.

The lack of appropriate institutional sources for training and access to AT are apparent in the data from our survey which shows that in all the three countries, civil society played a key, often more important role than state managed institutions (such as public libraries, schools) in getting people access to AT.

Table 3. Getting AT access through DPO/NGO by country

	Got AT through DPO/NGO	No AT through DPO/NGO	Got AT through Govt.	No AT through Govt.
India	88	13	5	96
Jordan	9	15	16	8
Peru	46	4	14	36
	143	32	35	140

Pearson chi sq significant at 99% (missing excluded)

Table 3 is indicative of how state assistance differs in the three countries. In India and Peru, civil society organizations (CSOs) clearly play a very significant role in the delivery of AT training and services (to people with disabilities broadly), whereas in Jordan, the government still plays the lead role. However, one gap with this data is that we do not know how many of the CSOs that provided AT training had received state funding of any kind. We also tried to understand if individuals' economic status impacted the sources of AT training. We find here that people who are relatively poorer tend to rely more heavily on DPOs for their first training in AT.

It is relevant here that people with medium-high wealth coefficients tend to receive services from multiple sources – both state and civil society. In contrast, the relatively poorer individuals tend to gain access almost entirely from civil society.

Table 4. Economic status / getting assistance from DPO/NGO

	Got AT through DPO/NGO	No AT through DPO/NGO	Got AT through Govt.	No AT through Govt.
Medium-High wealth coefficient	79	28	32	75
Low wealth coefficient	63	4	3	64
No Wealth Data	1	0	0	1
	143	32	35	140

4.2 AT in the Public Sphere

A critical part of the marginality of individuals with severe vision impairments was the lack of knowledge about AT both for them and for those around them – including their social and economic circles. We found that individuals with congenital or early vision loss, who were at some point connected to institution providing services for people with disabilities were a lot more likely to be familiar with AT, even when they were unable for economic reasons to access such AT. On the other hand, people who acquired vision loss later in life often spent a significant part of their early years of vision loss without any knowledge of AT options.

When I lost sight I did not know that screen readers existed. It was 10 long years when I came to know about the screen reader software…Though I was staying in a well-developed area i.e. defence area in Bangalore and I was surrounded by highly educated people, but even then, I remained at home for 10 years without knowing that I could be independent. But I feel even now the situation is the same;

whenever people see me carrying a laptop or working on the computers, they ask what is that I am doing with a computer when I can't see.

Respondent 60, India

The lack of knowledge is an important indicator of how segregated the experience of disability can be in LMICs. There was little awareness of AT in the public sphere, and by public sphere we refer both to the popular media, and to the more intangible general public consciousness. More importantly, we find that people with disabilities were deeply segregated., There was so little discussion of disability in the public sphere that there was little, if any, social contact over the issue of a disability.

An important indicator of this is how the individuals who experienced acquiring a disability found that they were completely disconnected from any networks of services. Four out of five female respondents from India who reported sudden loss of vision reported a reversal of the initial depression caused by loss of vision only after access to AT. Of these four, two were at home for over five years before they ever found out about AT. While the female respondents talked of their families being worried about letting them out independently as a major reason why they were unable to find out more about technology or other options for economic and social participation. The same was also true for the most part with male respondents, who likewise report prolonged periods of uncertainty and isolation in case of sudden vision loss.

I was not having any goals or aims to achieve anything; I was blank in my mind. Because I do not know what VI people can do; what work they will be able to get; but during the course which took one year to complete, I came to know about the work VI were able to perform; I also realized that blinds were getting a lot of job opportunities because they were learning to work on the computer and were using technology in a variety of ways; so I also started thinking about getting a job.

Respondent 61, India

The lack of AT knowledge a priori not only changes individuals' sense of what is achievable, but creates a sense of social burden in institutional settings. Several of the respondents in all three countries reported issue dealing with the daily functions of being in an educational institution. Individuals frequently had to change their preferred subjects of study because their educational institutions did not support what they wanted to do. Late awareness of AT meant that individuals had already 'missed the boat' on starting work in some area of study, something they could never go back to.

When I was in school, I did not know about AT; otherwise I could have tried to do my studies with the help of AT. When I realized that I cannot go on with my choice (of subject of study), I had to choose arts out of compulsion. But my passion died. I felt a vacuum. I joined a "boys only" college and somehow completed 5 years of college to get my degree. I wanted to avoid a lot of embarrassment; hence I joined the boys' college. As I could not get the choice of my studies, I just finished the degree without any plan or aspiration.

Respondent 17, India

The lack of broader awareness of AT has consequences at various levels, sand often builds on existing cultural conceptions of disability in the same frame as charity or economic dependence.

On one hand, respondents from all three countries talked about the ways in which neighbours, friends, even complete strangers reacted with wonder and awe on watching a blind person use a computer. The deeper consequence of this lack of awareness, however, is that the social circles (and society at large) have a restricted imagination of what is within the aspirational province of a blind person.

> *When we were young and wanted to study, people around us used to ask why we should study any course; anyway we are going to run only telephone booths; for which minimum education is enough; simply why you are wasting your resources...Even when I wanted to write the competitive exams, many of my relatives discouraged me; they were asking why should I write such exams; they never think that even we have goals in our life; ...in IBM I was working as a procurement specialist; here I learnt what is procurement; as we are buyers, what are the things I should look into while buying things; how to prepare purchase orders; how to compare prices; whom to consult. Right now I am working as a clerk in the bank. Within 5 years, I want to see myself as an IT officer. Within 10 or 15 years, I want to become the manager of the information technology wing.*
>
> *Respondent 47, India*

Thus, a job interview was inevitably a huge hurdle. Respondents in all locations reported workplaces as being unaware of what kinds of use a blind person can put to a computer. Peruvian respondents talked about getting formal certification from well-known certifiers since they offered 'proof' that an individual could perform technical tasks. While the first challenge with labor participation is the foot through the door, the subsequent challenge is investment into AT. Companies frequently flatly refused to invest in AT, or used that as a reason for not being able to invest in a blind employee.

> *When I entered the institution, the period of crisis and austerity was starting and as it is a state entity, they wouldn't have bought it. In that time my program cost around 1200 dollars. I know the price now is much lower, you can find it in 600 dollars an original version but in that time that was the price. So I had to buy it because the institution was not going to give it to me, impossible....*
>
> *Respondent 2, Peru*

> *The informatics guy came here and deleted all my screen readers because they said that as we don't have licenses, they didn't want me to have it, so they deleted it. So I said "how am I going to work", "that's not my problem" he said, "I can install NVDA", but the NVDA is terrible because it's free it's a terrible version.*
>
> *Respondent 3, Peru*

> *I had to tell them that we can work with Jaws and I had to show how it is possible for us to work on computer; though they are working in the field of disability, they do not have much awareness of the needs of the disabled; I gave a lot of demos to convince them that we can work on the computer... I was on employment only on contract and that contract was only for 4 months. They were of the*

> *opinion that as JAWS is quite costly; they can't waste the same on a temporary contractual employee.*
>
> *Respondent 35, India*

In places where firms refuse to pay for a licensed version of AT software, the individual typically has to use a demo version of the software, which runs for 40 minutes before a forced system restart. It is surprising how many employees do this on a regular basis and adjust to working in 40-minute chunks. The employers thus are not just unaware of the full value of AT, but come to fundamentally devalue the individual at the workplace. The long-term impact of productivity loss of the employee from having to restart a machine over and over would probably cost a fraction of purchasing a licensed version of the software. The number of firms and individuals that accept this status quo, in which a blind employee is perpetually unable to be their entire productive self indicates the attitudes of employers in hiring individuals with disabilities. It also serves as a haunting reminder of how little an employee may be forced to settle for.

4.3 AT and Aspiration

The complex relationship of marginality with aspiration has been examined at various points in the ICTD literature, and it is here that one of our major contributions is located. We find that people report their aspirations as greatly increased by access to AT, but we also find that individuals had great variance in their experience with, or estimation of, the functional viability of those aspirations. The immediate reaction to learning AT was frequently one of much excitement. This is not entirely unique in the ICTD world – research has found similar narratives of surprise and enthusiasm from individuals at being able to use technologies they imagined were out of the realm of possibility with others they shared homophily with such as their social peers or relatives [8].

In the case of people with vision impairments, this is a particularly salient point, since it speaks to the idea of "possible selves" in marginality. 47 of the interviews conducted discussed some element of their own education or work options being engineered towards certain directions in early years – these included massage therapy, telephone operation, or front desk management. The elements of viewing disability from the perspective of pity or charity were also fairly prevalent in all three countries, and respondents were deeply aware of social attitudes towards disability. AT was thus perceived as a tool that furthered one's potential to reimagine oneself in terms of a place and relationship with society.

> *I just showed it to my friend, he is right now is a lawyer; so when I showed it to him he was totally dumbfounded. So what I mean to say there was no reaction at all means for a minute or so they were not able to speak a word because they could not believe their eyes. And then slowly questions started rising up. How to use the computer, how to use the cell and how do you understand things. The reaction was very thrilling.*
>
> *Respondent 49, India*

> *In the year 2003, one of my friends introduced me to computer with the help of AT – JAWS. I was so thrilled that I put in lot of efforts and learnt it very well. I was able to do all that a normal person was doing on the computer and I felt very happy about it. I was so proud of myself. With this knowledge, my aspirations turned to getting a job with IT knowledge or generate money with the help of computers.*
>
> *Respondent 19, India*

It allows me to develop independently in my post, to collect information, to pass on information, to prepare my documents...it has given me more tools to be able to aspire to better situations using these tools to strengthen my capacities, my knowledge, to strengthen my interpersonal and institutional relationships

Respondent 3, Peru

The most common theme of aspiration was frequently in the career realm, typically changes around workplace options. For one, we found in India particularly, that there was a gravitation towards a few firms that had developed reputations as employing persons with vision impairments. Cases of aspirations being oriented towards a specific firm or set of firms are typical for geographies with limited industrial options, and for other excluded groups – we find cases in systemic exclusion of women or racial groups like African Americans in the United States [20]. Akin to the African American refrain of "There's always work at the post office", a theme we observe in this data is the desire to "work at an MNC."

Almost a fifth of the respondents from India—19 in all—mentioned working at MNCs as an important aspiration either for themselves or for others with vision impairments. The foreignness of the MNC thus becomes an important element of the aspirational frame, since it represents an international ethic of inclusion, separated from the relatively static local attitudes towards workplace accessibility. That these firms are typically in the technology sector (particularly in and around Bangalore, where the majority of this work took place) adds an important layer to the discourse of technology being an element of dramatic change for the lives of people with vision impairments. Particularly in India, we find that even individuals with a general proficiency in computing would discuss the desire to work specifically in technology.

Previously, I wanted to become a lawyer. But after getting exposed to computers, I want to become software developer. When I was informed that even blind people can use computers, I was very curious to know about it. Immediately I went and learnt the basics and then I became crazy about computers. Now I want to do something with the computers only.

Respondent 96, India

The key to increased aspiration starts with the increased sense of independence that people with AT report.[1] An important part of this independence is the movement to being an information seeker from an information receiver – the reliance on others to make phone calls, on waiting for periodic broadcasts on the news, readers for all sorts of materials from the news to official business, the ability to approach people and start conversations rather than being restricted in circles to those that approached them, were among the various elements of independence that respondents discussed. All of these contribute to expanded privacy with transactions and control over one's own affairs, which in turn help build a sense of agency in social and economic transactions. This sense of agency plays an important role in emphasizing the ability to live independently, not only for the individual, but also to household members, whose encouragement (or even permission) is critical in this equation.

Now they have realized that I need to be on my own and the AT has played a very big role in my life. I have come out of my home for the first time to learn

---

[1] At least two respondents felt that AT did not change their aspirations, they felt it strengthened their aspirations (J21, P4)

the AT and get trained in computers so that I can get a job. So AT has played a very great role in my life.

Respondent 42, India

In our survey, we asked individuals to rank on a Likert scale the role of AT in increasing or decreasing their sense of independence, and self-reported results are telling. Except for one person who said that their sense of independence was neither increased nor decreased, everyone felt that their sense of independence was increased or greatly increased. Among female respondents, the sense of independence increase was extremely high, with 60 of 61 respondents noting that that their independence was highly increased by access to AT. 163 of the total 176 respondents rated AT as having significantly increased their sense of independence.

Besides the information benefits of opening up access to information (estimates show that less than 5% of all published material makes it to accessible formats), there is an additional problem of the speed at which other formats such as Braille or cassettes can be accessed. AT creates important conveniences, which in turn increase the amount of time and ability to focus on and complete tasks. This directly impacts an individual's productivity and sense of what they are able to achieve in the time they have access to.

If we have to pursue higher education, we need to read and refer a lot of printed materials; such materials and books are not available in Braille. So we have to go to 4-5 readers' homes to get them read to us; we have to find any reading centers for this purpose; we need to be highly mobile for going to such places; if we are not mobile, then again we can't reach these places; while doing so, we lose out on time; if we get two hours of reading time, we have to spend another two hours for commuting;

Respondent 62, India

This increase in access to the conveniences that non-disabled populations tend to take for granted are an important part of individuals' aspirational frame. In a situation where one is completely dependent on individual or institutional sources for information, one needs to be cautious, often strategic on how much of a resource can be counted upon – how often can one person be approached to spend time as a reader? How many new books will be available in accessible formats? This preoccupation with the mundane, can be an important impediment to the 'capacity to aspire' particularly since it goes hand in hand with so many other forms of structurally enforced dependencies. The institutionalization of people with disabilities is one of the primary ways in which this happens.

I went blind and for me, the world was over, and this is because when you grow up in a boarding school, that's your world. Also when I went with my family, I stayed at home and my world stopped there... I learned how to use Windows, Internet, I learned how to use Word and all that. There I even felt important, to be able to write a document, to be able to send it via e-mail, to send messages to my friends or to any other person that I might need to contact, to receive messages, read these by myself, to be able to reply... For me that was great, there was nothing else in the world, I had won the world with that.

Respondent 5, Peru

5. DISCUSSION

The narratives thus far help us understand how institutional and public sphere acceptance of AT, and how attitudes towards disability more broadly, in turn impact individuals' sense of aspiration. These narratives tell us that that there is in fact a very clear and important role of AT on aspiration, particularly through reinforcing the possibility for independent living. We can further infer that these three countries are fairly representative of other LMICs, where the rights of persons with disabilities are not strongly encoded, and where access to AT is severely inhibited by either cost or lack of appropriate access.

We argue here that to answer the question of whether technology leads to greater aspiration, which is both at the heart of this paper and a critical question in ICTD circles, we need to understand the nature of marginality. In this paper – the examination of institutions and of the public sphere in sections 4.1 and 4.2 respectively are meant to paint a picture of the nature of marginality for persons with severe vision impairments. We propose that there is clearly a relationship between AT and Aspiration, but that this relationship is also because of the fundamental nature of marginality that the experience of sensory disability presents in this case.

ICTD projects in the last decade have typically focused either on service delivery or on some form of human action for marginal populations. These marginalities have been defined in terms of geography, economic deprivation, educational attainment, and gender, among others. Each form of marginality comes with an accompanying structure of social exclusion that the technological intervention seeks to circumvent – thus when a farm laborer is introduced to technological means of learning crop prices, there are questions over whether he or she has the ability to actually act on that information, likewise when a child in a poor rural family is given a computer, the question becomes whether the school has the ability to support the learning that goes with the technological device – and so on.

It is here that the idea of the "possible selves" from social psychology is a useful lens for ICTD. The reconfigurist position on ICTD has always been that there are fundamental means of impacting these marginalities through technology, and the implicit argument thus has been that the technology, per se, is neutral and unlike the social structures that inhibit the marginal population's ability to progress.

The amplifier position on the other hand makes the case that the tool is non-neutral, and that the small farmer's or school child's existing ability, as an individual or social group, is fundamental to the value of the tool. From this perspective, it would seem that the "possible self" is secondary to the magnification ability, i.e. the potential of reaching a so-defined higher state.

The narratives of the respondents here support and contradict both positions in important ways, and at the same time indicate why a clearer understanding of the nature of marginality, and the intersection of various forms of being marginal are critical in understanding the role of technology in development. By beginning to participate in the culture of tool use, our participants were able to see themselves as creative and innovative users of technology. This self-perception, as well as the direct benefits of the technologies, played a defining role in the reconstitution of their aspirations.

5.1 The Reconfigurer

We started looking at the data from the lens of whether what we see is simply technology amplifying existing abilities. An important insight into this question comes from a respondent from India who did not discover AT till she was 29:

I got so crazy in the first month (of discovering JAWS); I read 24 books in thirty days. That means out of the 24 hours, 20 hours I was reading. Absolutely, I use to eat food with the head phone because I always thought, I have seen people read and I really wanted to read, so I just said how I am going to do it? So what I did is once I got my hands on it, I just want to grab all of it.

Respondent 97, India

It is clear from several of the responses here that AT has been much more than a technology that has simply created some conveniences. It has fundamentally reshaped peoples' lives. The lack of AT forms a first order barrier that is uniquely different from, for instance, the lack of crop information for farmers, or the lack of computers in rural schools. To compare the respondents here with these two groups, we must ask: does the AT alone make a significant difference, without the stars aligning on the other factors – such as access to human networks, educational attainment, geographical proximity etc? At the risk of sounding extreme and dismissive of these other factors, we reiterate the voice of our respondents in claiming that this is much more true for AT users than has been the experience of a number of other marginal populations that have received access to technology in past ICTD work.

I think that if I hadn't learned and if screen readers didn't exist, I believe I wouldn't have been able to accomplish any of the things I have now, neither be thinking about being successful in the future... because reading books, entering to a website, browsing on the internet, these all open many doors and also give you a lot of knowledge. This is with the support of screen readers because it's the only way we can access information.

Respondent 15, Peru

As this very research shows, the culture of inclusivity in society, accessible materials, workplace accommodation, social attitudes towards accessibility are all critical pieces. However to simply call AT another tool that magnifies individuals' ability underestimates the centrality of the artifact itself and its role as a mediator between the individual and society that is fundamentally digital.

Absolutely (necessary)! Without AT, persons with disability will feel subhuman! At least when dealing with the computer, then you do not feel that you are blind.

Respondent 6, Jordan

The statement above from Jordan suggests the ability of AT alone to create a different world for the user, one which is separated from the visceral space of exclusion, which is repeatedly referred to in the interviews. Given the nature of engagement in both social and economic means in all three countries, being behind a computer gave the individuals a space for engagement where abilities and aspirations were not mediated by the social visibility of disability.

In India, for instance, a number of interviewees talked about being trained for building cane baskets or candles, until they chanced upon some non-profit that offered screen reader training and access. Likewise in Jordan, a number of respondents talked about an unspoken 'standard' of desk jobs with no responsibilities in government offices for blind people. For people from such sets of experiences, AT created a new form of agency that not only increased their ability to choose options for themselves, but also reframed their sense of place. A key example of such self-

actualization comes from the experience of a respondent who is one of the few blind system administrators in India.

(when stenography became obsolete) the emotional issue was that we were sitting idle for nearly 2 years; at that time many people thought that I am drawing the salary without doing any work; I was perceived to be a liability for the company; they were talking that as there is no work which can be allotted to me; when the computers were introduced, there was a lot of doubt that whether we can work with such computers; they also thought that getting the screen reading software is quite expensive and should it be bought at all? So we are forced to work with the demo version of the JAWS ; every 40 minutes, we reboot the system; initially we were doing it; but there arose a problem – all the computers were connected in a network; most of the persons were using the computers to get some data, or doing some job over the system; so at that time, we were not able to shut down the system; during such intervals, we used the narrator; wait for some time to shut down the system; it was a very difficult situation. (but now) In the whole of insurance industry I am the first person to get transitioned from stenographer into a sys admin.

Respondent 59, India

In this narrative, we find multiple relevant themes. The issue of employment engineering, of channeling individuals towards specific occupations is a very important problem that AT interacts with. As with respondent 59 above, individuals with vision impairments, particularly in India and Peru, were employed in front desk and stenography operations. These jobs mostly vanished in the mid-2000s, and in several cases, AT helped create a pathway for transition. For respondent 59, this transition was extremely difficult because of the lack of awareness or appreciation of AT in the firm, but the eventual outcome was a more fulfilling career.

Thus the initial experience of not having access to appropriate work options goes through a dramatic transformation following access to technology. Indeed, the majority of stories of AT users represent some incremental workplace progress over the past, but we do find cases from all the countries of individuals who successfully changed to technology careers.

Well, at the beginning, I just wanted to be able to use the computer like everyone else. Then when I did, I basically had a lot of free time on my hands. I started teaching myself basic coding skills. Then, I got adventurous with HW, changing HW, upgrading certain parts of the computer, assembling computers on my own etc, many adventurous things in that regard until I got to where I am now (an engineer)

Respondent 21, Jordan

The most important case for a reconfiguration of relationships caused by AT comes from the inter-generational distinctions between job seekers. One clear theme through all three countries seems that acceptance with status quo on a job market is rapidly changing. In the words of respondent 58, a population that is much more aware of its workplace potential with AT cannot be made to accept employment channeling for long.

The people belonging to the older age group, for convenience sake let's call them 'above 40' have more or less settled for jobs like telephone operators more so because that was the only job open to them

15 – 20 years back. They are happy with their jobs and are not complaining as their life has now taken on a comfortable pattern. The younger or below 40 group, is more enthusiastic and looks at breaking challenges. This group does not and will not settle for a telephone operator's job as they believe that they have the potential to achieve more.

Respondent 58, India

5.2 The Amplifier

For most of the so-called normal people, a VI colleague is some kind of an enigma. They value all the work that a VI colleague does as a great achievement and this leads to seclusion. Even small things like dressing well, creating error free documents, dialing a number correctly… while people are overawed at the fact that a VI person has to beat the odds to work at their workplace, people don't really think that the VI person can do any credible work. They are overawed by AT and what technology can and cannot do, it is hardly about what you as a person can or cannot do.

Respondent 58, India

The idea of technology being a small part of a larger ecosystem of relationships is not new, though the idea of technology as being simply an amplifier of human intent and capability has become an important lens for viewing ICTD projects. The quote (58) above is a powerful statement on attributing improvements on technology than on human endeavor. Such a position in fact further contributes to the notion of attributing the advancement of people with disabilities to factors extraneous to their own capabilities. An amplifier lens in this scenario is an important and potentially empowering lens to view the role of technology.

You can have all the tech you want, but people think still that a VI should remain a "blind" person working and living in a mosque...I had to put a lot of work into making them believe in me. This is something you, as a VI have to do on your own. People generally do not believe in us. They do not see us as equals. (when I was looking for a job) I would prepare a short CV after I graduated from High School. I would be thrown out of some places by the security. There are others who would give me money as though I am a beggar. He only looks at me as though I am someone in need and a conduit to get to heaven.

Respondent 18, Jordan

The statement (18) from Jordan is one among many in in which respondents report being expected to act like blind people. The technology thus, for all its affordances, meant little to the workplace the individual tries to enter. We find for instance that a number of CSOs in India have started programs in which a visitor will be blindfolded to get an awareness of the experience of vision impairment. While such simulations are problematic for a range of reasons, CSOs feel that the lack of awareness of disability in firms requires them to employ a range of means to get their disabled clients jobs. Some CSOs go so far as assure employers that an AT-using employee can perform, by offering mentorship programs wherein a technical assistant will come in to "fix" issues. Such third-party reaffirmation of one's ability to work would be demeaning to most job-seekers, among the rare places where such practices exist are employee assurances for former convicts in rehabilitation. With the

prevalence of such workplace attitudes, willingness to accept lesser work than one's capabilities is extremely high.

> *At least I am working on the phone. Many VI's are just coming, placing themselves on the seat and going back. Yeah and if you report this to the management they just say please just take your payment and walk out. I am happy with my job because it has given me all the materialistic comforts. It is giving me the payment. I mean it has given me these coupons where I can step down to any high funds restaurant and eat free of cost. Yeah all that is there, material comfort everything is there. But somewhere in the back of my mind I still have that feeling that you know I couldn't do what I wanted to do*

> *Respondent 50, India*

> *I can live with this situation; I can get over it. But I am handicapped by a society that thinks I am incapable of doing anything. They think that, as a VI, I am incapable of doing anything.*

> *Respondent 19, Jordan*

The extent of othering in all three countries was such that the technology artifact in itself served only a small purpose in functional access to the workplace that exists within a broader social system of exclusion. The enthusiastic potential we see in the reconfiguring of aspiration and relationships is tempered by the ways society in general and the workplace specifically have not embraced a culture of accessibility. In such a scenario, an amplifier perspective is, in fact, a very valuable counterpoint to imagining how technology plays a game-changing reconfigurist role.

> *Whatever letter they write, they will mention as "Mr. Ram Kumar (blind)" In every communication, they make it a point. Even if it is not related with my disability also, the college will mention my name in this manner only .....I received a letter from the Director of Technical education a confidential letter for preparing a question paper in one of my subject; Principal replied to this letter that "Confidential letter is delivered to Ram Kumar (Blind) for preparing the question paper." Then the Director notices that and asks "oh is he blind?"*

> *Respondent 54, India*

6. CONCLUSION

> *I hail from a village where female infanticide is prevalent; so when I was born that too without vision, all my relatives advised my parents to do away with me*

> *Respondent 61, India*

The goal of this paper is to emphasize the voice of the respondents who contribute to this work, while framing it within the key theoretical perspectives dominant in recent ICTD work. While we find benefits in both the reconfigurist and amplifier perspectives to framing the use of AT, narratives such as 61 above remind us of the critical intersections of marginality that individuals with disabilities encounter at various social locations.

The qualitative analyses of the narratives show that social locations and intersections play a constituent role in the narratives of aspirations. The limited institutional commitment in providing access to the necessary technological tools and the poor awareness of AT in the public sphere present a chicken-and-egg impediment

to greater economic and social inclusion. By beginning to participate in the culture of tool use, our participants were able to see themselves as creative and innovative users of technology. This self-perception, as well as the direct benefits of the technologies, played a defining role in the reconstitution of their aspirations. The social marginality framework helps us draw a picture of how aspirations are reconfigured in the imagining of possible selves at the intersections of gender, class and culture. But a contextual examination of the ground realities through an amplification lens also shows us the challenges of translating of the affordances of AT to practice.

AT for people with disabilities provides an important case for using a marginality framework when examining a project from either a reconfigurist or amplifier position. Indeed AT users are somewhat unique in that the lack of technology acts as an artificial barrier from information access in addition to other social barriers of exclusion that may perhaps be more generalizable across ICTD projects such as technology for learners in impoverished villages, or for health management etc. However, unpacking the nature of marginality helps us understand what elements of reconfiguration of relationships can be expected from the access to technology, and where the nature of existing social relations are likely to act as critical barriers.

It is here that aspiration is a critical piece in ICTD. When we examine the nature of marginality, we can first understand whether the individual imagines such benefits (that the ICT offers) as within her scope of aspiration, and then understand whether the society she inhabits imagines this aspiration as within the scope of her potential. The expressions of aspiration by respondents in our study clearly indicate that there is in fact a place for reconfiguration, whereas dismay with structural barriers suggests the areas where an amplification lens helps us understand what technology cannot do.

> *When I sit in the bank and work, customers who come to the bank realize that the VI can work on the system seeing me; they go and spread this information in their neighborhood*

> *Respondent 74, India*

In the words of one of our respondents, even when AT did not do all that it promised for the individual, it was playing a showcasing role. Technology did create small wonders.

7. REFERENCES

[1] Maslow, A.H., R. Frager, and J. Fadiman, Motivation and personality. Vol. 2. 1970: Harper & Row New York.

[2] Appadurai, A., The capacity to aspire: Culture and the terms of recognition. Culture and public action, 2004: p. 59-84.

[3] Thorelli, H.B. and G.D. Sentell, Consumer emancipation and economic development: The case of Thailand. 1982: Jai Press.

[4] Burrell, J. and K. Anderson, I have great desires to look beyond my world': trajectories of information and communication technology use among Ghanaians living abroad. New Media & Society, 2008. 10(2): p. 203-224.

[5] Shklovski, I., et al. Transnational Times: Locality, globality and mobility in technology design and use. in Proceedings of the 12th ACM international conference adjunct papers on Ubiquitous computing-Adjunct. 2010. ACM.

[6] Liao, J. and H. Welsch, Social capital and entrepreneurial growth aspiration: a comparison of technology-and non-technology-based nascent entrepreneurs. The Journal of high technology management research, 2003. 14(1)

[7]   Rangaswamy, N. and E. Cutrell. Anthropology, development and ICTs: slums, youth and the mobile internet in urban India. ICTD2012. ACM.

[8]   Pal, J., The machine to aspire to: The computer in rural south India. First Monday, 2012. 17(2-6).

[9]   Ray, I. and R. Kuriyan. Towards aspiration as a development indicator: the case of information and communication technologies.ICTD2010. ACM.

[10]   Brewer, E., et al., The case for technology in developing regions. Computer, 2005. 38(6): p. 25-38.

[11]   Parikh, T.S. and E.D. Lazowska. Designing an architecture for delivering mobile information services to the rural developing world. in Proceedings of the 15th international conference on World Wide Web. 2006. ACM.

[12]   Toyama, K. Technology as amplifier in international development. in Proceedings of the 2011 iConference. 2011.

[13]   Gandhi, R., et al. Digital green: Participatory video for agricultural extension. ICTD 2007. ACM

[14]   Park, R.E., Human migration and the marginal man. American journal of sociology, 1928: p. 881-893.

[15]   Crenshaw, K., Mapping the margins: Intersectionality, identity politics, and violence against women of color. Stanford law review, 1991: p. 1241-1299.

[16]   Mahalingam, R., Culture, power and psychology of marginality. Contesting stereotypes and creating identities: Social categories, social identities, and educational participation, 2007: p. 42-65.

[17]   Markus, H. and P. Nurius, Possible selves. American psychologist, 1986. 41(9): p. 954-969.

[18]   DePauw, K.P., The (1n) Visibility of DisAbility: Cultural Contexts and "Sporting Bodies". Quest, 1997. 49(4)

[19]   Warner, D.F. and T.H. Brown, Understanding how race/ethnicity and gender define age-trajectories of disability: An intersectionality approach. Social Science & Medicine, 2011. 72(8): p. 1236-1248.

[20]   Rubio, P.F., "There's Always Work at the Post Office": African Americans Fight for Jobs, Justice, and Equality at the United States Post Office, 1940--1971. 2006. UNC Press