

# **Innovations for Independent Living among People with Disabilities in India**

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A study conducted for LIRNEasia by VIHARA



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# Credits

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## INNOVATIONS FOR INDEPENDENT LIVING AMONG PEOPLE WITH DISABILITIES IN INDIA

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# Contents

## Preface

## Process Flow Overview

### 01 Research Process

- Method of data gathering
- Description of field geographies

### 02 Independent Living for People with Disabilities

- Why independent living ?

### 03 Disability in India

- Disability rights in India
- Measuring disability in India

### 04 Operational Concepts

- How do we understand independent living?
- How do we understand ICT, AT, and ICT as AT?
- How do we understand disability?
  - people with speech and hearing impairments
  - people with visual impairments
  - people with locomotor impairments
- Notions of Independent Living

### 05 Insights

- The multiple barriers of transport ecosystems
- 'Illiterate' accounts and the denial of essential services
- Create opportunities by creating possibilities
- Information & Communications Technology hits and misses
- Increased vulnerabilities during health emergencies and natural disasters
- Long-term effects of seclusion and alienation
- Predicaments of self-identifying as a person with disability
- Disability does not always signify physical or intellectual inability
- Inordinate focus on 'normalising' disability
- Struggles of the speech and hearing impaired
- Maximising the potential of assistive aids for the locomotor impaired
- Information & Communications Technology developments for the visually impaired

### 06 How does a Person with Disability Experience Barriers to Independent Living?

- Infrastructure
- Artefacts
- Behaviours

### 07 How does a Person with Disability Exercise Choice?

### 08 The Choice Framework

- Thinking behind the Choice Framework
- Using the Choice Framework
  - *Saeed*
  - *Kriti*
  - *Rumi*

### 09 Intervention Directions for Policy and Technology

## Appendix 1

List of User Cases

## Appendix 2

Problem Area Long list and Intervention Development

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# Preface

The Innovations for Independent Living among People with Disabilities in India study aims to assess how Information and Communications Technology (ICT) can enable independent living for persons with disabilities in India. This study has been conceptualised by LIRNEasia, a Sri Lanka based regional ICT policy and regulation think tank, in partnership with Vihara Innovation Network. LIRNEasia aims to strengthen independent living opportunities in India and South Asia for people with disabilities, by catalyzing the use of ICT.

This study is an extension of two similar studies that were carried out in Nepal and Myanmar by LIRNEasia. The objectives of the study included:

- **Investigating daily life and the challenges faced in social, economic, educational and other critical aspects in the lives of persons with disabilities;**
- **Mapping the use of ICT as assistive technology, and for recreational and informational purposes, by persons with disabilities;**
- **Assessing disabled communities' understanding of, and expectation from, ICT; comparing different types of impairments and socio-economic categories;**
- **Reviewing user experiences of those using ICT and AT;**
- **Evaluating the extent to which ICT is being used for employment by the disabled community;**
- **Understanding the barriers to the use of ICT for the disabled community;**
- **Understanding how the disabled use ICT to respond during a natural or man-made disaster; and,**
- **Identifying and mapping key themes around challenges and opportunities, accordingly.**

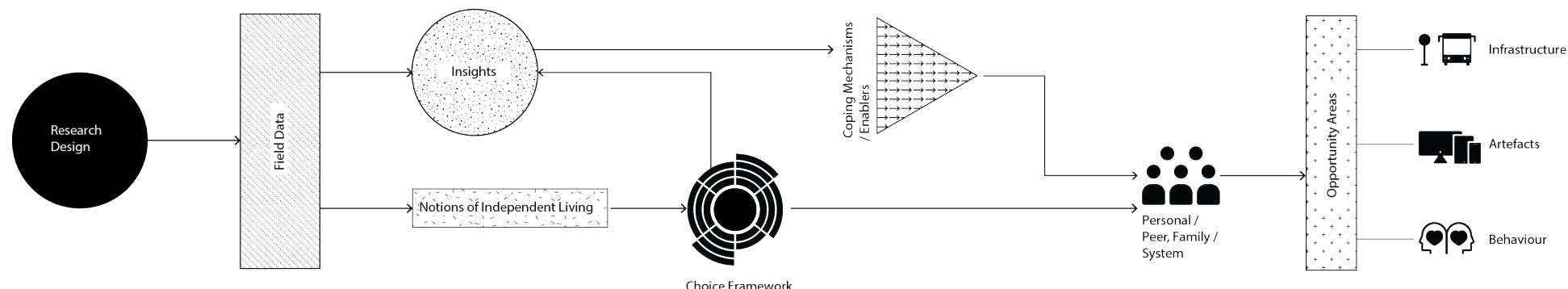
# Process Flow Overview

From field data inputs, which were collected using ethnographic research methods, we mapped the *notions of independent living*. Data was simultaneously analysed to arrive at *insights* or the ways in which people with disabilities negotiated public and private life. This led us to identify a set of problem patterns (experience of barriers in different domains of everyday life), and a set of *enablers* (people, processes, institutions, and artefacts which allow people with disabilities to operate in daily life).

The choice framework was developed using the notions of independent living to understand what independent living choices people with disabilities could exercise, and with which degree of assistance. It allowed us to analyse if a person with disability was able to conduct the task or access the experience at a personal level, at the level of peer or family support, and at the level of systemic and/or community interventions. Insights also revealed enablers or those people, artefacts, or processes which allowed a person with disability, to negotiate everyday life.

Problem patterns showed us barriers at the *infrastructure*, *artefact*, and *behaviour* levels, which provided us with *opportunity areas* to help direct future technological and/or policy interventions.

Each tab of the process flow overview diagram links to a separate chapter of the report. Each section can be used on its own to understand specific aspects of the research, or to generate particular resources (frameworks, tools, recommendations, etc.)



# 01



## Research Process

*“disabled people should be considered experts on their own lives, needs and feelings, and therefore ... those who do research with disabled people should allow disabled people to play an active part in shaping the course of research projects.”*

*-John Davis, “Disability Studies as Ethnographic Research and Text”  
in Disability & Society*

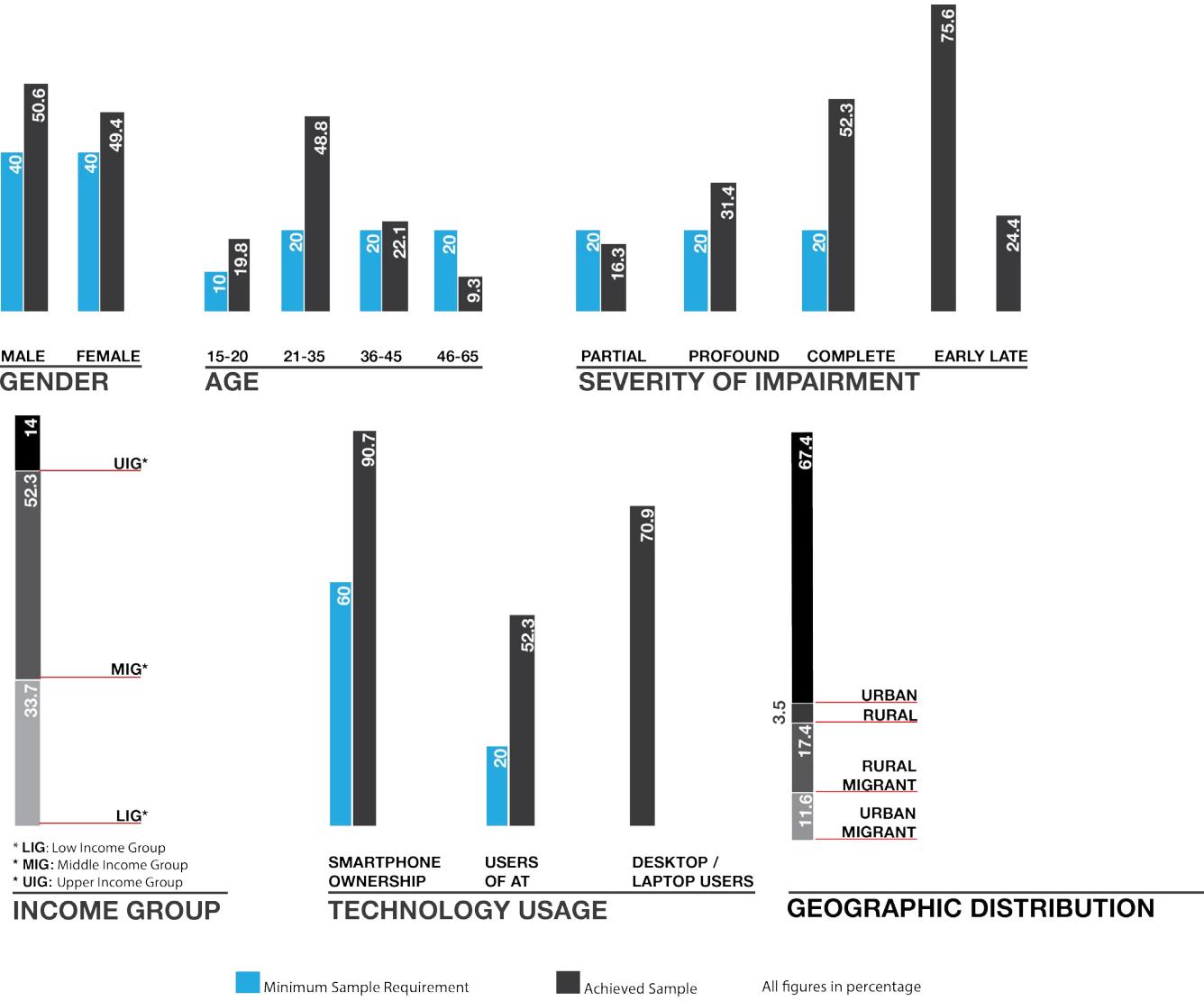
# Research Process

## Method of data gathering

A qualitative and ethnographic research exercise was carried out with 86 people with disabilities and nine key informants from the community. Three segments from the disability space were selected for the study

- speech and hearing impaired + deaf segment;
- visually impaired + blind segment;
- locomotor or orthopaedically impaired segment.

Vihara targeted respondents with a single type of disability across different income groups (low, middle, and upper), maintained gender parity, and targeted for ICT users. A functional understanding of disability (based on whether an individual was able to perform physical functions) was followed to understand how disabled the person with disability is/ feels, and Vihara recruited study participants reporting a range of impairments from some difficulty in performing the function, to complete impairment of the function itself.



# **Research Process**

## **Method of data gathering**

Vihara used ethnographic methods of research, to understand disability as a complex of experiences in different domains of everyday life. Using focused ethnographies, in depth-interviews, key informant interviews, and focus group discussions, Vihara completed the data collection exercise over one month in the two identified geographies.

Focused ethnographies were conducted over two days where the first day involved understanding the respondents' daily living challenges in the home environment, and the second day involved a public life exercise where the researcher shadowed the respondent in a public space to understand the challenges in the external environment.

In both engagements, we attempted to understand how the respondents navigated built structures, transport ecosystems, and other barriers, with or without the assistance of technology. Participants' responses as well as researchers' observations were counted as data.

In-depth-interviews were conducted to understand the life experiences and challenges of people with disabilities, map their use of ICT in daily life, and collect data using semi-structured and pre-identified areas of inquiry.

Key informant interviews were conducted to get a macro understanding about disability issues in India, views on latest policy work, and other developments in the field.

Separate focus group discussions with each of the three disabled groups were conducted, to understand what the experiences and expectations associated with specific disability types. Vihara also conducted one focus group discussion with women, to explore possibilities of gender and disability dimensions.

All discussion guides were co-designed and vetted by disabled experts.

# Research Process

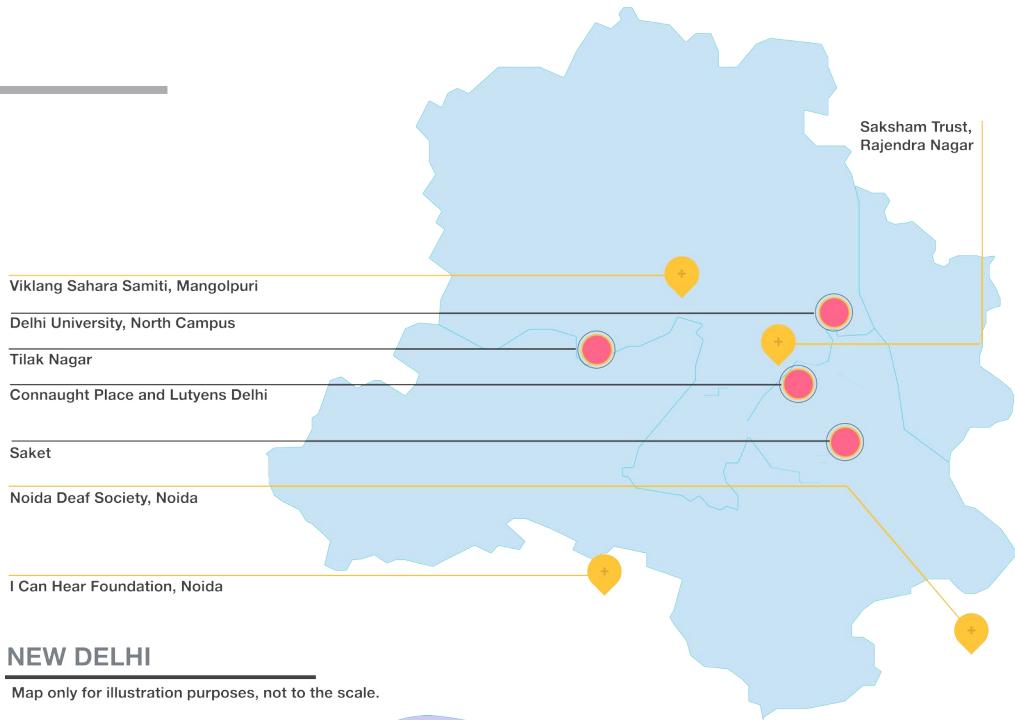
## Description of field geographies

After reviews of different locations across India, LIRNEasia and Vihara decided Lucknow and Delhi as the two sites where the study would be conducted. The urban and peri-urban areas covered in both cities are primarily middle to lower middle class colonies or neighbourhoods.

Lucknow has witnessed considerable infrastructure and development in the last decade (particularly so in the past six years). Rapid urbanization has given middle to lower class residents the opportunity to commute to other parts of this growing city faster, with fewer roadblocks or traffic, and with greater access to public transport. The single operational metro line connects a number of peri-urban and semi-rural localities situated to the south of the city, to central areas such as *Vidhan Sabha* and *Hazratganj*. However, this service has not quite caught up to other public transport in popular use, and footfall in the Lucknow metro is minimal even at peak office hours.

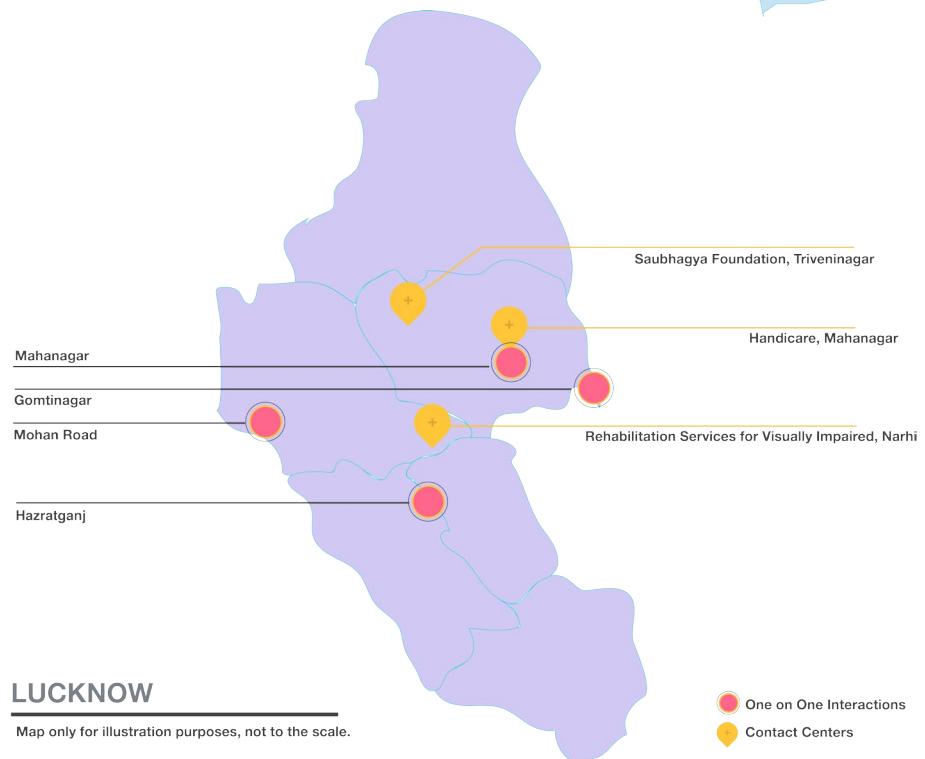
Delhi, on the other hand, is considerably more congested, with infrastructure expanding in the National Capital Region of Greater Noida, Manesar, beyond Ghaziabad and Faridabad. There is little scope for large-scale infrastructural improvements in the heart of the city. The Delhi metro has expanded rapidly in the last five years, and has successfully connected a number of peri-urban and semi-rural areas outside the NCR bounds, to central and south Delhi, with twelve operational lines.

A number of the respondents covered in both cities resided in the margins of their cities; their public lives, movement and social networks affected by the same.



### NEW DELHI

Map only for illustration purposes, not to the scale.



02



## Independent Living for People with Disabilities

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*“we must distinguish between a disability and a disease, for there is frequently a confusion of the two ... [disability] results from the things one is not able to do because of the organisation of the world around you; its causes are predominantly rooted in external social factors ... In the independent living movement we reject these definitions that limit and control us, because they do not describe our aspirations in society.”*

-Simon Brisenden, “Independent Living and the Medical Model of Disability” in *Disability, Handicap, and Society*

# Independent Living for People with Disabilities

## Why independent living?

The *independent living movement* in post-World War II United States of America came into being largely to address the lack of agency people with disabilities faced in crafting their own futures.

While rehabilitation and support services attempted to address the physical aspects of impairment that disability posed, and offered programmes to allow re-integration into mainstream society, these were not directed with input from people with disabilities themselves.

With the involvement of disabled veterans in designing support programmes, agendas slowly broadened from providing individualised support, to making changes in the environment.

Construction of ramps and curb-cuts to reduce curb-street level differences allowed wheelchair and assistive aid users to navigate the streets on their own, for the first time.<sup>1</sup>

Over time, independent living came to indicate access not just for wheelchair users, but for other disabled communities as well. Access came to be interpreted in broader terms of not just access to the built environment alone, but also access to opportunities in education and in employment, to ensure full and barrier-free participation in public life for people with disabilities.<sup>2</sup>

The idea of *independent living* now provides guiding frameworks for accessing built spaces, achieving social inclusion, and expanding choices for people with disabilities.

<sup>1</sup> Brown, Steven E. 2018. "A Brief History of the Independent Living Civil Rights Movement in the United States", in Roy Hanes, Ivan Brown and Nancy E. Hansen (Eds.) *The Routledge History of Disability*. Routledge: New York.

<sup>2</sup> Jaeger, Paul T. & Cynthia Ann Bowman. 2005. *Understanding Disability: Inclusion, Access, Diversity, and Civil Rights*. Westport: Praeger.

# 03



## **Disability in India**

*"The Act [Rights of Persons with Disabilities Act, 2016] is a very well thought out and very well written act ... but implementation may not take place. This is the third year running [of the act] and it will take time. The government machinery, it is huge, but when it starts working ... things do move"*

*-Conversation with Ruma Roka, Key Informant and Founder,  
NOIDA Deaf Society*

# Disability in India

In India, people with disabilities number close to 27 million. According to 2011 Census estimates, this number constitutes about 2.21% of India's population. The 2011 Census also notes that 69% of People With Disabilities in India live in rural areas. Additionally, the proportion of people with disabilities to non-disabled people is also higher in rural areas. One third, or 33% of people with disabilities were below 30 years of age.<sup>3</sup>

The presence of children with disabilities in schools was low, with only 61% attending school, of which more boys (57%) are in school than girls (43%). People with disabilities in India have also reported lower levels of literacy (55% against the national average of 74%), with only 5% having attained higher education, and lower rates of employment.<sup>4</sup>

## Disability rights in India

Disability issues in India gained momentum from the late 1970s, when the first job and education reservations for people with disabilities were introduced in government institutions.<sup>5</sup> Disability rights came to be articulated within a human rights framework in 1996, with the introduction and enforcement of the People with Disabilities Act.<sup>6</sup>

Despite the presence of progressive and comprehensive legal frameworks based on international human rights, the lived experiences of disabled persons in India does not always reflect the tone of conversations at the state and policy levels.

The updated and revamped 2016 Rights of Persons with Disabilities Act is consistent with the United Nations Convention on Rights of Persons with Disabilities (UNCRPD), but ground realities continue to be different, with state governments consistently failing to meet targets set by the act. Disability rights continue to be violated, and people have been refused wheelchair assistance in airports,<sup>7</sup> refused access to public transport,<sup>8</sup> refused entry into professional programmes of study,<sup>9</sup> to name a few.

<sup>3</sup> Ministry of Statistics and Programme Implementation's Disabled Persons in India Report, 2016. URL: [http://mospi.nic.in/sites/default/files/publication\\_reports/Disabled\\_persons\\_in\\_India\\_2016.pdf](http://mospi.nic.in/sites/default/files/publication_reports/Disabled_persons_in_India_2016.pdf)

<sup>4</sup> Ministry of Statistics and Programme Implementation's Disabled Persons in India Report, 2016. URL: [http://mospi.nic.in/sites/default/files/publication\\_reports/Disabled\\_persons\\_in\\_India\\_2016.pdf](http://mospi.nic.in/sites/default/files/publication_reports/Disabled_persons_in_India_2016.pdf)

<sup>5</sup> First Country Report on the Status of Disability in India, 2015. URL: <http://disabilityaffairs.gov.in/upload/uploadfiles/files/First%20Country%20Report%20Final.pdf>

<sup>6</sup> Kothari, Jayna. 2012. The Future of Disability Law in India. New Delhi: Oxford University Press.

<sup>7</sup> Karnataka High Court's verdict against Air India for violating rights of wheelchair user. URL: <https://newzhook.com/story/karnataka-high-court-air-india-dr-rajlakshmi-sobha-rs-twenty-lakh-compensation>

<sup>8</sup> Disability rights activist refused cab ride in Chennai. URL: <https://www.thehindubusinessline.com/news/cities/bangalore/disability-rights-activist-refused-cab-ride-in-chennai/article28106717.ece>

<sup>9</sup> Disabled cannot practice MBBS. URL: <https://www.thehindubusinessline.com/news/unfair-that-disabled-cannot-practice-mbbs-say-experts-to-nadda/article26260060.ece>

# Disability in India

## Measuring disability in India

Legally, a person with disability in India is defined as someone “with long term physical, mental, intellectual or sensory impairments which, in interaction with barriers, hinders his full and effective participation in society equally with others.”<sup>10</sup> This definition entails more than just a medical impairment in functioning, and extends the scope of disability (or the experience of disability) to ‘barriers’, or external, disabling factors as well.

Given India’s long, active interaction with disability issues and disabled populations, there are many state-sponsored supporting measures to reduce ‘barriers’ for people with disabilities, and ensure equal opportunity in all spheres of life. These include employment and education reservations, as well as easy finance options, affordable aids and appliances, accessible libraries and digital resources, etc.

However, to be eligible for these services, the ‘percentage’ of a person’s disability is measured, or the extent to which their physical/cognitive functioning is impaired, is assessed. The current benchmark, to be eligible for disability benefits in India stands at 40%. Anyone with impairments which fall below the 40% mark are not assigned disability certificates--the main validation of disabled status. However, disability assessment processes do not reflect the social or environmental aspects of disability.<sup>11</sup>

Now, with a revised and more comprehensive rights-based framework, it is even more imperative to substantiate the conversations at the policy levels, with implementations on-ground, to meet objectives of independent living and promote social inclusion.

<sup>10</sup> The Rights of Persons with Disabilities Act, 2016. URL: <http://www.disabilityaffairs.gov.in/upload/uploadfiles/files/RPWD%20ACT%202016.pdf>

<sup>11</sup> Jeffrey, Roger and Nidhi Singal. 2008. “Measuring Disability in India” in Economic and Political Weekly Vol. 43, No. 12/13

# 04



## Operational Concepts

*"devising strategies to confront disability must first start by defining disability. Definitions implicitly connote goals, which in turn suggest potential solutions and targets for action."*

*-Lisa Iezzoni & Vicki Freedman, "Turning the Disability Tide"  
in JAMA The Journal of the American Medical Association*

# Operational Concepts

The study adopted certain guiding definitions while deploying research methods, and analysing field findings. These served as operational concepts, on which later grounds for arguments and analyses were built.

## How do we understand Independent living?

Independent living can be understood as, fundamentally, the ability to live without or with minimal assistance. After exploring what independent living means to respondents and what experts and key informants believe it indicates, we arrived at the following components:

- a. the ability to perform 'basic' tasks or execute 'basic' projects without human assistance, or with minimal assistance;
- b. the ability to exercise choice and of decision-making around 'basic' needs;
- c. the ability to move and operate beyond the home sphere; (movement)
- d. the ability to operate (publicly) free (from fear) of discrimination and prejudice.

'Basic' refers to all everyday chores, education, health, communication, and income related tasks that help establish any individual's ability to conduct their lives.

# Operational Concepts

## How do we understand ICT, AT, and ICT as AT?

### **Information & Communication Technology (ICT)-**

Includes technologies which give access to information, and are used primarily for communication. In addition to looking at smartphones and laptops/computers, in this research, we looked at ICT in the built environment (public and private announcement and information systems) as well.

### **Assistive Technology (AT) -**

Includes devices or technologies that enable independent functioning. An assistive technology could include a cane, a wheelchair, or a hearing aid.

Those artefacts which perform the function of allowing access to information, promote communication, and enable independent functioning for people with disabilities, can be called **ICT as AT**.

A hearing aid, a smartcane (which gives haptic feedback about the environment), screen-reading software, and video relay systems can be called **ICT as AT**. Sometimes, navigation apps perform assistive functions for people with disabilities, specifically, people with visual impairments, in allowing them to navigate without human assistance.

# Operational Concepts

## How do we understand disability?

In this study, we understood disability as the experience of barriers in every aspect of daily living, due to impairments on the body of the person (such as low vision, hearing loss, or loss of motor function in limbs) & obstacles which are external or in the surroundings (such as narrow doorways and corridors, books in non-audio or non-braille formats, lack of ramps, and even attitudes and mindsets).

In our research, we targeted participants falling under three broad impairment areas:

- a. people with speech and hearing impairments
- b. people with visual impairments
- c. people with locomotor impairments

These categories of impairments include people who acquired the impairment at an early age (before the impaired function was developed), as well as those who lost function (after the impaired function was developed) and acquired impairments at a later stage in their lives. In this study, we have called those who acquired the impairment from birth or at an early age **people with early stage disabilities**, and those who acquired the impairment at a later stage in their lives **people with late stage disabilities**.

### People with speech and hearing impairments-

People who report loss in hearing or complete deafness at birth or from a young age (6 months - 5 years), develop associated speech impairments. In this report, 'deaf' refers to people with profound to complete hearing loss, who primarily use sign language to communicate, do not use verbal communication in their daily lives, and self-identify as 'deaf'. 'Hard of hearing' refers to people who have some degree of speech abilities, but do not have fully functional hearing (this includes both cochlear implantees and hearing aid users) and 'speech and hearing impaired' refers to the larger community.

### People with visual impairments-

Visual impairments include a range of impairment from partial loss in vision (low vision) to complete blindness. For the purpose of this report, 'blind' refers to those people who not only suffer from profound to complete vision loss, but also self-identify as blind. 'Low vision' refers to people who have near-complete vision loss but are able to distinguish shapes, colours, shadows, etc.

### People with locomotor impairments-

Locomotor or mobility impairments include a fairly diversified range of functional impairments in the arms, legs, spine, muscular function, etc.

This group includes people who use wheelchairs and other assistive technology, such as crutches, and calipers, as well as people who report difficulty in accessing function in their arms, legs, hands, feet, and so on, but do not necessarily use any assistive technology.

# Operational Concepts

## Notions of independent living

Vihara defined 'independent living' as the ability to live without and/or with minimal assistance. Vihara developed notions of independent living, and categorized them under the following broad experiential domains:

- **sociability** which denotes the ability to create social relationships and includes being able to build virtual networks, communicate face to face, and build intimate relationships with friends and/or partners,

- **private life** which denotes the ability to independently operate in private life, and includes being able to navigate the home space, use the toilet, and perform daily chores like cleaning, cooking, laundry, etc.

- **public life** which denotes the ability to independently operate in public life and includes being able to travel without barriers, use public toilets, access healthcare services, participate in recreation, and navigate legal and/or bureaucratic systems

- **public/social identity** which denotes the ability to freely present one's self in public and includes being able to dress per own choice, and disclose/ hide disabled identity as required.

- **education** which denotes the ability to access and attain primary and higher education and includes being able to access learning materials, exercise subject choice in higher classes, and attain higher education and disciplinary specialisation

- **financial inclusion** which denotes the ability to generate a basic and a long-term income and access financial services and includes being able to earn a livelihood/have economic means, conduct financial transactions, and build a career,

Vihara studied independent living challenges and limitations to achieving independent living for people with disabilities in India. The aim of the study is to be able to create possibilities and expand the spectrum of opportunities for people with disabilities, in different domains of everyday life.

# 05



## Insights

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*“... at one level, deprivation can result from the very nature of the impairment ...  
On another level, deprivation can be the result of barriers in the environment ... At a third  
level, deprivation can result from the economic constraints that impairment may place on the  
availability of, and demand for, resources ...”*

*Nandini Gosh. Interrogating Disability in India*

# Insights

## The multiple barriers of transport ecosystems

### Focus group discussion with deaf students at Lucknow:

*"I had an experience on a train. Platforms were switched because of which I was not able to catch the train as I didn't even know when the train came as there is no digital show of any updates. We have written so many applications but it didn't help. In case of bus also the conductor speaks [and announces stops] and we are not able to understand what he has said, so there should be an app to help us record the voice and show in text form what he has spoken. It would aid us."*

### Focus group discussion with visually impaired youth in Delhi:

*"[The] metro provides good infrastructure including human assistance. In human assistance there will be someone who will hold you and take you till the exit board and help you get an autorickshaw. But due to that facility we are not able to analyse the available infrastructure. There are tactile paths, but whether they are taking us to the elevator, the lift, or not, we are not able to analyse because there is human assistance and he [the assistant] takes my hand and he pulls me and takes me [with him]."*

*"I travel daily for two hours and change three metros [lines] and I have to walk a lot in between. The lift is mostly in the [far] corner and I tell them [assistants] to go by the escalator but they refuse saying that I will fall."*

Daily commute gets affected when bus stops and metro stations pose navigability barriers. Improperly designed tactile pathways do not serve their intended functions, and it was noted that human assistance often deters independent movement in the long run, rather than assisting in it. People with visual impairments stated being unable to effectively map their surroundings on their own, because of readily available human assistance. Long distance travel comes with its own array of barriers—of which the inability to use a train or airplane bathroom was vocalised the most. On trains, wheelchair users faced unsanitary and dangerous conditions, and on flights, the embarrassment of having to publicly use 'pocket' urine bags.

### Neha's case, 63, locomotor impaired, female:

*A few years ago, 63 year-old Neha, who has polio in one leg and uses a wheelchair, had to travel by train. Trains in the Indian railways veer and sway dangerously, especially when moving at top speed. While she was squatting to use the Indian style toilet, the train suddenly lurched, and Neha fell feet first into the open hole and her 'good leg' got stuck in the toilet. "At that time, I felt like I would definitely lose my good leg too," Neha told us. She shouted for help for some time before her husband came to pull her out. Her entire leg was black and blue, and her clothes were soiled. The restroom had no infrastructure to allow herself to clean up, and Neha used her shoe as a mug, filled it with water, and poured it over herself to clean up. Not having her husband around may have further imperilled Neha. Neha has not set foot in a train since.*

### Conversation with Abhimanyu, 40, locomotor impaired, male:

*"Take this Peeschute [a portable urine bag], for example ... I just searched on what are [sic] some of the ways to travel by air, or to travel long distances. So it was in one of those [discussion forums] where someone had mentioned this. I searched around for it, and in about one year it became available on Amazon, so then I ordered it ... it is embarrassing sometimes but you've got to do what you've got to do."*

# Insights

## 'Illiterate' accounts and denial of essential services

### Conversation with Puneet, 29, visually impaired PhD scholar, male:

*"I had applied for a debit card from the University bank branch, and he [the official] said that I have to get two witnesses. I said that I will not get [anyone] and he can reject my form ... Then I got a call from his boss and he said that he will bend the rules and give me the card. I told him not to bend the rules. I told him if it is legal then give it and then he finally gave me my card ... I applied for an account in a bank when I was doing my junior research fellowship. I was a masters student then. I gave him my masters ID card, disability certificate, and Aadhar card. He immediately allotted me an illiterate account and I still have that account. He took an undertaking for illiterate people because I was putting a thumb print in the form, instead of a [handwritten] signature. Then he told me that you will not have any facilities like an ATM debit card, internet banking, etc. on this account. I told him my ID card is of a masters student, so how can you even allot an illiterate account? After threatening him with the police he gave me an ATM card. But it is still an illiterate account."*

In India, not being able to sign one's own name is seen as a mark of illiteracy. Visually impaired students, who use thumb prints instead of manual signatures are often wrongly allotted 'illiterate' accounts in banks, which offer no debit card or internet banking services. While such a process is inherently discriminatory, it also restricts access to digital banking platforms for people with visual impairments, directly leading to lack of inclusion in financial services.

### Conversation with Saeed, 29, deaf, male:

*"In India, NHFDC<sup>12</sup> provides loans to disabled people. But the government doesn't give any money. They only give Rs 50,000 to open a business. That is not enough. But banks don't give loans when we show the NHFDC certificate. Banks say that there is nothing like this. We have to give 11% interest [at regular rates], there is no benefit."*

Poor awareness about existing government schemes leads to denial of existing support provisions for people with disabilities. Members of the deaf, sign language speaking community reported being treated with suspicion by government officials, who denied knowledge of financial subsidies, leading to outright denial of financial inclusion services. As a result, deaf people were left with few options to further entrepreneurial ventures, or achieve other career ambitions.

<sup>12</sup> The National Handicapped Finance and Development Corporation (NHFDC) is a public sector unit set up by India's Ministry of Social Justice and Empowerment. Its main function is to promote financial inclusion of people with disabilities, by extending easy, subsidised loan and micro finance options. Loans are extended through partner banks.

# Insights

## Create opportunities by creating possibilities

### Conversation with Anuj, 43, visually impaired, male:

*“...to be honest, there were issues with recorded books and all. We didn't have enough material in other subjects. We had many seniors who had pursued the subject Political Science. They had ready [study] material with them. So, that was one of the main reasons for choosing Political Science. Otherwise, I was more interested in English Literature but at that point of time technology was not so advanced. In fact, we didn't have any accessible technology at that point of time.”*

### Conversation with Rita, 17, visually impaired, female:

*“Okay, and which is your favorite subject [in school]? ”*

*“My favorite subject was maths.”*

*“Oh! Maths.”*

*“But I have stopped doing maths from some years now.”*

*“Why?”*

*“They have maths only till [class] 8th here.”*

### Conversation with Charu, 24, hearing impaired, female; accompanied by her mother

Charu is a young, aspiring animator, but has been rejected at every place she has applied to for a job. She is speech and hearing impaired, and goes for speech therapy regularly. Charu was rejected for admission to several mainstream schools before being finally accepted in a school which supported and educated children with hearing and cognitive disabilities alike. Charu's mother shared her daughter's frustration during our interaction, saying *“... schools should at least give them a chance. And if she cannot come to the level [of her peers] then it's ok. But they didn't give the chance ... I think someone should give her a chance if she is going for an interview.”*

Opportunities to build careers, attain disciplinary or academic specialisation, and achieve long-term aspirations were often cut short for people with disabilities during their youth. Certain areas of education and employment were firmly closed. While in the domain of education, people with disabilities ended up opting for disciplines significantly distant from their inclination and aptitude, in employment they felt they were not even given an opportunity to present or develop their skills.

# Insights

## Increased vulnerabilities during health emergencies and natural disasters

### Conversation with Munish, 29, deaf, male:

*"About two-three years ago there was an earthquake in Lucknow. That was a very small earthquake but we could feel it but we didn't know what to do. We felt something, but we ignored it. Neighbours were continuously ringing the bell to call us out of the house. If there is an emergency like a fire outside, we cannot control that but what we could do is make some kind of fire indicator that has a light on it and vibration also so that we could know that there is a fire. I don't think that there is such kind of fire indicator."*

Not only did our participants with disabilities feel additionally vulnerable during emergencies and earthquakes, most speech and hearing impaired respondents faced challenges in communicating with doctors while explaining symptoms, and doctors in turn faced problems in identifying and communicating diagnoses. While this poses a significant health risk for an already vulnerable group, it also reduces trust in public health institutions.

### Focus group discussion with deaf students in Lucknow:

*"In the hostel whenever we go to the common medical department we just show wherever we are having pain, and the doctor gives us medicine according to that, and it doesn't fully help in making us fit. At this point, we can't even argue with the doctor as it is difficult to make him understand whether we are suffering from any kind of disease or not."*

# Insights

## Information & Communications Technology hits and misses

### Conversation with Anuj, 43, visually impaired, male:

*“Would you say that the mobile-phone has really changed a lot of things in recent times?”*

*“Yes, definitely. It [mobile] has made our [people with visual impairments] life simpler. It is much easier to use than computers; desktops and laptops. Nowadays, I use my laptop only for Office applications at the most. Otherwise, I am totally dependent on my iPad and iPhone ... ”*

*“Would you say that independent movement or travel has become more accessible because of these technologies [app-based services]? ”*

*“They have become extremely accessible. Taxi booking apps have made life so simple. Earlier, I had to walk from my home for at least 100 or 200 metres with all the stray animals around. It was so tough that I could not go independently. I had to take somebody's help. Then, I would take public transport. Public transport is also not up to the mark. Now, I simply stand outside my house and I can just book a cab. Most of the time, they keep their car in front of me and I just get into it.”*

Smartphone based navigation apps have had a significant role to play in enabling independent movement. Maximum reports of using ICT for assistive functions came from the visually impaired segments.

Transcription apps and sign language dictionaries were used by people with speech and hearing impairments, and ICT proved tremendously useful in promoting sociability at different levels, across disability segments. However, updates often 'broke' apps which were previously accessible for the visually impaired, and those ICT devices which used haptic feedback to communicate physical barriers, were met with limited success.

# Insights

## Long term effects of seclusion and alienation

### Conversation with Rita, 17, visually impaired, female:

*"Before coming to a specialized school for blind girls, I used to study in a normal, sighted school ... Actually, we didn't know that blind children can even study. I used to feel like apart from me, there is no one else who is blind in the entire world ... I used to pity myself and cry all the time. I used to think that because I am blind and I can't see, nobody will take care of me in my house and will throw me out. But when I stepped out of my house and saw that there are a lot of people in this world who don't have anything, they can't speak, can't hear, can't walk but still are living their lives, I felt that maybe I am better off than they are."*

For a significant part of their youth, and in some cases even into adulthood, people with disabilities reported feeling alone, with little or no support. World views expanded only after they came into contact with support centres, disability organisations, and other networks. Families were, for the most part, unable to equip them with the requisite skills to operate in everyday life, and children felt they had no future. Inability to plan long term, leads to greater dependence on family, peers, and the state, as people with disabilities get older, making an already vulnerable group, even more so.

# Insights

## Predicaments of self-identifying as a person with disability

### Conversation with Shabnam, 20, locomotor impaired, female:

*"How did you arrive at Lucknow?"*

*"I got admission and that time I traveled through bus. I didn't have CMO [disability certificate]"*

*"What do you mean by CMO?"*

*"The district level officer did not know the way to make a certificate for disabled people. He had no knowledge. He was saying I look fine and not disabled."*

Articulation of disabled identity is a delicate, multifaceted process. Fearing discrimination, people struggle to openly identify themselves as disabled. However, people who do not carry immediate and visible markers of disability on their body, often find themselves in the uncomfortable position of 'proving' they are disabled. They feel that this leads to lack of empathy, understanding, and contributes to pervasive discrimination. Having to prove they are disabled leads to difficulties in negotiating disability identification processes, which are the cornerstones for availing a range of associated, state-sanctioned benefits.

### Conversation with Ruma Roka, key informant, capacity builder—deaf inclusion and skilling:

*"So, what are some of the challenges that you are facing, or barriers, if you think, because of which the institutions are not adopting inclusivity?"*

*"When we are talking about inclusivity ... schools have to create that environment, no? Now that [reluctance] could be a funding issue ... also mostly it is the mindset. That when I look at you it is an invisible disability, what problems could you [who shows no signs of disability] possibly have?! I mean if deaf people looked very visibly like persons with disabilities, then the empathy would come, but they look so ... regular, no?"*

# Insights

## Disability does not always signify physical or intellectual inability

### Conversation with Suyash, 29, hearing impaired, male:

*"If I ask from your experience, when a company hires a deaf person, what do they think about the work a deaf person can do? Is there a difference between their thinking and the person's ability?"*

*"They [employers] provide limited work. They give work which requires minimum communication. They provide basic work like packaging; in More\* [a clothing store] they give work like folding clothes, but according to me and other Deaf [persons], we are not limited to that. We can be cashiers. We can be team leaders if they give us a chance. And everybody needs guidance when they join a new place."*

### Conversation with Pratap, 26, locomotor impaired, male:

*"What are your hobbies? What do you play?"*

*"I like to play kabaddi. I started playing in Rajasthan; I played a tournament and won a trophy."*

*"Do you play here [in Delhi]?"*

*"In Delhi, we had gone to play, but we were the only handicapped people [in the arena] so they removed us because they said that we won't be able to play ... After that I gave up [playing]!"*

*"Did you ask the school administration to include you in sports [when attending school]?"*

*"They said I am weak, and that my family would be upset if I get injured..."*

### Conversation with George Abraham, key informant, blind disability rights advocate:

*"Unfortunately, there is a perception that visually impaired people cannot be employed. The eye is a very important factor in running the world today; in the way the world is designed today. About 80% of what people might be doing in a day is visual and that is the way the world is designed and therefore people straightaway think that once you are blind ... you are not competent. What the world does not realize is that a blind person ... by the time he is 21-22 years old, his faculties to cope with the world are advanced. His memories, sense of interpreting sounds, interpreting smells, his sense of noting landmarks, bookmarking ... All visually impaired people who are working, they go around in the [work] space independently, with confidence. It will take only two-three days before you develop your own mechanisms, your own framework, to guide you through the whole space."*

Assumptions of being too 'unfit' for public participation, leads to cascading effects in several domains of life for people with disabilities. Their ability and efficiency is questioned in employment settings, their future career growth trajectories are cut short, and certain health promoting and necessary outlets such as sports, are closed. This further restricts social circles, and in some cases, reduces the possibility of participation in sports as a profession.

# Insights

## Inordinate focus on ‘normalising’ disability

### Conversation with Karim, 39, visually impaired, male:

*“I didn’t know much about these [assistive technologies for visually impaired]. I needed them at that time. I have passed [class] 10th with so many problems … Actually at that time everyone was—even my family—trying to cure my disease. They were trying everything they could but that was of no use. They were not doing what they should have done in the first place. I was going to the doctor since the age of four, so when I was 19 years old, I asked the doctor that will it get cured. He told me clearly that it could not be cured and I will lose all my vision slowly. But then [at that time] I could not accept that. Actually what happens in small towns is that people joke about disabilities. In my neighbourhood there was a beggar who was blind. People used to make jokes about him and say that he is a fake [sic] and he is faking his disability. I have seen that environment, and in that case it was very difficult for me to accept that I am blind. My family wasn’t accepting that I am blind. I didn’t get any exposure because they used to hide me. I used to myself hide the fact that I am blind. It was a lot of psychological struggle [sic].”*

We found that acceptance of disability was fraught, especially within the home, and parents pressured children into corrective measures despite significant trauma and frustration. Parents invested heavily in normalising children, and focused minimally on self-learning. Speech and hearing impaired respondents experienced being pushed towards oralism, despite demonstrated benefits of early adoption of sign language. This can lead to cognitive gaps and further constraints on jobs and careers.

### Conversation with Preeti Sapra, key informant, sign language expert:

*“If you just see in a family, even from month old, they [the children] started catching voices, right? Listening to sounds and everyone’s voice and the words they are using; whatever language is spoken in their family, maybe English, Hindi, or some local language, Telugu or Tamil, they are just observing and catching and learning it. So, when later they go to school, then it will be easy for the student to match [sic] with what they [teachers] say in school. But with the deaf person the problem is, they cannot listen to anything or nothing is taught in sign language. So, observation and learning stops there. When they take the admission in school, the same thing is happening. If you start signing from the starting months of the birth, the cognitive development is quite high. Now, it is being done, if you check with Haryana special schools. There are 8 special schools in Haryana. Just go there and check out the capability of the students. They are doing earlier [sign language] interventions.”*

# Insights

## Struggles of the speech and hearing impaired

### Conversation with Saeed, 29, deaf, male:

*"Do you have a driving license?*

*"I faced a lot of problems in getting my license ... The government official asked me to show the rule which said deaf people can also get driving licenses. So, I searched on Google and showed him the rule. They asked me for proof ... People told me I will get a license only after I pay a bribe. But I gave the exam 3-4 times, and showed proof that deaf people can also get a license ..."*

*"You said you are looking for a job ... So what kind of job do you want?"*

*"I want to work for the metro, in private banks. I have applied there but they said they could not give the job to a deaf person. But I want a job in either of these places. I want to start a business and an NGO, so that Deaf can benefit from that, and they don't have to face any problems. I don't want them [other deaf people] to face what I have faced in my life ... Hearing people can easily get loans, but deaf people don't."*

People with disabilities, across segments face a number of implicit biases, of which we find that the hearing impaired are subject to most. In terms of adaptations and accommodations for the hearing impaired, schools and places of work struggle to conceive of, let alone implement the same. On the flip side, certain disabilities are 'preferred' when it comes to hiring for reserved jobs. Deaf associations and networks campaign very hard to get their students/members placed, but returns on those efforts so far have been minimal.

### Conversation with Preeti Sapra, key informant, sign language expert:

*"If you check out the employment in government sector, they are only getting C and D grade jobs, not a very high positions."*

*"C and D grade level jobs ..?"*

*"Multiskilled, informal workforce like maybe clerks, which is highest in that grade; peons and cleaning staff, etc. So when the government identifies jobs, when it declares a list of jobs, and it identifies quotas against jobs ... most deaf people are identified in C and D category jobs. A and B [managerial positions of greater responsibility, with decision making powers] are not open to them at all. Even in the private sector, if you just check it out, most of the people are appointed in a hospitality sector."*

*"Hospitality?"*

*"Cleaning bed sheets, room service, and these types of jobs."*

# Insights

## Maximising the potential of assistive aids for the locomotor impaired

### Rakhi's case, 23, locomotor impaired, female:

*Rakhi was afflicted with polio in both legs when she was a young girl. She does not like using crutches or calipers when she moves around in Lucknow, and walks balancing on her haunches. Rakhi agreed to participate in a focus group discussion, but incessant, unseasonal rain made her late. While we spoke, rainwater slowly flooded the road leading to the house. After the engagement, Rakhi waded through four inches of flood water to reach her modified scooter, getting her hands, feet, and clothes wet and muddy in the process.*

*Rakhi stays on the first floor in the older, significantly more congested and chaotic part of the city. Narrow, dark stairs lead up to her home. Rakhi also attends a 'rehabilitation' university in Lucknow. Advertised as an 'inclusive' university, it has been designed to cater to disabled and non-disabled students alike. The university boasts open lawns, wide corridors, flat surfaces, and 'accessible' buildings. Averse to using assistive aids while conducting other parts of her life, Rakhi uses a wheelchair during all the hours she spends at university.*

Assistive aids such as wheelchairs perform their enabling function only when the built environment provides proper support. Non-assistive aid users who operated without crutches, calipers, or wheelchairs for most of their lives, freely used wheelchairs in conducive settings. Wheelchairs, we found, could be called truly assistive only with supporting accessibility components in the built structures and spaces.

### Neha's case, 63, locomotor impaired, female:

*Neha was diagnosed with polio in her right leg in childhood. She was able to walk without assistance for most of her life. More than two decades ago, Neha suffered what can be called 'post-polio syndrome', over the course of the next few years, Neha started using a wheelchair. Neha and her husband, a physiotherapist, have made their entire home accessible. There are ramps every place where there is a difference in height between surfaces, and the doorways are wide. Rooms are organised with enough turning radius for wheelchairs, and door handles are located at waist height.*

*While we sit and talk, Neha wheels herself out of her home to the street where a vegetable cart has stopped, picks her day's supply of vegetables, goes back inside to the kitchen, cleans, cuts, and chops the vegetables, and quickly puts together a small meal, all the while keeping up a steady stream of conversation.*

# Insights

## Information and Communications Technology access for the visually impaired

### Conversation with Anuj, 43, visually impaired, male:

*"What accessibility features do you use?"*

*"Phones and laptops have the talk back feature. We also use the money reader application on the phone ... I will open the application and show the note in front of it and it will detect the note so that I can separate the notes ... There is a document reader, there is photo vision AI. There is Kibo, Envision AI, and Spee. They are all android apps. Free apps."*

*"So is it correct to say that technology has made your independent living level higher?"*

*"Yes, fully. There is this Nearby Explorer app. The app tells you whatever store is around you if you are travelling by bus or auto. Like Café Coffee Day, Reliance, Mother Diary; it will announce everything. If I am walking the phone will announce that there is Big Bazaar and I can navigate on my own or I can go to Google and it will give you the route. I go to the areas I do not know. I use Google Maps and it tells me the way. Because I cannot see how you can reach. So GPS it is very helpful. Like these, there are many apps that help a lot. There is Be My Eyes. You open that app, and a video call [with someone] will guide [you] if a family member is not available."*

### Conversation with Rakesh Jain, visually impaired, key informant, Founder, Rehabilitation Services for the Visually Impaired, Lucknow:

*"[If you take my smartphone away] then I shall have no social media access, I shall have no newspaper, no WhatsApp, no books to listen, I cannot send emails ... I will not have access to my typing facilities, railway reservations, hotel bookings and offers that I get on my credit card. I am a very passionate listener of books. I spend 7-8 hours of my 24hrs in listening to books. I use audio book apps. They have thousands and thousands of collections of books. It doesn't just read the books, it performs the book [sic]."*

Some of the best disability-specific mobile applications and services have been designed for the visually impaired segment. Some tech companies have the active policy of testing new application design and software updates with members of the visually impaired segment. For the visually impaired segment, ICT performs a range of functions from navigation to financial transactions.

06



## **How does a Person with Disability Experience Barriers to Independent Living?**

*“Disability impacts on and finds expression in every aspect of contemporary social life. Disabling barriers permeate the physical and social environment: organisations and institutions; language and culture; the organisation and delivery of services; and the power relations and structures of which society is constructed.”*

*-John Swain, Sally French, Colin Barnes, & Carol Thomas.  
Disabling Barriers - Enabling Environments*

# How does a Person with Disability Experience Barriers to Independent Living?

All of the previous themes discussed, and the testimonies/responses that lend to them, directly indicate that the experience of disability can be about an increased lack of choice, or of limitations set on the variety or diversity in the already limited choice basket available to the person with disability. Further constraints that disability poses to an individual's already constrained pool of choices can be experienced through barriers the person faces in the infrastructure the individual negotiates, the artifacts the individual uses, and the behaviours the individual adopts and encounters.

## Infrastructure

Those barriers which relate to the material environment (roads and highways, stations and bus stops, public buildings and marketplaces, etc.) or institutional processes (such as legal and/or bureaucratic processes) were identified as infrastructural barriers. Within infrastructure, we distinguished between **critical** (large-scale systems, critical to civic functioning) infrastructure, such as telecom, railways, roadways, public education institutions, public sector units, healthcare, the legal system, etc, and **basic** infrastructure, such as the built structures of homes, restrooms, smaller buildings, stores, etc.

People with disabilities report critical infrastructure barriers such as lack of consistent WiFi services, inaccessible transport ecosystems, systemic barriers such as inability to access education and employment. Basic infrastructure barriers include poorly designed restrooms, stairs, kitchen stoves, retail stores, and restaurants, to name a few.

## Artefacts

Everyday objects and products posed significant barriers for people with disabilities. We identify these as artefacts which may be **material**, that is, they are tangible objects such as shoes, tables, chairs, etc., and **digital**, that is, they are intangible products, such as videos and websites.

Reported material artefact barriers include certain types of clothing, pens, books, copiers and fax machines at the workplace, private vehicles, etc. Digital artefacts such as websites, captchas, digital images, videos without audio/visual support, music without captioning, etc., posed barriers for people with disabilities.

## Behaviours

In addition to rampant infrastructure and artefact barriers, a common challenge was behaviour, or the affective ways in which people present themselves to the world, responded to stimulus, and reacted to events. Behaviour barriers such as insufficient **knowledge** about disability, **attitudes** deriving from misconceptions and prevalent misapprehensions about people with disabilities, and the active **practices** of dealing with disability, compounded the infrastructure and artefact barriers, and often led to slack and inconsistent implementation of solutions.

Prevalent misconceptions about disabled people's inability to take part in physical or strenuous activity, their inability to take part in formal employment, their inability to handle financial transactions, all not only presented new challenges and posed new barriers, but also exacerbated and deepened existing hurdles.

07



## How does a Person with Disability Exercise Choice?

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*"I studied in a mainstream school ... It was a different approach to life ... Teachers were more skilled and more committed. The choices were far more. In blind schools ... if the subject was difficult, they immediately made compromises...They were compromising on teachers, they didn't expect too much from students, or what these students will become. The answer to that was, they are blind, what can they do?"*

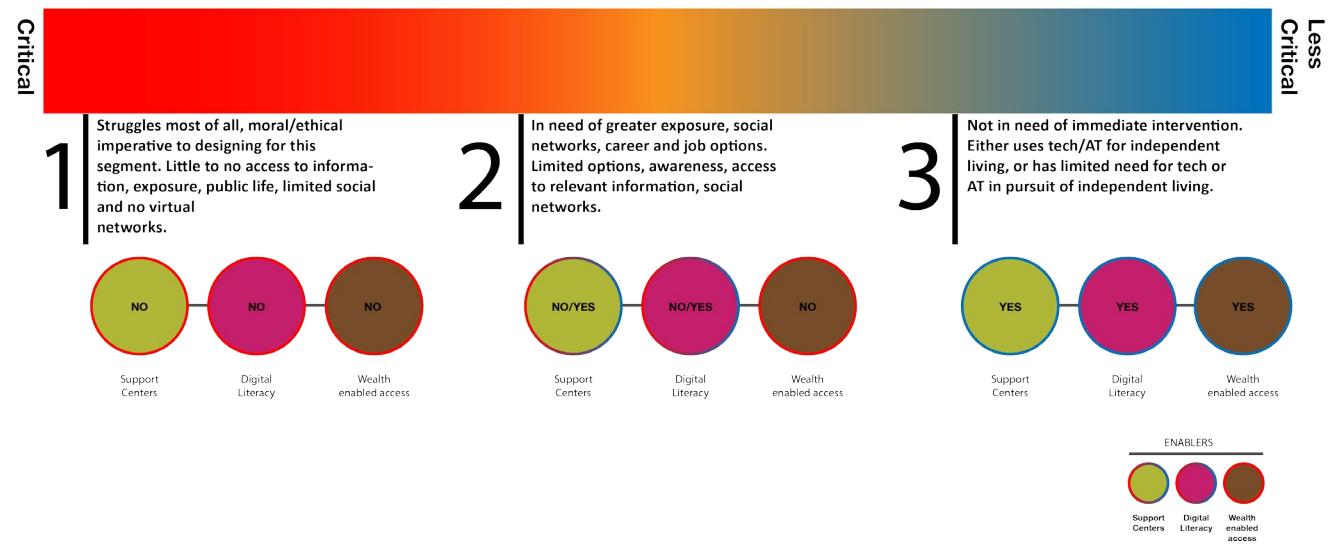
*-George Abraham, Founder, Score Foundation,  
disabled rights advocate, and inclusion expert.*

# How does a Person with Disability Exercise Choice?

In independent India's four decades of intervention in disability affairs, certain legal frameworks, networks of support centres, and advances in technology, have built ecosystems which allow people with disabilities to exercise (still significantly restricted) choice.

In addition to existing legal frameworks and community based support centres (rehabilitation institutions and disability rights organisations), other enablers which contributed directly to people's ability to navigate their daily lives emerged from our data as well. These included ICT based apps on smartphones, the internet, mobile phones, and sensitised peer and family networks. Additionally, wealth too enabled access to different technologies and opportunity areas. For the most part, individuals who had access to support centres, basic digital literacy, and wealth, were able to perform better according to the outlined independent living parameters.

The *priority indicator framework* was developed to understand which groups benefited most from the enablers, and which require further, targeted support.



# 08



## The Choice Framework

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*“to enable people to exercise choice and control over a wide range of everyday activities, there needs to be options that people can choose from. Those options need to be responsive to people’s needs, family obligations, personal preferences and future expectations.”*

*-Parvaneh Rabiee and Caroline Glendinning.*

*“Choice: what, when and why? Exploring the importance of choice to disabled people” in Disability and Society*

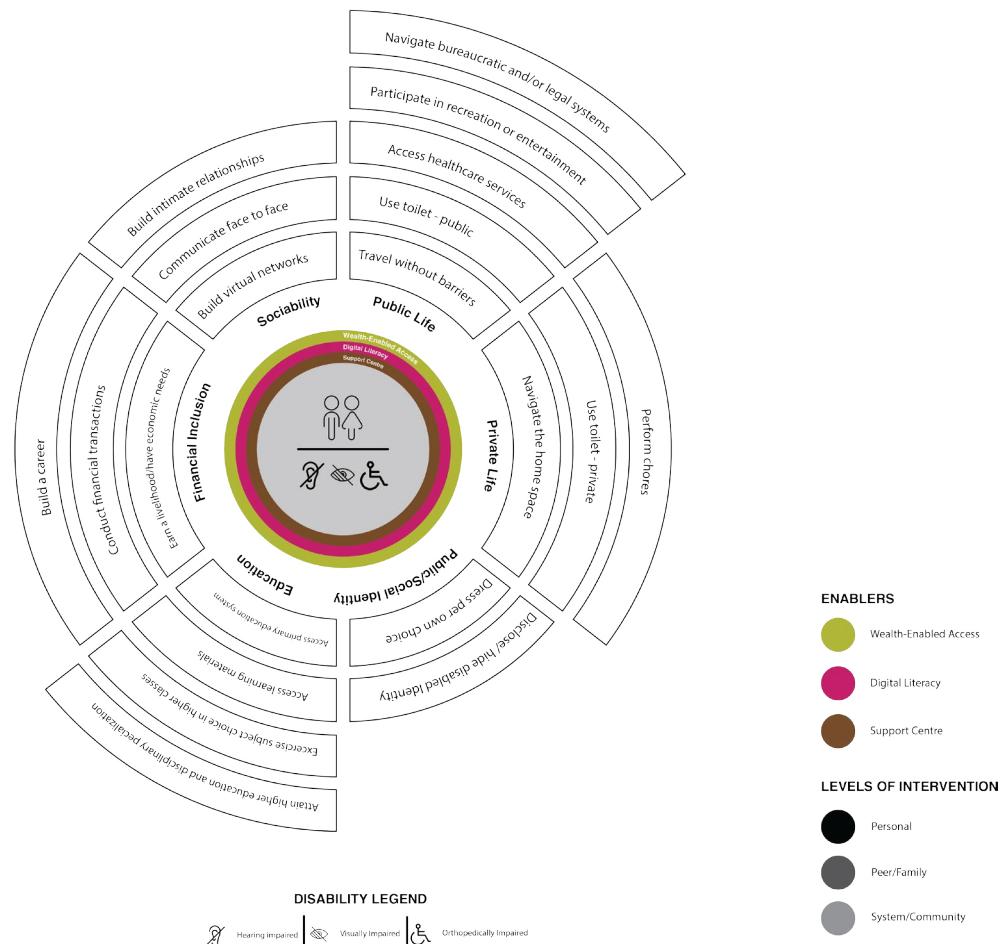
# The Choice Framework

Using phenomenological (deriving knowledge from direct experience) methods, we used *experiences* of persons with disabilities as data. We gathered their narratives, with specific questions on the users' experiences of educational facilities, public spaces and transport, health facilities, emergency situations, places of employment, legal systems, and technological interventions that may have eased their integration into the same. The original research problem centred on assessing the respondent's/user's ability to live independently, as well as understanding the pain points, or points of disruption, caused directly or indirectly by the respondent's disability.

The approach we took to problem solving, based on the experiential frameworks developed through this study, involved:

- mapping, broadly, life histories and experiences of people with disabilities;
- assessing for major disruptions, according to the respondent;
- reviewing the quality of independent living they enjoy, by assessing the degree/extents of choices available to them, and therefore the limitations placed on them; and
- accordingly assessing for existing & potential new intervention points for design and policy solutions

We used the identified areas of inquiry, supported by the notions of independent living, to generate a basic phenomenological lens, or framework with which to review and filter the raw data. We chose to call this the experience framework. Reviewing user cases across different disability segments through this lens, led us to the conclusion that independent living, for our entire respondent sample, is defined by and dependent on the range of choices they perceive as being available to them.



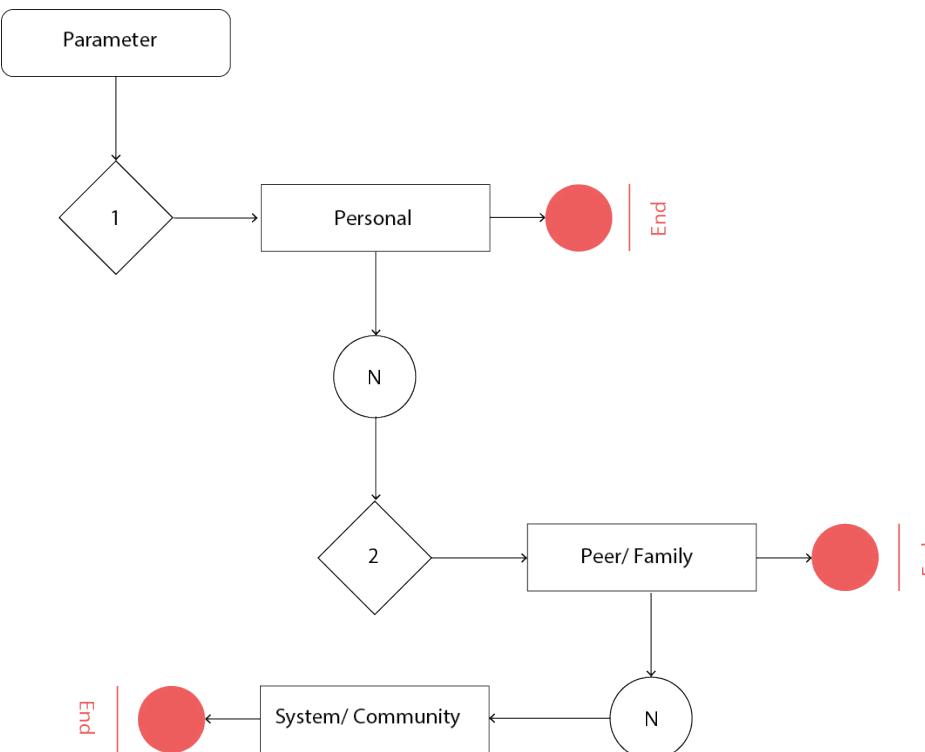
# The Choice Framework

For example, how independent would a locomotor-impaired respondent feel/how much independence would the respondent experience when attempting to travel across their city or town? This would depend broadly on a) the number of transport options available to the respondent, private and public, and b) last mile/door to door connectivity.

Assessing the users' ability to navigate transport outside the house, independently, without human assistance, leads us to understanding their choices, as well as the limitations placed on their choices. Accordingly, we developed the choice framework as an aggregator of the users' needs, frustrations, pain points and disruptions.

Each of the independent living notions or experiences can be conducted either at the personal level (without assistance from family, peers, or strangers), at the level of family or peers (where the person with disability requires a family member to be able to go to the bathroom, or needs a friend to be able to travel), or at the level of the community (where large scale, systemic support is required for the disabled person to conduct the task at hand).

Deploying the choice framework against individual cases can reveal what are some of the barriers individuals face, which can be resolved using either technological or policy interventions, or both.



The conditional flowchart helps us identify the potential enabler for the user. When a user does not meet a condition (i.e. we find she or he does not have access to the enabler), we move to the next check point on the flowchart.

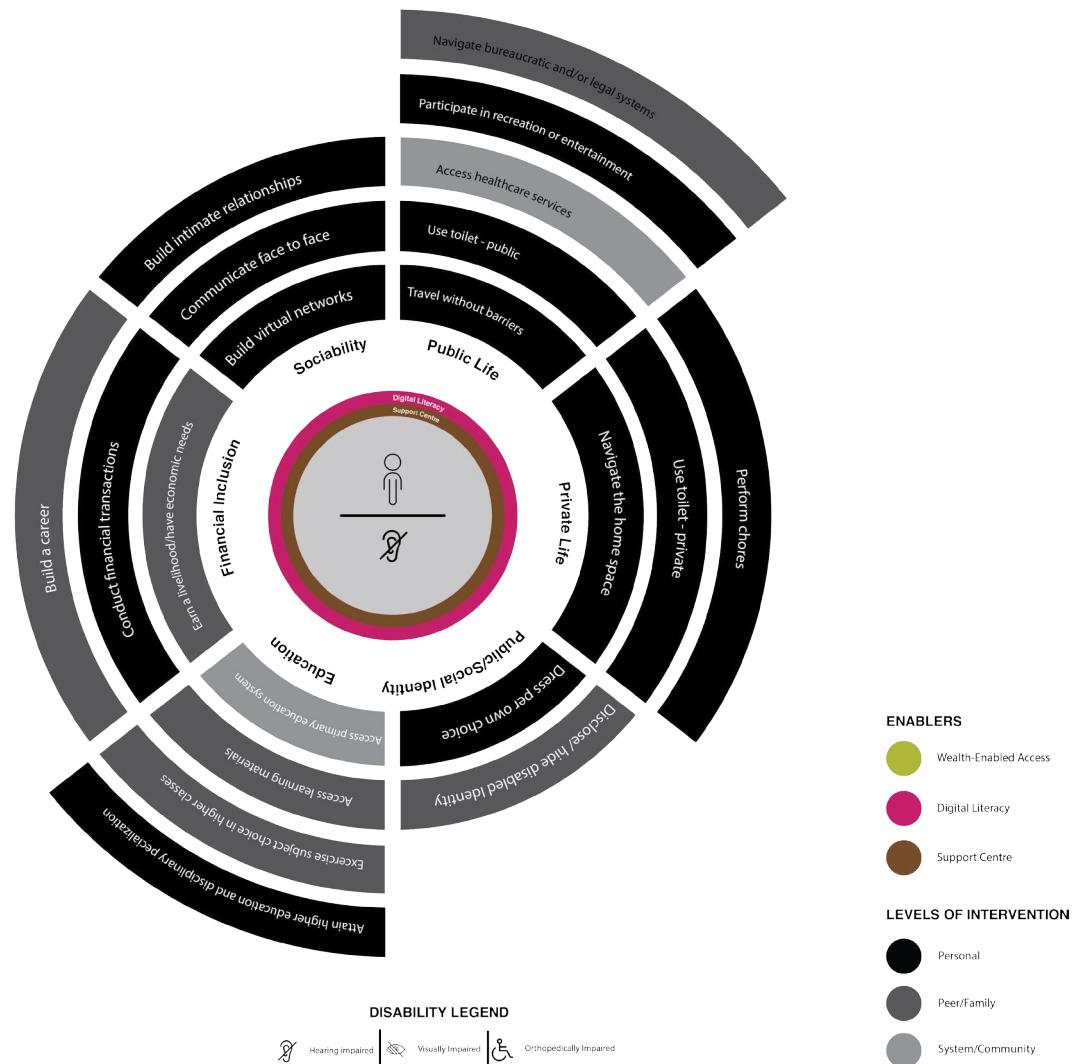
# The Choice Framework

## Using the choice framework

### SAEED-

Saeed (29, male) is part of the Deaf community and lives with his low-income family in urban Lucknow. He spent some of his years in a deaf school in Lucknow, and after finishing class 12 he moved to Delhi to study at a support centre for supplementary learning. He loves watching movies, but can only go to select theatres that show subtitles.

Saeed experienced the benefits of going to a support centre through which he acquired informal work skills, and built networks with others who have the same disability. His sociability is also enabled by the use of technology, specifically, video calling platforms which allow him to communicate using sign language, over dispersed geographies, in real time.



# The Choice Framework

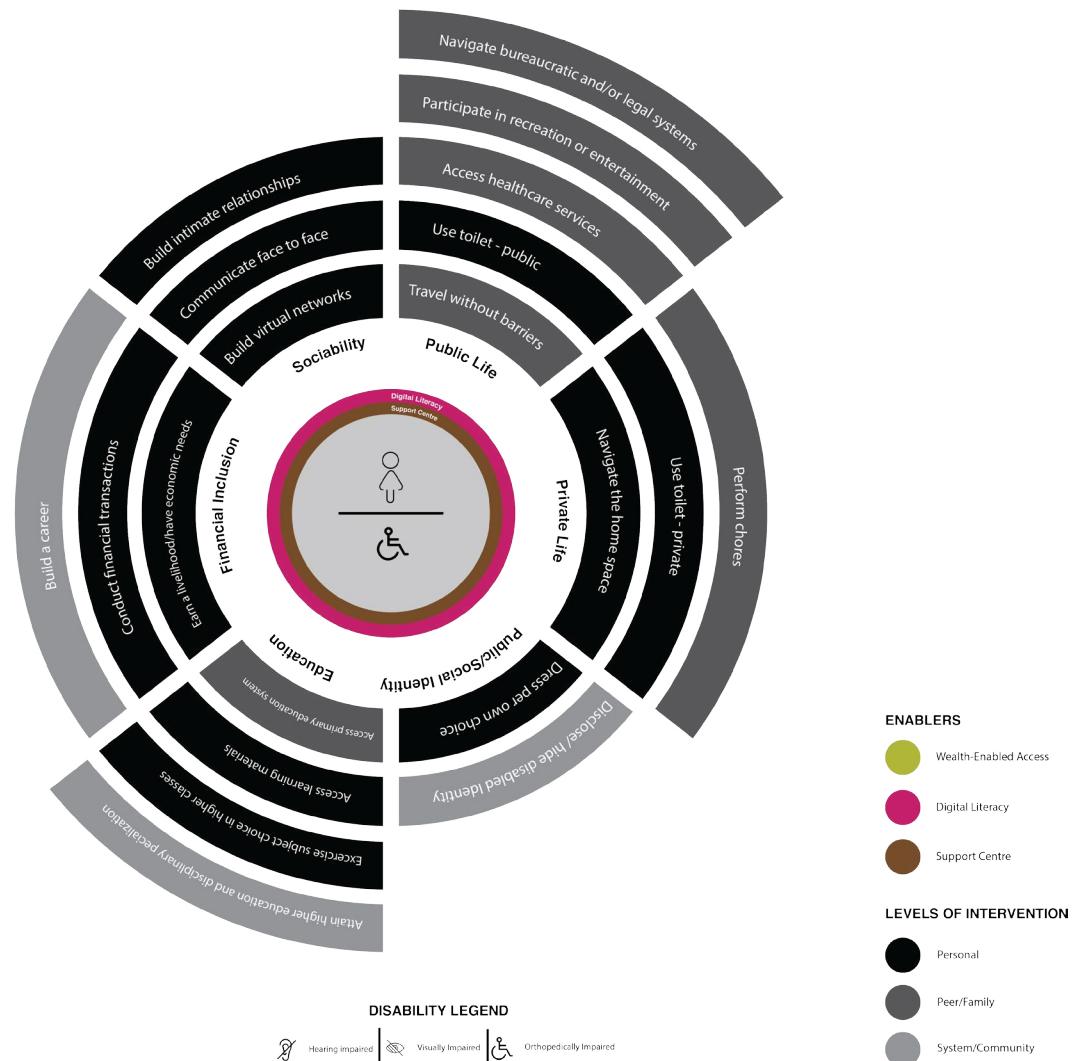
## Using the choice framework

### KRITI-

Kriti (22, female) is locomotor impaired, and lives with her parents and twin brother and older sister in a low income, West Delhi colony. At the age of 5, Kriti says, she got a fever, after which one of her legs stopped working. Eventually the bones in the impaired leg started to degenerate and as she puts it herself 'dissolve'. She isn't the only one in her family with a disability. Her older sister has multiple disabilities.

While Kriti feels she able to operate independently, she relies on family or peer support in strenuous public and private life activities.

She also faces significant systemic barriers. Having a disability, which is not immediately apparent to the naked eye, has prevented her from accessing affirmative opportunities or state benefits and has, as a result, hampered her independent living choices.



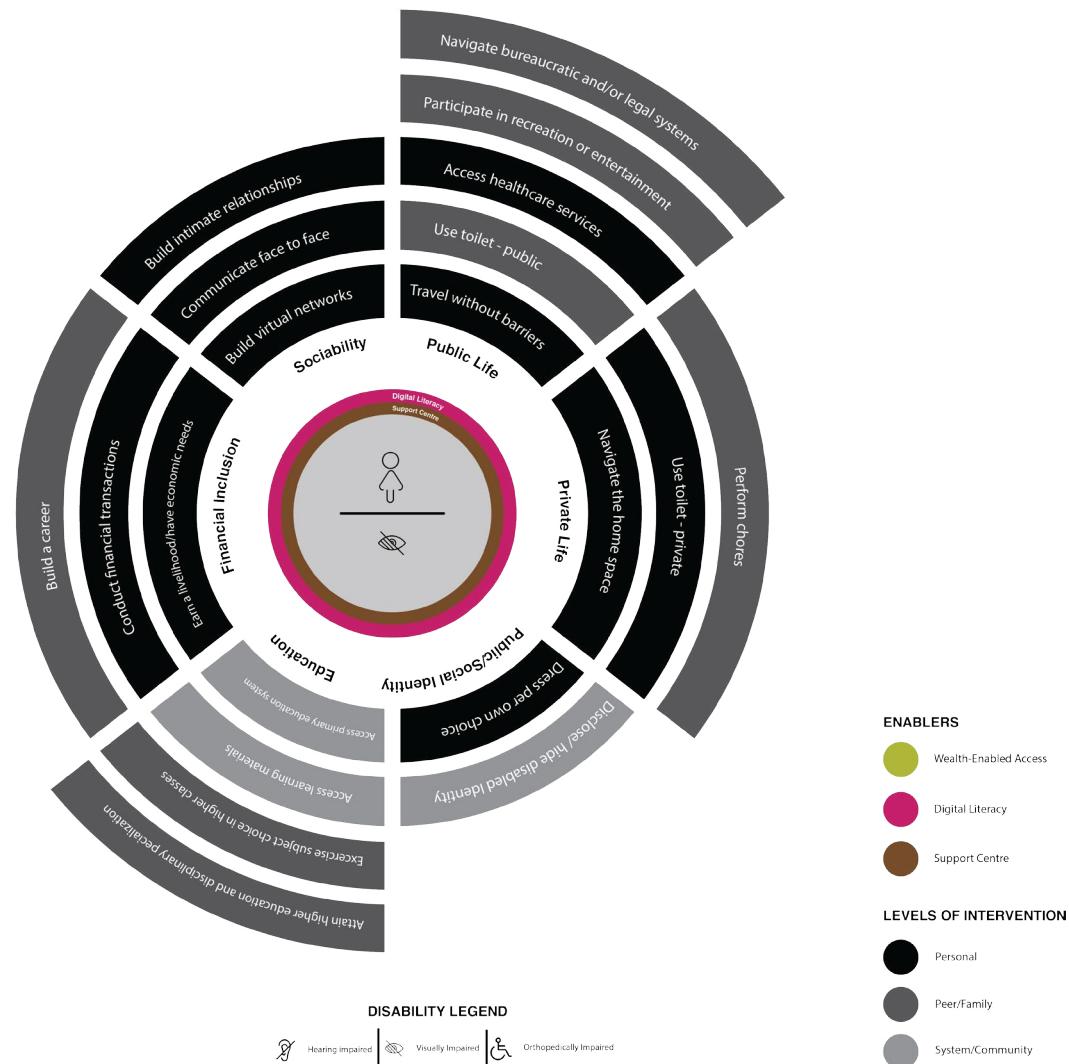
# The Choice Framework

## Using the choice framework

### RUMI-

Rumi (36, female) is unmarried and works in an entry level government sector job in Lucknow. She lost her vision late, and lost out on her education in the process too, having to restart her learning as a blind person halfway through primary school. Her experience of being a person with disabilities in Lucknow has shaped her cynicism of public spaces and interactions.

Rumi depends on human assistance to conduct a wide variety of independent living activities. Support centres intervened in skilling and integrating Rumi after she completed her schooling from a school for visually impaired girls. With their help, she has been able to get access to employment opportunities and is now financially independent, and uses ICT. However, she was unable to follow a higher education of her choice, and now faces little scope for creating a career trajectory for herself.



09



## Intervention Directions for Policy and Technology

*“People are operating in silos. They don’t engage with the end users to know what are the problems that they face and what are the solutions you should be looking for ... the people who are responsible for bringing technology to the people with disabilities are indifferent ... So the problem is not with technology, it is with us people.”*

*-Conversation with George Abraham,  
Key Informant and Founder, Score Foundation*

# Intervention directions for Policy and Technology

Vihara pulled out patterns (repetitive, constant problem areas), analysed how the identified problem areas affected choice-making, and abstracted design principles to direct solutions. Using outlined design principles, product/design briefs were developed, and some indicative solutions were derived (see Appendix II). The experience of barriers in infrastructure, artefacts, and behaviours leads us to the following areas to target policy and technology interventions.

## Opportunity areas for policy makers

- Ensure **mainstreaming of disability thinking in industry standards**, across the automotive, building, and telecommunications industries, work directly with national standards bodies.
- Target national education bodies to **integrate disability studies in national curriculum frameworks**.
- Revamp **disability identification processes** to ensure users are able to avail affirmative action measures and benefits, and communicate disable identity.
- Redesign **financial service processes** to enable maximum and easy participation of people with disabilities.
- Target and **revamp emergency response systems** to include people with disabilities.
- Create **healthcare communication tools** to promote access to healthcare for people with communication disabilities.

## Opportunity areas for architects

- Increase navigability of living spaces. Develop **low cost design solutions** for making private spaces accessible.
- Design '**universal' restrooms** for trains, planes, and other public spaces, with appropriate surfaces, fixtures, and call buttons.
- Design '**universal' sporting arenas**.

## Opportunity areas for product/ technology developers

- Incorporate **ergonomic design for disability in clothing**, to users' choice of clothing that can be worn with assistive aids such as calipers, orthopedic shoes, crutches, wheel chairs, etc.
- Target **accessibility for hearing impaired in smartphones**. Develop and implement methods of non-verbal and non-audio communication.
- Develop **learning delivery systems** that are accessible and encourage participatory behaviours for people with disabilities.
- Create **systems to communicate accessibility changes and updates** in apps, websites, and software.
- Create **multi-sensorial media products**.

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# **Appendix 1**

## List of User Cases

### **Case Study 1**

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#### **Suneet\***

21, Delhi  
Single,  
Master's Student, Hearing Impaired - Complete

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Suneet

Suneet is a 21 year old boy who studies Sociology at JNU. He belongs to the Upper Income Group category. He likes playing football, and has a strong social network, comprised mainly of non-disabled persons. He loves football & partying.

- Cochlear implant in right ear at age 7. Speech therapy at specialist clinic in Chennai. He doesn't use sign language.
- Advised to select one language for speech training - parents chose English. Has picked up Hindi but his proficiency is still beginner's
- exception made for him to drop Hindi as compulsory second language
- Can speak, comfortably using cochlear implant and amplifications. Has received expensive software upgrades over the years
- Studied at Delhi University college, shared an apartment with friends; lives with parents, needs no human assistance
- Drives himself; says he must pay extra attention to the roads, external environments, since he struggles to hear horns



### Obstacles

. Very few significant blocks to identify. Suneet's parents preempted all the major obstacles that he would face.

. Parents' financial position and access to information have minimized the challenges at hand.

. Communicating with multiple people on the football field is a challenge.

. Waking up is a challenge as alarms do not work for him

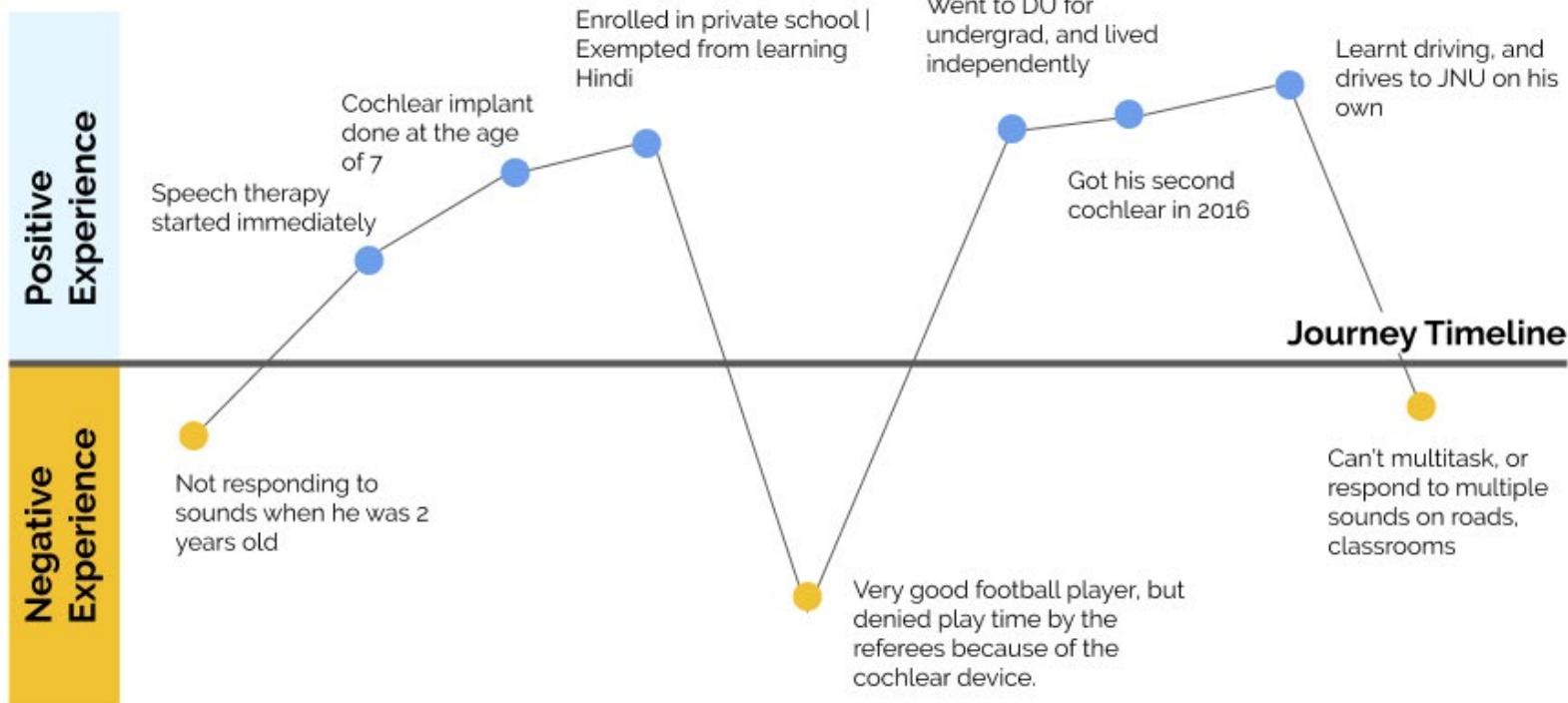
. Horns on roads a challenge, must pay extra attention

# Appendix 1

## List of User Cases

### Suneet

21, Male  
Hearing Impaired,  
Delhi



# Appendix 1

## List of User Cases

### Suneet

#### Life Goals

- . Pursue a PhD and subsequently work in research

#### Frustrations

- . Inability to multitask
- . Can't respond to multiple sounds coming from different direction.
- . Referees don't always allow him play football because of the cochlear devices. His ability to play professionally has been affected

21, Male  
Hearing Impaired,  
Delhi

#### Tech Used

- . Cochlear implant
- . Whatsapp, Facebook, Google Maps, Youtube, Ola, Uber and food delivery and banking apps (on his phone)
- . Laptop for writing assignment and reading.

#### Needs

- . Suggests the cochlear app be adapted to connect with the laptop, as well.
- . Hostel accommodation has quota which shouldn't be there for PwDs

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# **Appendix 1**

## List of User Cases

### **Case Study 2**

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#### **Vijay\***

35, Lucknow  
Informal sector, Unmarried,  
Speech and Hearing Impaired - Profound

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Vijay

Vijay lives in peri-urban Lucknow. He does two jobs, as a servant and than at a wheat mill [*latta chakkil*], and earns Rs. 5,000 at each. He is the main breadwinner, and supports his brothers and an aging mother. Vijay wasn't a typical recruit in this study - he was recommended by the vendor in Lucknow, who happens to be an acquaintance.

- Vijay was never educated, nor were his brothers
- He has a bank account but needs help to operate it
- There is a significant communication gap between Vijay and his family. Relatives use basic, acceptable hand signs to check in with him, but there is no scope for a detailed conversation
- He spends his spare time at home, either listening to music on his phone, or else working on his cycle. He counts two people, including a colleague at work, as his friends
- Once in a while, he cycles twenty kms across town to visit an aunt and her family. That is the extent of his social or trust circle.



### Obstacles

. Vijay was born into an uneducated family and wasn't given the chance to educate himself

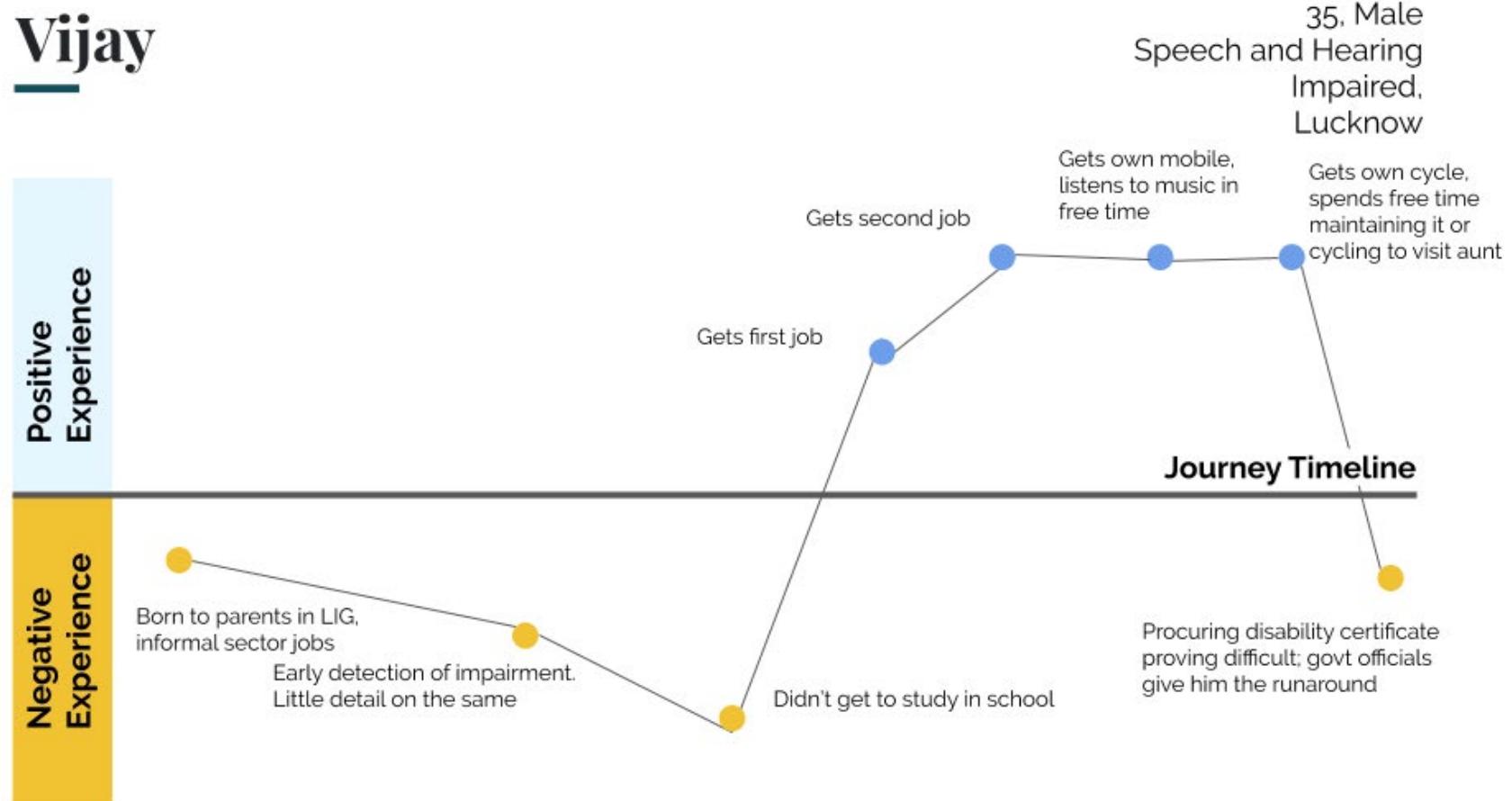
. There is little scope for self-expression or creativity in his life

. Being a menial wage labourer in the informal sector, has little scope during the working week to meet with deaf association or society-like organisations

. One inference is that his disability and poor family support affected his chances at marriage

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Vijay

#### Life Goals

- . This area is a black box because of the challenge we faced in trying to speak with Vijay
- . One inference is that a [minor or major?] goal was to purchase a cycle, which he managed to save for and did

#### Frustrations

- . The following are inferences, given the poor communication between Vijay and everyone around him
- . Inability to study, to build a peer network outside his family (as evidenced by his willingness to cycle 20 kms to visit relatives)
- . Inability to get a disability certificate made, and lack of awareness surrounding that process

35, Male  
Speech and Hearing Impaired, Lucknow

#### Tech Used

- . Cycle
- . Smart phone
- . Music player app
- . Occasionally watches movies on TV

#### Needs

- . Immediate need for disability certificate
- . Perhaps, an increased exposure to a deaf persons network/ sign language introduction
- . Increased transparency of bureaucratic procedures, & awareness, including within family, of legal procedures, disability rights

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## Appendix 1

### List of User Cases

#### Case Study 3

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##### **Saeed\***

29, Lucknow  
Unemployed, Unmarried,  
Deaf

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Saeed

Saeed lives with his family in urban Lucknow. He spent some of his years in a deaf school in Lucknow, and after finishing class 12 he moved to Delhi to study at the Noida Deaf Society. He loves watching movies, but can only go to select theatres that show subtitles.

- Saeed is Muslim, and comes from a lower income group household. He has had to push past several barriers in order to pursue an education
- He speaks exclusively in sign language, and doesn't use any assistive device. He doesn't appear to feel the need for or miss having any assistive device or implant now
- Became deaf at a very early age. Lost a few years in the prime schooling years when he engaged in protests for the rights of deaf people
- The loss of hearing inspired Saeed to protest discrimination against the hearing impaired and the deaf, at a very early age. He has founded an organization to promote awareness and fight for the rights of the hearing disabled in Lucknow
- A constant frustration for Saeed is the lack of sign language interpreters at educational institutions, government offices, banks and other such public spaces moderated/administered by government bodies



### Obstacles

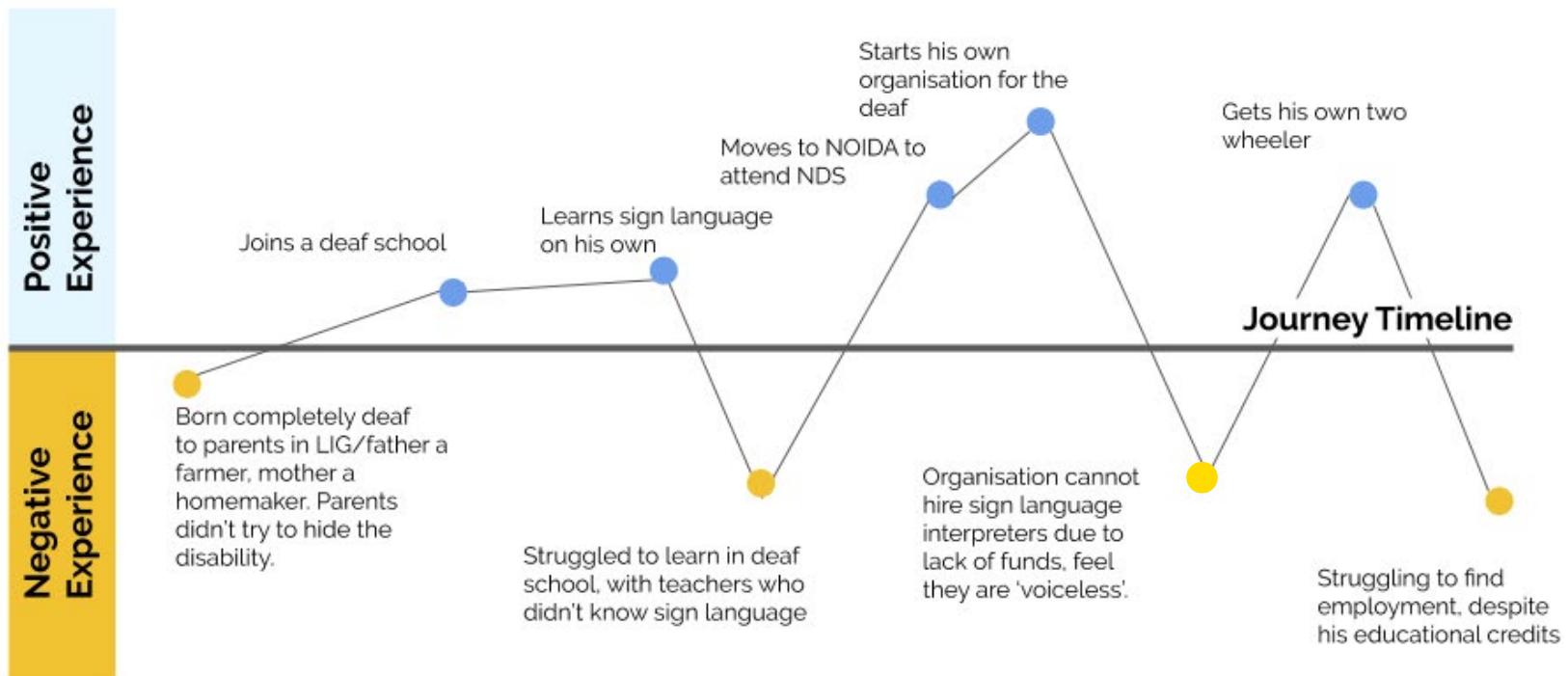
- . Lack of sign language interpreters in school, govt offices and banks
- . Poor numbers of teachers in schools with sign language skills
- . Govt reservations are limited to people with 60% hearing impairment - those with 100% disability don't stand a chance. Saeed has been struggling to find a job
- . The deaf often have to pay bribes in order to get driving licenses

# Appendix 1

## List of User Cases

### Saeed

29, Male  
Deaf,  
Lucknow



# Appendix 1

## List of User Cases

### Saeed

#### Life Goals

- . He wants employment. Has been looking for jobs but hasn't found anything so far
- . He wants his organisation to be able to reach growing numbers of hearing disabled, and train and employ more sign language speakers

#### Frustrations

- . Lack of enough sign language interpreters, specially at govt offices and buildings, metro; lack of visuals for HI in metro
- . Lack of awareness on deaf persons' rights generally, and specifically amongst govt bodies and the police
- . Corruption of the driving license process for the hearing disabled
- . Lack of disability specific apps in India

29, Male  
Deaf,  
Lucknow

#### Tech Used

- . Bike
- . Smart phone & laptop
- . Whatsapp, Facebook, Google, Maps

#### Needs

- . Greater support for the deaf in government spaces
- . A smoother driving license procurement procedure for the HI and deaf
- . Greater pool of sign language speakers at schools, govt offices, banks etc/greater sensitization

# **Appendix 1**

## List of User Cases

### **Case Study 4**

#### **Priya\***

19, Delhi

Single, Vocational Training Student at Noida Deaf Society,  
Speech and Hearing Impaired - Profound

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Priya

Priya is a 19 year old girl, living in a west Delhi colony with her parents and twin brother. We recruited her through the training centre at the Noida Deaf Society. Priya's parents take great pride in her ability to travel without their assistance, her hockey successes, and her overall self-sufficiency.

- Early stage detection led to some speech therapy and a successful cochlear implant in the right ear at 9
- Priya prefers to use sign language, and only uses the cochlear amplification for her family
- Teachers in school didn't know sign language, and she struggled. Learning faster now that she's at NDS (maths, english, computers)
- In comparison to other non-disabled girls in west or east Delhi, Priya has quickly developed the ability to travel long distances, using the Delhi metro
- That said, she needs routine and punctuality in order to travel a route regularly. She visits with specific vendors in the market, or goes with friends to walk the malls for fun. Movie halls aren't considered user-friendly, and her parents don't let her go



### Obstacles

Priya struggled with trying learning without sign language/rote, non-visual learning

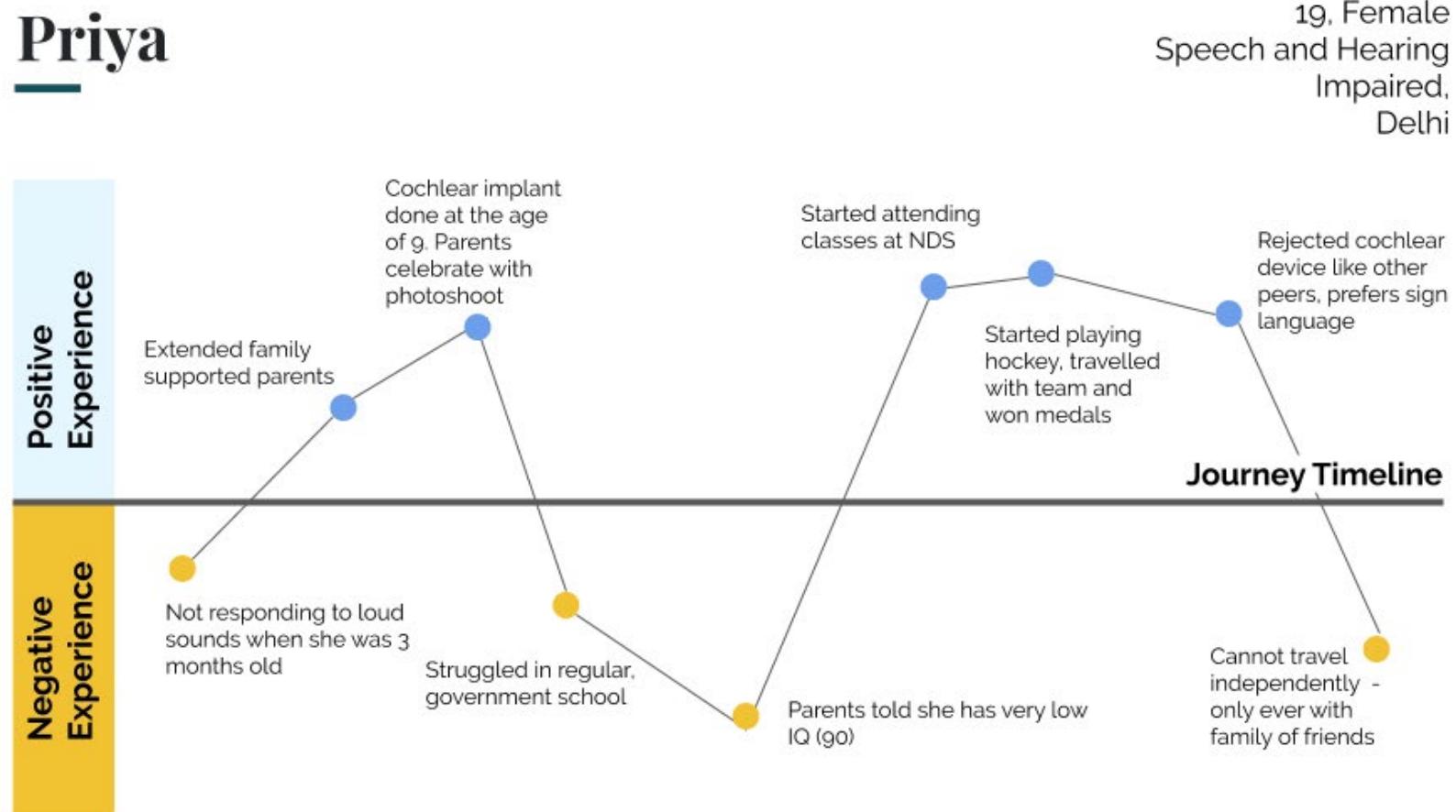
. Recreational, spontaneous travel is out of the question without family

. Finding employment after graduating from NDS will be a challenge

Even if there is a position for her if she isn't able to find a peer group member who travels back & forth with her, her family may not allow her to take it up

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Priya

#### Life Goals

- . Wants to get a job after finishing NDS
- . Wants to continue playing hockey
- . Finds calligraphy interesting, is keen to find a class and train, after NDS

#### Frustrations

- . Never travels alone, she has to have someone around her, who can alert her to get on or get off the transport/metro.
- . Uncomfortable with cochlear device
- . Must use cochlear device for parents and brother, who haven't picked up sign language

19, Female  
Hearing Impaired

#### Tech Used

- . Cochlear implant - only for family
- . Whatsapp video calls, Whatsapp, Google Maps, MiBit, laptop at home for writing assignments and reading, television (not an avid user)
- . Uses Metro for travel, smart card, recharge devices

#### Needs

- . Needs sign language speakers around her for support in public life
- . Deaf persons network - much stronger than with other disabilities - necessary for her education and exposure
- . Need for captioning in essential services - ex: apps, news channels

# Appendix 1

## List of User Cases

### Case Study 5

#### **Suyash\***

29, Lucknow

Engaged, Social Mobiliser

Speech and Hearing Impaired - Profound

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Suyash

Suyash has profound hearing loss, and has always been uncomfortable at home. His family insisted that he speak when with them, so he started spending lesser time with them. They didn't learn sign language in order to communicate with him, either. He loves playing cricket, although he doesn't play anymore.

- Suyash can talk, but refuses to, specially in public, as a statement
- His fiancee is a sign language interpreter herself
- He has worked in a number of places, doing low skilled jobs. He worked at Domino's for a while, and had a supportive boss there, but still struggled. More recently he worked in a clerical job, inputting data into excel sheets. Not having an interpreter in his work places hurt his ability to take on more responsibility
- He is now a mobiliser for the deaf sign language speakers, attached to an organisation for the deaf. He uses Youtube to upload instructional videos in sign language, offering training and placement tips
- Employment opportunities are tough to find - people don't want to hire a deaf person. The interview usually ends when they find out Suyash is deaf



### Obstacles

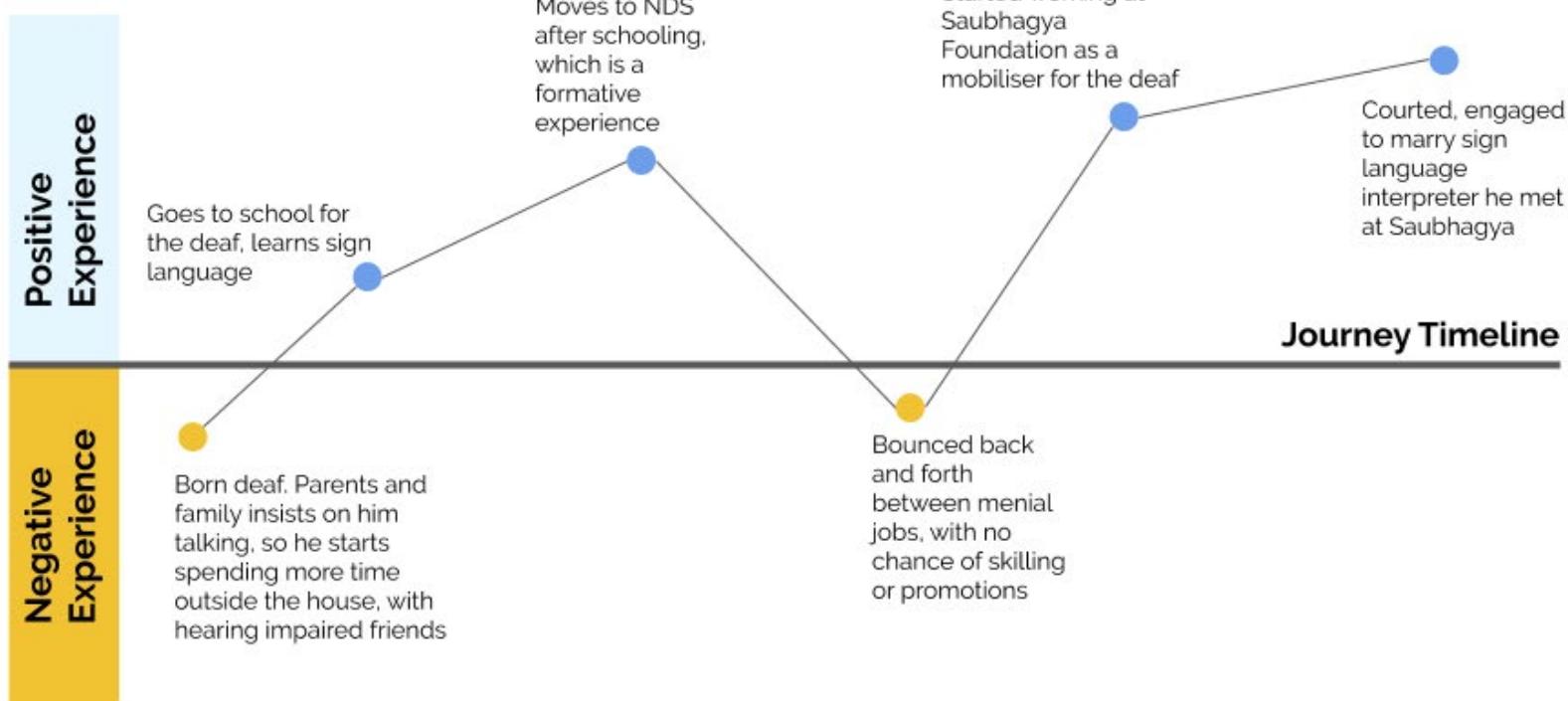
- . In his previous roles, employers weren't willing to give him too much responsibility in the workplace
- . Communication barriers in places such as banks are very challenging
- . People often don't have the time or patience to explain instructions, directions etc
- . He must write down questions or queries for non-disabled/hearing people in an effort to communicate with them, which can be frustrating and time consuming

# Appendix 1

## List of User Cases

### Suyash

29, Male  
Deaf,  
Lucknow



# Appendix 1

## List of User Cases

### Suyash

#### Life Goals

- . He wants to be an activist and facilitator for the deaf/on deaf rights. He is already employed at an organisation and works to train and empower the hearing disabled.

#### Frustrations

- . Communication barrier at important places such as banks, shops and markets
- . Family hasn't learnt sign language, puts pressure on him to talk when with them
- . Lack of sign language speakers, interpreters and awareness within govt bodies of their importance
- . Switching jobs is difficult, because it means he must relearn instructions and processes over again

29, Male  
Deaf,  
Lucknow

#### Tech Used

- . Youtube, google maps, facebook
- . Online banking and payment portals, such as PayTM
- . Online shopping portals

#### Needs

- . Greater communication, training at the workplace
- . Ease of communication in public spaces

# Appendix 1

## List of User Cases

### Case Study 6

#### **Abhimanyu\***

40, Lucknow  
Self-Employed, Unmarried,  
Locomotor Impaired - Paraplegic

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Abhimanyu

Abhimanyu had just started his short service in the Indian Army, as a squadron leader. He was in a car accident at 27, that left him paraplegic and using a wheelchair. He was in the Army hospital for two years receiving rehabilitation, before officially retiring in 2009. He moved to Lucknow, and made adaptations to his house in order ease his transition. He likes playing cricket and his own real estate and construction business.

- Abhimanyu feels the lack of accessibility in public life, most acutely
- He mostly travels by car - long or short distance - and hires a driver. He feels most comfortable with this travel option.
- The Indian Army has rehab centres in Chandigarh, Mohali and Pune. They have physiotherapy, sport centres for the disabled, and treatments at minimal charges. Self-employment is easier for disabled veterans in these cities too. Abhimanyu rejected these services and chose to strike out on his own
- Occasionally travels by air. Says Air India used to have the most disabled-friendly airport to plane transit service. Private airlines don't use ambulifts, so he has to be carried up the stairs, which he doesn't enjoy.

In comparison, the Indian Railways is much tougher to navigate.



### Obstacles

. His concerns re: disability have more to do with public infrastructure

. He feels strongly about the lack of disability-friendly design in public areas, and works as an advocate on the same. Some of the pain points he identified include parking areas (no reserved parking spots), lack of wheelchair track on roads.

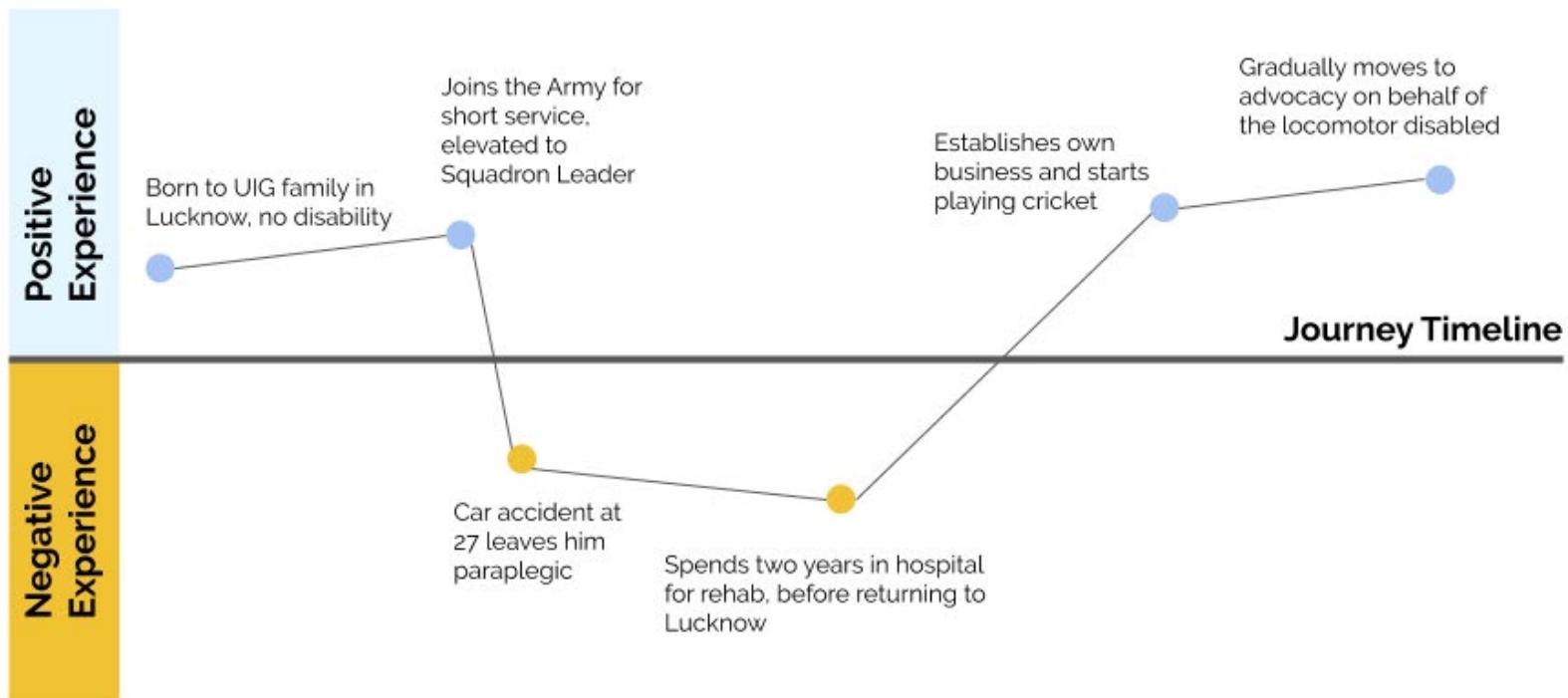
. There's a lot technology that is still at prototype stage and too costly even for UIG respondents such Abhimanyu to access. For example: wheelchairs

# Appendix 1

## List of User Cases

### Abhimanyu

40, Male  
Locomotor  
Impaired,  
Lucknow



# Appendix 1

## List of User Cases

### Abhimanyu

#### Life Goals

Abhimanyu has turned himself into an influential figure, and an advocate for LI disabled rights and awareness.

#### Frustrations

- . Even the decently designed, manual wheelchairs that the govt distributes are cost prohibitive, starting at Rs. 30,000 to Rs. 40,000. Even the good wheelchairs, starting from a lakh, need further customization to support the spine
- . The govt spends very little on awareness on disability

40, Male  
Locomotor  
Impaired,  
Lucknow

#### Tech Used

- . Smart phone
- . Wheelchair
- . Social media platforms for the disabled
- . Travels frequently by car but doesn't drive himself

#### Needs

- . greater sensitization, awareness among non-disabled persons, especially govt appointed functionaries
- . low cost/cost-effective disability tech
- . better design of public transport transit points

# Appendix 1

## List of User Cases

### Case Study 7

#### Kriti\*

23, Delhi  
Informal Sector Labourer, Unmarried,  
Locomotor Impaired

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Kriti

Kriti lives with her parents and twin brother and older sister in a low income, west Delhi colony. At the age of 5, Kriti says, she got a fever, after which one of her legs stopped working. Eventually the bones in the impaired leg started to 'dissolve'. She isn't the only one in her family with a disability. Her older sister has multiple disabilities - a locomotor disability and a speech impediment.

- Kriti had a [surprisingly] supportive environment at the government school she attended.. Teachers allowed her to sit on chairs or benches, while other students had to sit on the floor
- The doctors recommended she get operated after turning 18, but 5 years after that, she still hasn't gotten the operation. Doctors have suggested she may need crutches, which would've meant adapting to an assistive aid for the first time
- Kriti enjoys observing fashion, and prefers arts and crafts over relatively more physical activity
- Her brother had the Singer sewing machine she uses mechanically adapted so that she wouldn't have to use the pedals as frequently anymore



### Obstacles

. Inference: Although her parents are supportive of her, the effort to help her adapt and generate an income at home MAY serve as an impediment to her long term exposure and development outside the home sphere

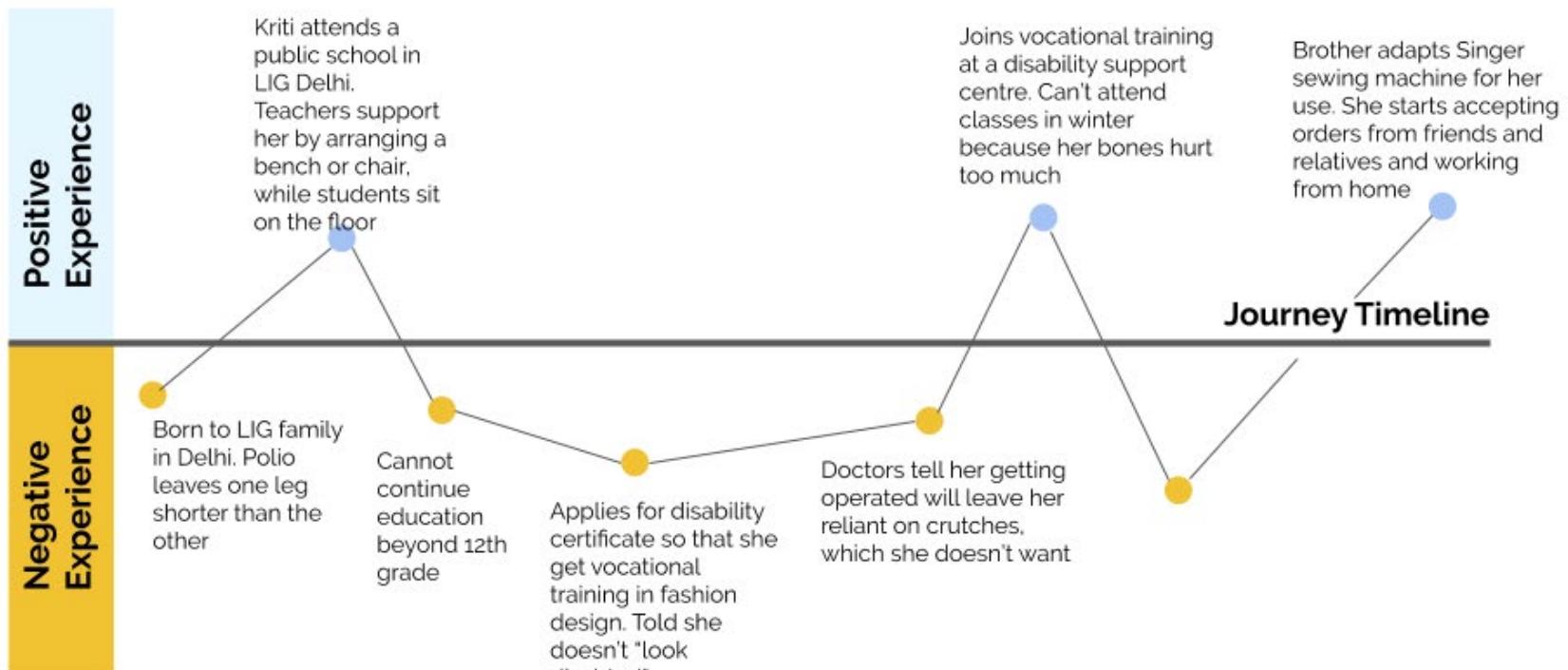
. Doctors and govt officials have, on different occasions in her life, disbelieved her and questioned whether hse is actually disabled. This has directly affected Kriti's ability to secure low cost treatments, supplements, and more recently her disability certificate

# Appendix 1

## List of User Cases

### Kriti

23. Female  
Locomotor  
Impaired,  
Delhi



# Appendix 1

## List of User Cases

### Kriti

#### Life Goals

- . Wants to study fashion design and make a career out of it
- . INFERENCE: She may have a desire to travel, and purchase items online

#### Frustrations

- . Govt doctors and officials don't believe that she is disabled, because she 'doesn't look disabled'
- . She hasn't been able to secure a disability certificate, that she needs in order to access govt services, reservations and more urgently the training programs for PWDs in fashion design
- . Her bones hurt during Delhi winters, causing severe restrictions on her movement & overall mental health. She hasn't been able to access low cost calcium supplements
- . She can't attend classes at the Vikhlang Samiti centre in winter

23. Female  
Locomotor  
Impaired,  
Delhi

#### Tech Used

- . Smart phone
- . Whatsapp, TikTok, Beauty Plus (App), Messenger, Voot, Youtube, Windmate, FB, Amazon, FM Radio, Saavn, Makemytrip

#### Needs

- . greater sensitization, awareness among non-disabled persons, especially govt appointed functionaries
- . disability tech
- . affordable assistive tech, supplements
- . Greater exposure, mobility

# Appendix 1

## List of User Cases

### Case Study 8

#### Tanya\*

33, Delhi

PhD Candidate, Unmarried,  
Locomotor Impaired

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Tanya

Tanya lives in south Delhi in a first floor apartment. She leaves home everyday at present to go visit the NMML Library, as she is finishing her PhD dissertation and needs to work there every day, for as long as 8-10 hours. She uses a caliper, which she finds difficult to use, and extremely uncomfortable. She didn't date for a long time, but has a steady boyfriend now.

- She had polio at 5 months, after her parents missed giving her the right shots. Had several reparative procedures and physiotherapy immediately.
- She stopped using the calliper at 12/13 after doctors asked her not to.
- Describes herself as a late disability because she had to learn to walk again and start using a calliper, after a torn knee ligament at 28.
- She wears her calliper along with two layers of clothes, even at the height of summer. Suffers cuts, bruises to the inner thighs as a result
- Has suffered discrimination on basis of disability and gender in another library - complaint against the offender went unregarded by university authorities

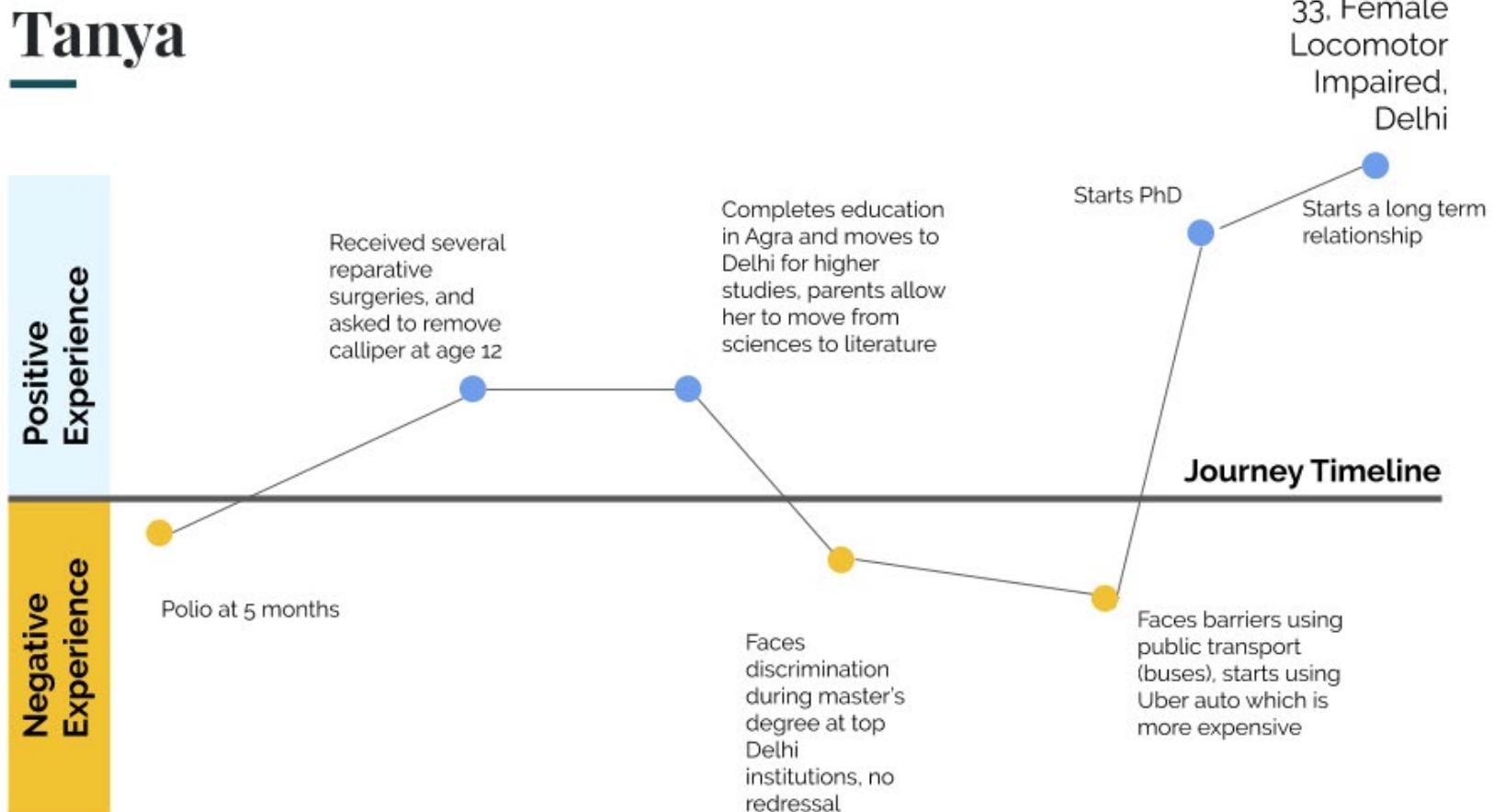


### Obstacles

- . Mental trauma of having to learn to talk again is the main challenge
- . Discrimination because of a now pronounced limp affects her morale and self-impression considerably
- . Not comfortable with the calliper

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Tanya

#### Life Goals

- . working on her PhD, on Kashmir.
- . wants to stay in academia, going forward

#### Frustrations

- . People continue to discriminate against her, based on her limp
- . She cannot use public transport and must spend much time directing Uber autos
- . the calliper causes her considerable discomfort, and she's not comfortable letting it show; must always wear flats, and cannot wear saris

#### Tech Used

- . Smart phone
- . Uber auto
- . Google Maps, using voice instructions

33. Female  
Locomotor  
Impaired,  
Delhi

#### Needs

- . better public design & layout
- . better access to public transport and communal buildings such as libraries
- . better public and govt sensitization

# Appendix 1

## List of User Cases

### Case Study 9

#### Neha\*

63, Lucknow  
Banker & Activist, Married,  
Locomotor Impaired - Paraplegic

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Neha

Neha is married with two grown and married children. Her husband is non-disabled, a physiotherapist, and has helped design their entire house so that Neha can reach things easily, from a lower height. All the counters in her kitchen have been lowered so that Neha can cook there, independently. She also loves driving, and has had her car fitted in order to access foot controls by hand.

- Neha experienced post-polio syndrome - muscles that had worked for a good part of her adult life, suddenly gave up, leading to accelerated function loss. Although her disability set in early, this experience is much like having a late disability
- She loves clothes shopping, but finds that dressing rooms, lifts and other mechanically operated spaces in such spaces aren't designed to accommodate wheelchair users
- At the bank where she works, Neha makes it a point to execute her work quickly, so that people aren't kept waiting
- She uses a smartphone and a laptop for work, but doesn't feel the need to use it for anything beyond networking or socialising.



### Obstacles

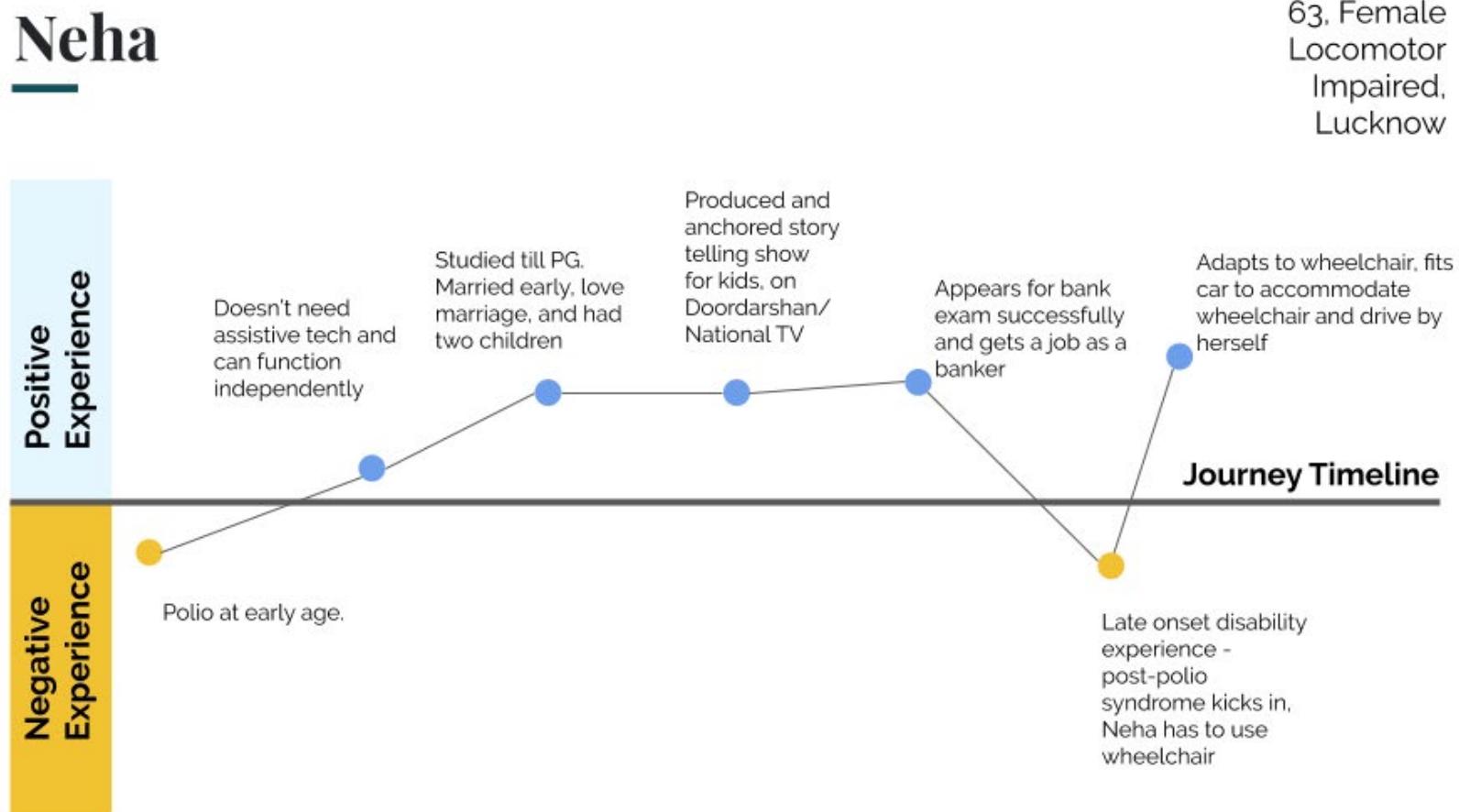
. Adapting to a wheelchair late in her life was a challenge. This also meant that she couldn't access the first floor of her house anymore

. She must fit her own car in order to drive. Alternately, she doesn't use travel apps such as Uber or Ola.

. The public spaces she loves visiting aren't fitted or designed to accommodate disabled persons or persons in wheelchairs.

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Neha

#### Life Goals

- . Wants to be able to travel the world more
- . As a young woman, she wanted to work on Doordarshan. She did for a while, but after getting a job in a bank, she let the showbiz dream go

#### Frustrations

- . Public spaces aren't well design, or designed keeping in mind the locomotor disabled and those using wheelchairs
- . She cannot access some of her favourite stores in Lucknow at any time she wants - restrictions are placed on her by store staff, and by the lack of good facilities
- . She would like to travel outside Lucknow more.

63, Female  
Locomotor  
Impaired,  
Lucknow

#### Tech Used

- . Smart phone
- . Modified car
- . Laptop

#### Needs

- . better public design & layout
- . better systems design around public buildings, specially stores and marketplaces
- . Cars that allow for disabled persons to drive, designed and fitted accordingly

# Appendix 1

## List of User Cases

### Case Study 10

#### Riaz\*

26, Delhi

Part time Cricketer, Widowered,  
Locomotor Impaired - Paraplegic

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Riaz

Riaz completely lost use of his legs and walks using his hands to drag his body forward. In a way, this is the first point of discrimination for Riaz, at least in public life. He is conscious of this, and is eager to operate independently, with minimal assistance. He used to work as a tailor but now works exclusively as a wheelchair cricketer.

- Riaz asserts that he is normal. He has a supporting family, and was married for a short while but his wife passed away shortly after their marriage
- He doesn't have his own wheelchair, and uses his hands to move. Over the weekends, he plays wheelchair cricket, for which he is assigned a special wheelchair, adapted for cricket play
- He doesn't like it when people healthier than him beg on the streets. Riaz thinks they are compelling society to look down on handicapped people, or else view them with pity
- He has his own adapted two wheeler, which he uses to self-commute. He is proud of being able to commute by himself.



### Obstacles

. Cost of wheelchair is a seriously obstacle for Riaz

. People can often be impatient, and not very helpful. For example, Riaz says bank staff aren't always helpful. He has raised this issue with the bank manager but doesn't get any constructive response

. Public spaces aren't designed keeping paraplegics such as Riaz in mind. Counters in banks, hospitals etc can be too high, and this leaves Riaz dependent on others (strangers), to reach out papers or items to him as needed

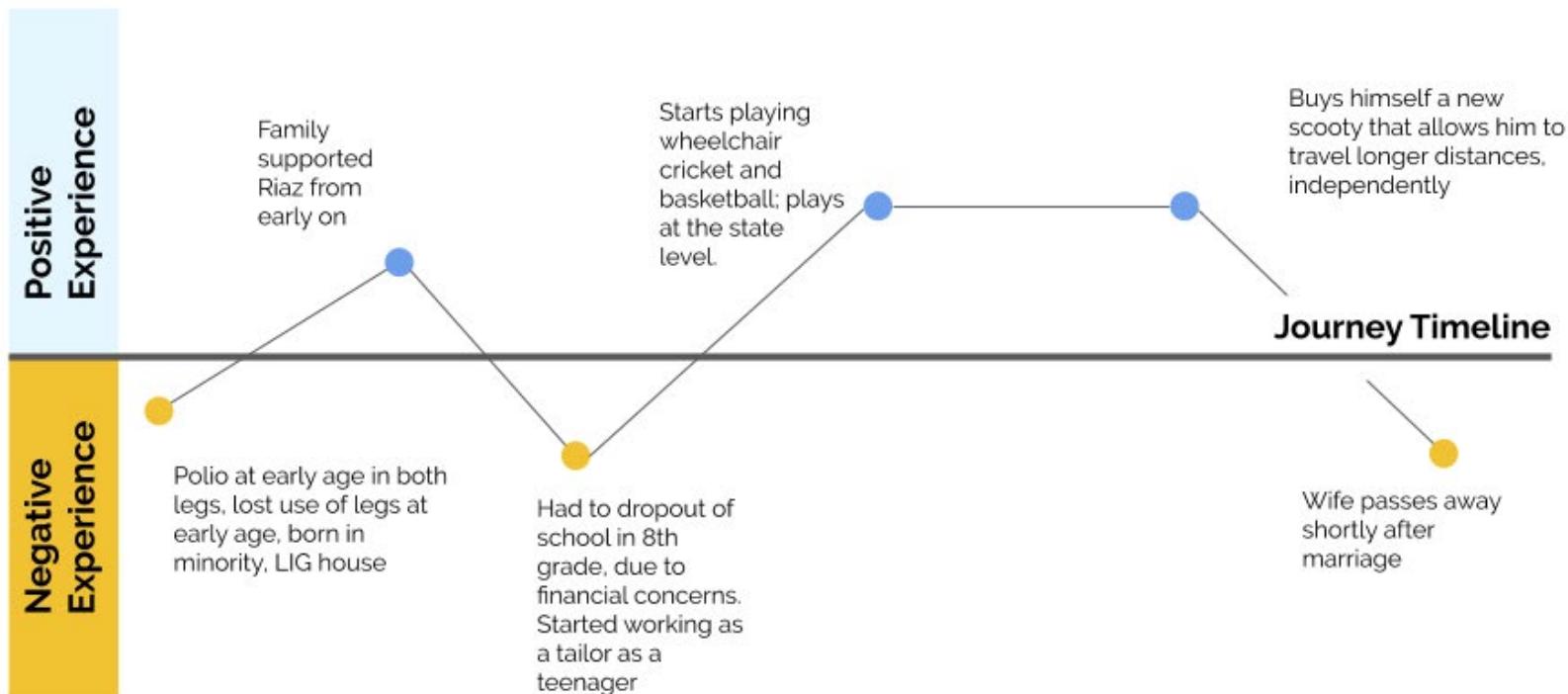
. He doesn't find the Lucknow metro user friendly

# Appendix 1

## List of User Cases

### Riaz

26, Male  
Locomotor  
Impaired,  
Delhi



# Appendix 1

## List of User Cases

### Riaz

#### Life Goals

- . Wants to continue playing cricket
- . Wants to buy his own, high-end wheelchair, so that his wrists aren't further damaged
- . Wants to live independent of his family/self-sufficiently and wants to set example for other disabled people.

#### Frustrations

- . Public spaces aren't easy to navigate. Surfaces are tough, and Riaz feels discriminated against by onlookers
- . Despite repeated efforts, Riaz hasn't been able to secure a driving license. He drives without one presently
- . Bus drivers, govt officials, bank staff are insensitive, tend to ignore him or his requests

26, Male  
Locomotor Impaired,  
Delhi

#### Tech Used

- . Smart phone
- . Modified wheelchair (only for cricket)
- . Scooty, modified

#### Needs

- . greater sensitization, awareness among non-disabled persons
- . driving license, easy bureaucratic navigation
- . affordable wheelchair

# Appendix 1

## List of User Cases

### Case Study 11

#### Rumi\*

36, Lucknow

Government sector employee, Unmarried,  
Visually Impaired - Complete/ Blind

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Rumi

Rumi is unmarried and works in a government sector job in Lucknow. She lost her vision late, and lost out on her education in the process too, having to restart her learning as a deaf person halfway through primary school. Her experience of being a disabled in Lucknow has shaped her cynicism of public spaces and interactions.

- Learnt braille late in life, this interfered with her ability to study. Has picked it up and is proficient in it now.
- Had to move from Lucknow to Delhi on order to pursue an education; having an english medium education prior, helped
- When she got her job in the GST department with the UP Government, she was surprised to find that her colleagues didn't "know about my disability".
- She has a limited social circle and operates in a routine, travelling from work to home and back
- Struggles with public transport, particularly with boarding buses. Puts it down to insensitivity on part of passengers and service providers.

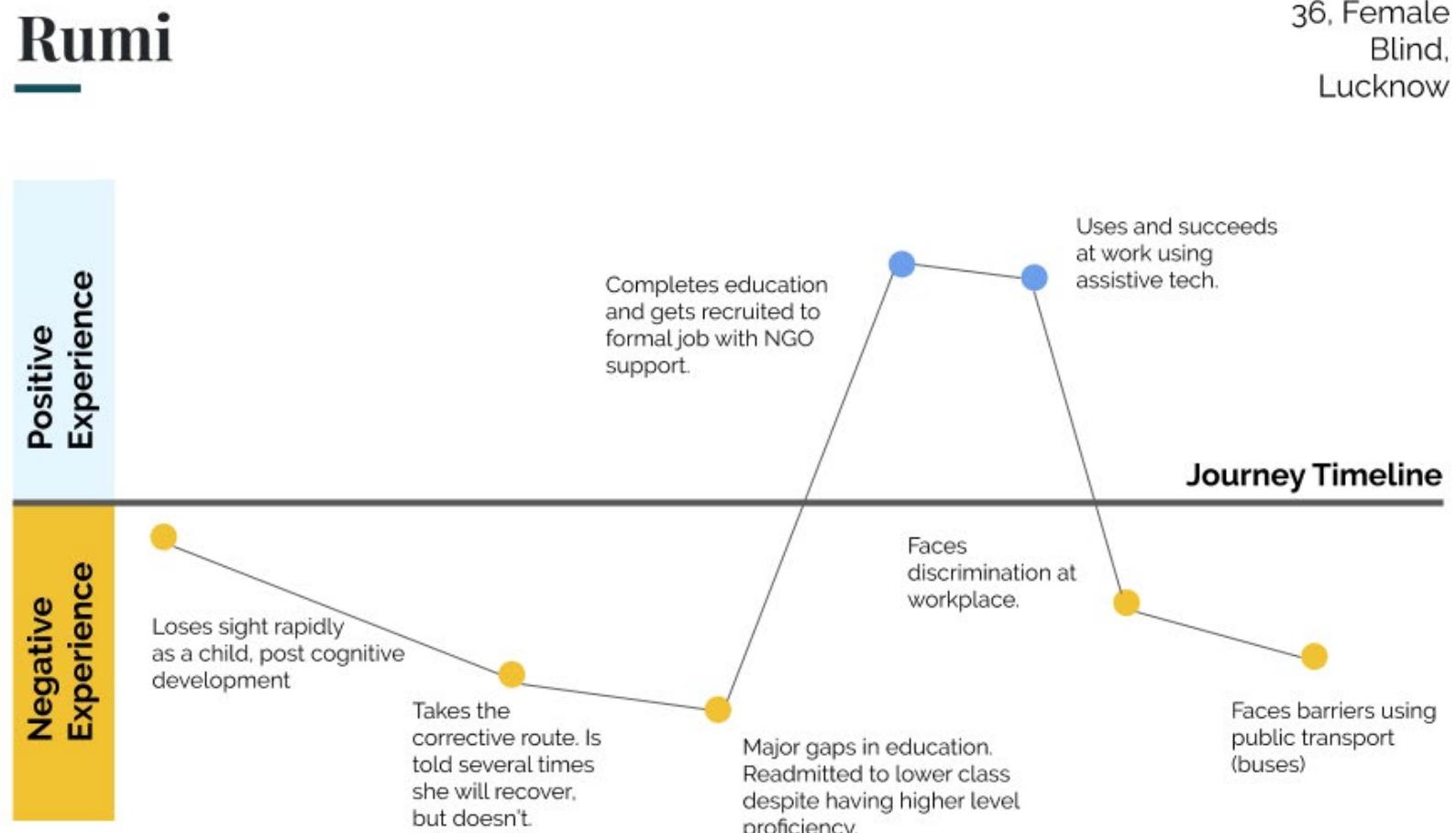


### Obstacles

- . Non-metro public transport, especially buses pose a particular challenge. There is always the fear of falling, and fellow travellers in Lucknow can be insensitive.
- . Punctuality and the design and layout of bus stations/bus stops are a concern.
- . Poor connectivity matters - especially poor last mile connectivity, affects Rumi

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Rumi

#### Life Goals

- . Wants to travel to the hills, specifically to Uttarakhand. Her favourite author writes about Uttarakhand.

#### Frustrations

- . Faces constant discrimination in the workplace. Has to go through 'tests' to prove that she knows her surroundings and is aware.
- . Had to be readmitted at a lower class because she didn't know Hindi and all blind schools teach in the Hindi medium.
- . Buses don't stop at assigned places. The bus run is not systematic. Can't use buses despite finding them more convenient.

36, Female  
Blind,  
Lucknow

#### Tech Used

- . Smartphone was a major boon for her when it first arrived
- . Google Maps, using voice instructions.

#### Needs

- . better public design & layout
- . accessible mobile phone apps, post updates

# **Appendix 1**

## List of User Cases

### **Case Study 12**

#### **Prateek\***

21, Delhi

Undergraduate Student, Unmarried  
Visually Impaired - Complete/ Blind

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Prateek

Prateek is 21 years old, originally from Uttar Pradesh. He moved to Delhi in order to study. He lost his eyesight early in life, and uses a smart cane as an assistive aid. He enjoys living away from his family. Barring help from his landlady on laundry and homemade meals, Prateek functions with little to no human assistance. Prateek is studying English Literature.

- Prateek lives in a rented accommodation, a set of two rooms, and a few basic electronics. He has his own room and shares another, common room and a refrigerator with a neighbour.
- He uses battery operated rickshaws and the metro to commute between home and college or the National Association for the Blind. He sometimes travels with a friend, female, also visually impaired.
- Metro guards usually offer him assistance after spotting his white cane folded in his pocket, when he is being frisked at the entrance.
- Eats regularly at the college canteen. He must make use of his hands in order to assess the food items he is about to consume.
- Says he finds the smart cane difficult to maneuver sometimes, because Delhi's crowded roads and platforms tend to set it off all the time.

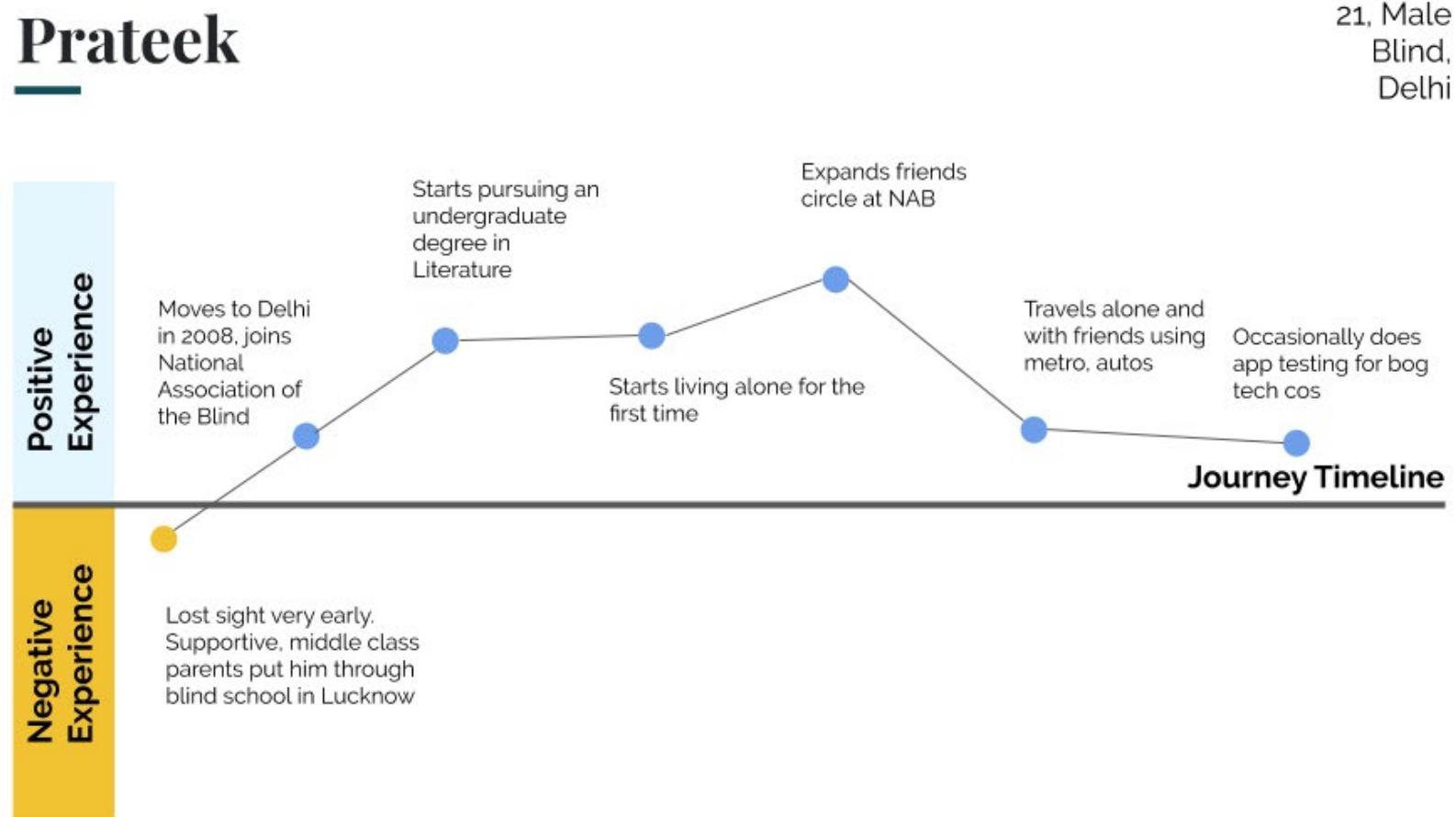


### Obstacles

- . Relatively independent, Prateek does however depend on the kindness of strangers - guards, staff etc - to help him out or offer him assistance when needed
- . the smart cane can be difficult to handle at times, vibrating constantly
- . whenever apps are updated on his android phone, he struggles with figuring out the new features

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Prateek

#### Life Goals

- . Doesn't seem to have given life goals too much thought, but he wants to stay in academia

#### Frustrations

- . Very few frustrations - the smart cane can be better designed with better haptic technology, and has rejected using it.
- . Doesn't always like using the cane - he knows that will mark him out as being blind/visually impaired to the public, and he is conscious of that image

21, Male  
Blind,  
Delhi

#### Tech Used

- . Smartphone
- . Zomato, Swiggy, search engines
- . Google Maps, using voice instructions
- . Movie players/streaming services
- . Screen reading software

#### Needs

- . More text reading options
- . More convenient smart canes

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# Appendix 1

## List of User Cases

### Case Study 13

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#### Ravi\*

31, Lucknow  
Banker, Married  
Visually Impaired - Complete/ Blind

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Ravi

Ravi's case is technically a late stage disability - i.e. his cognitive abilities had formed when he lost his eye sight due to a freak household accident (and some negligence on part of the doctors attending to him). He was self-conscious for nearly a decade after the accident, at age 9, and stopped leaving his room other than to go to the hospital with his mother.

- Ravi changed his outlook at the age of 19, and started studying again. He pushed himself to learn braille and computers, and started appearing for govt entrance exams
- Ravi says he felt discriminated against when, despite acing the entrance tests, he didn't get through any of them. He finally got through the State Bank of India test, and was stationed at a branch near his parents' home. They asked him to stick with this so that he could be close to them
- He likes using Ola bike shares to commute to and from places, and hopes to buy a car next year
- He was recently offered a promotion and more money to move to another UP town branch, but he declined in order to stay close to family and to support his present supervisor



### Obstacles

. the biggest challenge came post his accident - Ravi says he put on scores of kilos in weight, shut himself off from the world, and had to overcome a lot of mental blocks in order to return

. He struggled with the govt entrance exams - didn't get through to many final interview rounds. In one final interview, he realised a lot of candidates vying for disability reserved seats were non-disabled

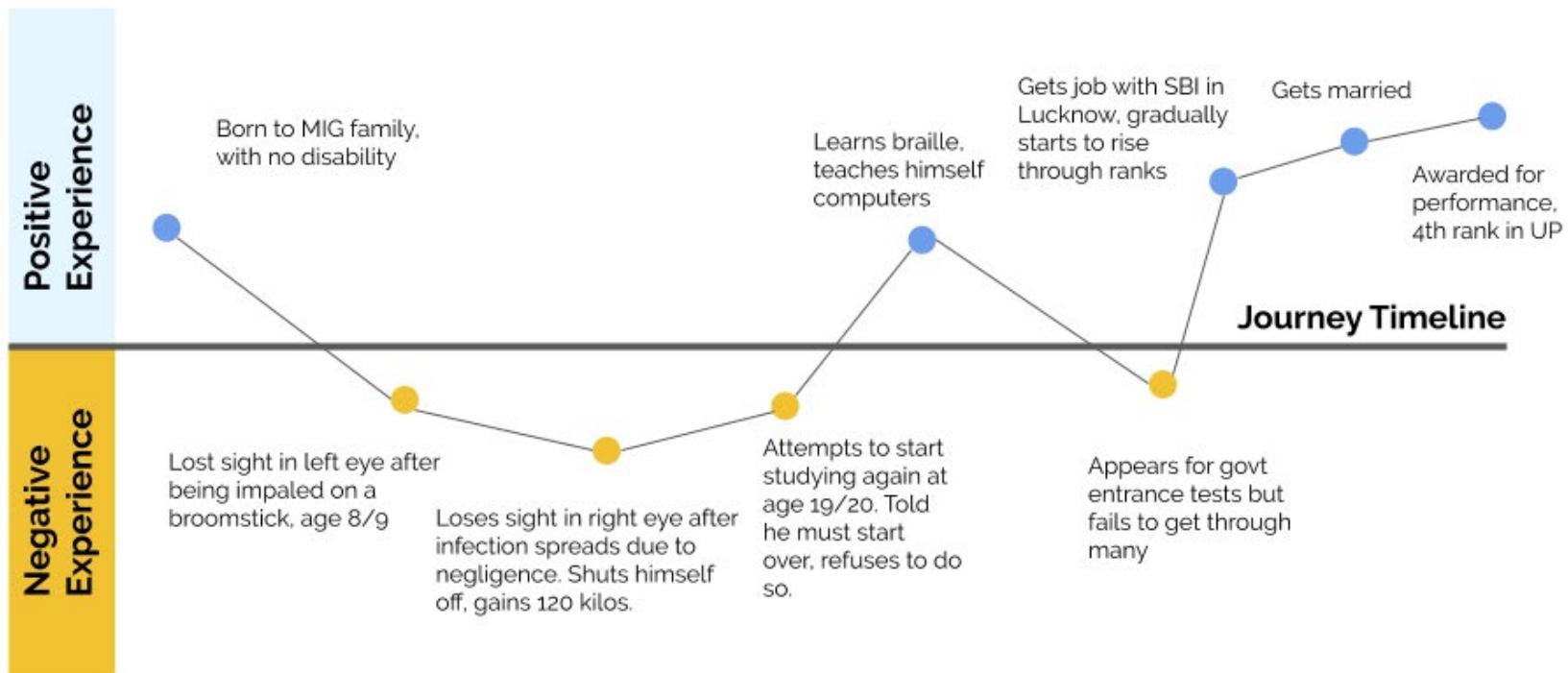
. govt bureaucratic systems can be frustrating

# Appendix 1

## List of User Cases

### Ravi

31, Male  
Blind,  
Lucknow



# Appendix 1

## List of User Cases

### Ravi

#### Life Goals

- . Wants to continue working with his present company
- . Wants to purchase a car next year

#### Frustrations

- . Discrimination is a problem - people don't always understand that their obvious pity for the visually impaired can be insulting or hurtful
- . Ravi wishes more visually impaired men and women would follow his example and make the effort to prove that they are just as capable as the non-disabled, or, deserving of meritocratic treatment

31, Male  
Blind,  
Lucknow

#### Tech Used

- . Smartphone, Roshni app
- . Ola bike, Uber
- . Google Maps, using voice instructions
- . Prepaid cards, online banking
- . Screen reading software
- . Laptop for work

#### Needs

- . Greater sensitization of govt officials, staff, bus drivers and conductors etc
- . More opportunities for the disabled outside the banking sector
- . Alarms for people to become alert when a VI person is in trouble

# Appendix 1

## List of User Cases

### Case Study 14

#### Karim\*

39, Lucknow

Banker, Married

Visually Impaired - Complete/ Blind

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Karim

Originally from a small town in Madhya Pradesh, Karim has had to move in order to build a life and career for himself. He has a genetic disorder, retinitis pigmentosa, which caused his eyesight to deteriorate as a child, to the point where he was completely blind. His family tried very hard to 'cure' him. He tried to hide his disability, which caused him a lot of anguish and psychological trauma early on.

- Studied in normal schools growing up. He started struggling with loss of eyesight around 16, by which time he had learnt to read and write
- Learned braille at 23. He followed this up by getting his bachelors of arts and masters of arts degrees. He also has a B.Education diploma.
- He learnt computer classes, and had to translate the guide books into braille. He has translated three such books into braille. Karim says it's a time-consuming effort
- Karim used to travel by buses in the past, but he finds them inconvenient. He now lives a few minutes walk away from his office, at a bank. A guard comes to get him every morning.
- His walking stick is his main, mostly only, guide to understanding the lay of the land around him/the environment he's walking in

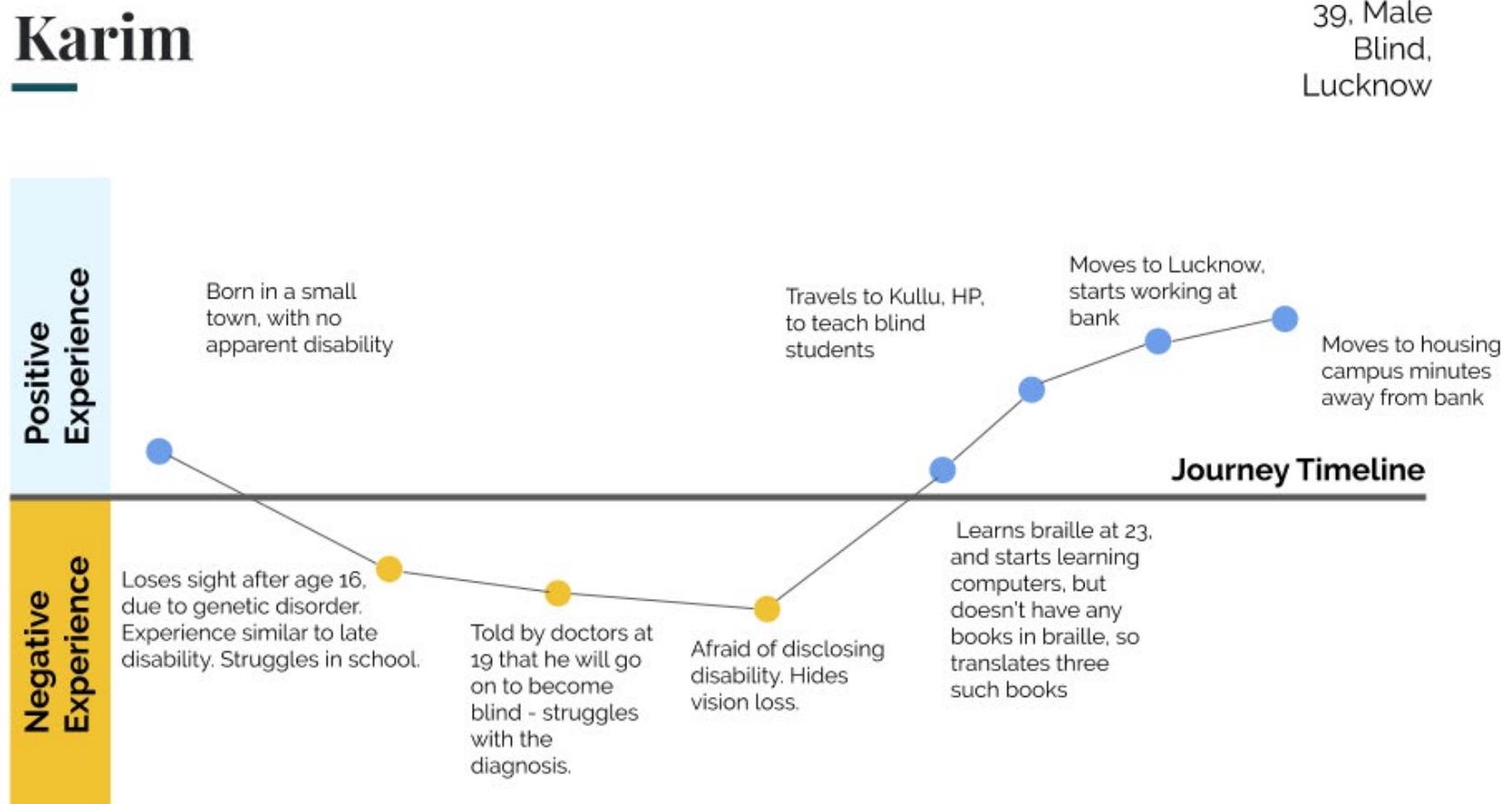


### Obstacles

- . Karim's main concerns have to do with poor connectivity, resources and facilities, and insensitivity.
- . His own parents' attempts to correct the course and hide him from the world have caused him long term mental trauma
- . Learning materials in braille at the time of his higher education would've been most useful
- . His movements are restricted to the sphere of the built environment he is familiar with - he has increasingly reduced the distances between home and work

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Karim

#### Life Goals

- . At present he is a scale 2 officer in a national bank. He would like to move further up the professional ladder

#### Frustrations

- . The early efforts to hide him away, at a time in life when he needed more exposure to world especially, caused Karim some trauma.
- . There should've been more resources in Braille at the higher education level
- . Public transport is increasingly difficult to navigate independently.

39, Male  
Blind,  
Lucknow

#### Tech Used

- . Screen reading apps, english handwriting reading apps
- . Be My Eyes
- . Uber Eats, Swiggy, Big Basket, Grofers
- . Google Maps, Google Pay,

#### Needs

- . Greater sensitization of the family, especially his parents, towards his condition, and on the needs of the visually impaired
- . More reading & training materials in Braille
- . Inference: Karim may need a greater social network than he has at present - spouse, family and a few friends at work

# Appendix 1

## List of User Cases

### Case Study 15

#### Anuj\*

43, Lucknow

Professor of Pol. Science, Married

Visually Impaired - Complete/ Blind

\*Name changed for respondent confidentiality.

# Appendix 1

## List of User Cases

### Anuj

Anuj completed his PhD in political science and currently teaches undergraduate students, but would have preferred to study English Literature. He settled on Pol Science because there were ready study materials available in Braille. Unlike some others in his segment, he enjoys travelling, and using public transport for the same.

- Lost his eyesight early, in the development years
- Friends in college and post-grad supported his studies by reading books out to him. In order to write exams, he'd have a junior read questions out and then dictate answers back to him. He also used recorders in order to record his answers during this time
- Presently, Anuj teaches political science and accessible technology at a rehabilitation centre for the visually impaired, in Lucknow
- Anuj has found that those who are well settled or belong to a higher income group tend to hide their disabilities from the world. Visually impaired PWDs in this segment tend to be ashamed of using the smart cane/white cane out in public



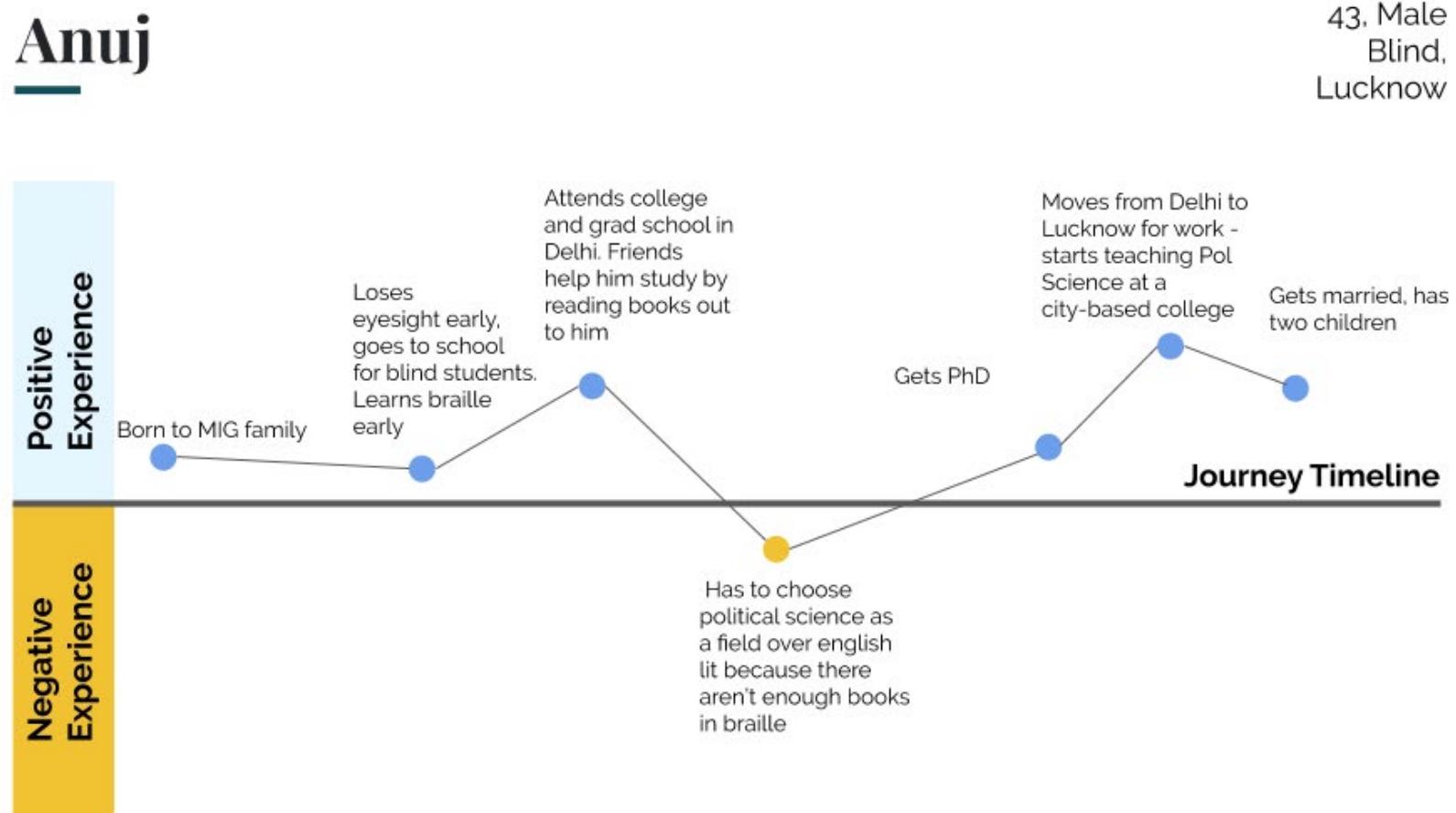
### Obstacles

. The lack of study materials in braille caused Anuj's shift in academic disciplines, which still figures as a regret in his narrative

. the smart cane can still be challenging, especially on Indian roads - it vibrates at every little crater or pothole,

# Appendix 1

## List of User Cases



# Appendix 1

## List of User Cases

### Anuj

#### Life Goals

- . He wants to work further to improve information and awareness on the need for accessible technology

#### Frustrations

- . There is still a lot of technology that needs to be designed in order to make it accessible to the visually impaired
- . OS updates can be tough to adapt to each time.  
More comfortable with Windows 10 than Windows 8,  
7
- . Better public transport design with lower cost to PWDs

43, Male  
Blind,  
Lucknow

#### Tech Used

- . Dotwalker, Google Maps
- . Net banking
- . Smart cane
- . Laptop, smart phone
- . Note-making apps, braille reader, Ola, Uber
- . Audible, Kindle, bookshare.org

#### Needs

- . Greater awareness and sensitization of tech designers to the needs of the visually impaired
- . Proper communication regarding updates in apps and new navigation features and design changes.

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
3	<b>HI segment feels 'invisible':</b> People with speech and hearing impairments, who do not carry immediate and visible markers of disability on their body, often find themselves in the uncomfortable position of 'proving' they are disabled. They feel that this leads to lack of empathy, understanding, and pervasive discrimination.	Public Life	Enable disability identification in order for them to avail affirmative action measures, benefits, and communicate disable identity.	An automated process for people with disabilities to avail critical services	Create easy disability identification methods which allow users to <b>choose</b> moment and place of disclosure.	Streamline existing disability identification processes.	Support Centres	Policy+Tech
		Public/ Social Identity		Sensitize employers and educators			Advocates	
		Education		Sensitize service providers			Digital and Media Platforms	
4	<b>Focus on correcting disability:</b> There is an inordinate focus on correcting disability by family members, educators, and medical professionals alike. This often takes place at the cost of significant trauma to the disabled person, and inhibits acceptance of long-term and permanent impairments.	Public Life	Facilitate communication on disability issues and promote inclusive behaviours.	Facilitate open communication and supporting behaviours among caregivers and educators	Design 'Disabled Advocates' programmes focusing greater attention on disability issues.	Include disability training modules in special education, medicine, and public health courses.	Digital and Media Platforms	Policy+Tech
		Public/ Social Identity		Shift focus from correcting physical impairments alone to addressing environmental barriers which often disable the individual as much.			Support Centers	
		Education		Create support networks (Post Polio Syndrome)			Advocacy Groups	
		Private Life		Sensitise medical professionals and public health cadres on disability issues.				
<b>HOME AND PRIVATE LIFE</b>								
5	<b>Homes are inaccessible:</b> Despite heavily investing in making homes spaces of order and accessibility, for those people with disability who face affordability concerns, or do not have requisite support structures, homes themselves pose major accessibility and navigation issues.	Private Life	Increase navigability of living spaces. Develop low cost design solutions.	Develop affordable and ergonomically customisable household artefacts (furniture and appliances)	Promote the use of everyday, easy to access, and leftover building and construction materials in designing low cost and accessible solutions.	Include accessibility provisions as a shortlisting criteria in public bids; introduce tax incentives (for builders) to make buildings accessible.	Building Design	Policy+Tech
				Develop flexible systems of customisable spatial design within the house		Review national building guidelines and enforce minimum accessibility provisions	Furniture Design	
						Provide house loans and home design financing options for people with disabilities	Product Design Central and State Urban Development Departments	

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>LIVED EXPERIENCE</b>								
1	<b>Isolated Youth:</b> People with disabilities experience extreme isolation in their youth because families are either embarrassed or over protective, peers are unsupportive and unempathetic, and teachers are not aware. This is often exacerbated due to low income capabilities and remote area locations.	Sociability  Public Life  Education	Create more opportunities to interact with peers with shared experiences, mentors, and create opportunities to build alternate peer networks; promote empathetic behaviours among peers, caregivers, and educators.	Build social network opportunities virtually or in real life	Organise 'Living with Disabilities' simulation exercises where people without disabilities experience barriers related to and arising from disabilities.	Leverage primary education and health facilitators (anganwadi workers, govt' primary school teachers) to disseminate information on disability issues.	Digital and Media Platforms	Policy+Tech
				Create awareness of challenges disabled people feel to promote empathy amongst the masses			Support Centers	
				Create platforms for people with disabilities to share experiences and communicate experiences with caregivers and educators.			Central and State Disability Departments	
2	<b>Constant Discrimination:</b> The experience of discrimination is a constant and pervasive presence both at home and in the public sphere, and rights are violated in nearly every sphere of life.	Sociability  Public Life  Public/ Social Identity  Education  Financial Independence	Develop widespread dissemination practices for disability sensitisation, awareness, and reporting.	Build social network opportunities virtually or in real life	Create story-sharing platforms using social and/ or creative media to share discrimination narratives.	Set up quick-response disability rights violation helplines and forums. (unbder existing disability rights framework)	Digital and Media Platforms	Policy+Tech
				Facilitate open communication and supporting behaviours among caregivers and educators			Support Centers	
				Sensitize employers and recruiters to be aware of reasonable accomodation for people with disabilities			Advocacy Groups	
							Service Design	
							Public Infrastructure Design	
							Central and State Disability Departments	

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>TRANSPORT AND PUBLIC LIFE</b>								
6	<b>Self-driven cars are inaccessible:</b> Private cars used by the HI and LI segment need to be modified to be operated by the disabled persons themselves, often at significant personal expense.	Public Life Sociability Education	Integrate disability design in current and future automotive design guidelines and practice.	Devise systems for enhancing compatibility of existing automobiles with disabled-friendly features.	Create platforms that serve as nodes for disseminating automobile customisation knowledge, legal information, and operate as markets for accessories and second hand vehicles.	Introduce accessibility provisions in automotive industry standards.	Automotive regulations Vehicle Design Central and State Road Transport Departments Advocacy Groups	Policy+Tech
7	<b>Locomotor impaired segment finds it difficult to board and deboard public transport vehicles:</b> Public transport poses boarding and disembarking issues, since entrances are not wide enough, and proper surfaces, handles, and grab bars are missing.	Public Life Sociability Education Financial Independence	Promote compliance with existing guidelines, standards, and disability provisions.	Create integrated designs where both buses/ trains and stops/ platforms level differences can be minimised.	Assign separate exits/ entrances for people who might need assistance  Consistently lower bus and train floors and reduce height differences between platforms and bus stops  Increase stoppage time to allow for easier boarding	Preferential public transport provisions for disabled people (booking, reservations, discounted rate, assistant facilities).  Unified, overarching, national transport policy guidelines.	Automotive regulations Vehicle Design Public Transit Design Advocacy Groups Central Railways Department State Road Transport Departments	Policy+Tech

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
8	<b>Hearing Impaired segment finds it difficult to navigate road traffic:</b> Road traffic is difficult to navigate for hearing impaired because of unpredictable traffic flows, and lack of awareness among traffic police officials. People holding licenses often get stopped without cause.	Public Life	Enable HI friendly road traffic navigation, communication, and interpretation.	Design feedback systems for road traffic which translates audio input to haptic/ visual input.	Create light and sensor signals on vehicles or on self-held devices (earphones, smartphones) to indicate closeness of traffic, honking, etc.	Conduct disability sensitization and basic sign language modules as part of ongoing training for traffic policemen and other law and order officials.	Vehicle Design Road Traffic Guidelines Advocacy Groups City and Urban Planning Departments	Policy+Tech
9	<b>Inadequate Built Environment:</b> Buildings, ramps, pedestrian walkways, elevators/escalators, transport eco systems - all need attention to help facilitate easier transition for the disabled, children and elderly. This is even more the case in areas with lower middle class and lower class colonies. Homes, especially in ready made settlements and apartment buildings, also need regularization for people with disabilities and the elderly to have increased mobility.	Public Life  Private Life	Create wheelchair friendly public spaces	Retrofit existing built environment to make it wheelchair accessible  Embed accessibility features in new built environment design	Provide low cost accessible design solutions.	Include people with disabilities in urban infrastructure planning conversations.	Building Design  City and Urban Planning Departments	Policy+Tech
10	<b>Movie theatres are underequipped:</b> While movie screenings in India seldom have subtitles, theaters themselves are underequipped to accommodate wheelchair users and assist people with hearing and visual impairments.	Public Life  Sociability	Design inclusive movie screening experiences.  Make subtitles and captioning more uniform.	Design immersive, adaptive, multi-sensorial movie screening experiences.  Retrofit existing theatres to accommodate wheelchairs, and design accessible theatres	Design movie modes for smartphones, with dark screens, where dialogue can be auto-transcribed in case movie does not have subtitles.	Guidelines for regional languages in subtitles and closed captioning.	Design Guidelines for Movie Theatres  ICT Accessibility Guidelines  Advocacy Groups	Policy+Tech

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
11	<b>Railway stations are inaccessible:</b> Railway stations come with their own set of accessibility issues, which include transferring from one platform to another, information about train arrivals, departures, and delays, etc.	Public Life	Review and redesign railway stations from disability perspective.	Design assistive infrastructure (escalators, travelators) based on transit data (ex: footfalls at key points of aggregation and entry)	Design ground level routes to travel from one platform to another; ensure ground level routes connect directly to escalators/ elevators/ travelators.	Conduct accessibility audits of railway stations, assign accessibility scores, issue accessibility certifications for stations that 'pass'.	Rail Transit Design Advocacy Groups Central Railways Department	Policy+Tech
12	<b>Train washrooms are inaccessible:</b> Toilet design on trains was a major pain point for respondents due to fear of injury. Many persons with visual and locomotor impairments avoided traveling on trains for long periods of time, fearing poorly designed toilets, slippery floors, and unpredictable jerks and sways of a moving train.	Public Life	Design 'universal' washrooms for trains, planes, and other public spaces, with appropriate surfaces, fixtures, and call buttons.	Design inclusive washrooms with ergonomic considerations allowing for safe and hygienic use.	Introduce anti-slip surfaces in train washrooms  Introduce anti-slip grab bars at appropriate places in train washrooms  Design alarm/ notification systems inside public washrooms to call for assistance.  Ensure fixtures such as taps, etc. are at accessible heights	Identify and designate point person on trains for assisted travel.	Train Compartment Design Advocacy Groups Central Railways Department	Policy+Tech
13	<b>Private taxi services are not accessible:</b> While people with visual and hearing impairments reported benefiting significantly from app-based taxi services, the locomotor impaired segment noted that services such as Ola/ Uber were not wheelchair accessible. They did not have sufficient storage space for stashing wheelchairs, and drivers often refused to take on disabled passengers despite having equipped cabs.	Public Life	Provisions for commercial transportation services to offer inclusive facilities (training of service providers, wheelchair storage etc.)	Design a range of taxis equipped to convey disabled passengers	Good Citizen Program  Incentivize retrofitting (govt. subsidized and train experts)  Peer network of disabled friendly vehicles- zoom car, Uber/Ola	Recommend airports designate pick-up/ drop-off point for people with disabilities, where taxis can halt. Vehicles equipped to handle people with disabilities can stop there and wait for pick-ups.	Guidelines for Incentivising Services for People with Disabilities Automotive regulations Vehicle Design Advocacy Groups	Policy+Tech

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
14	<b>HI people do not get driving license:</b> Despite guidelines which allow people with speech and hearing impairments to get driving licenses, road transport authorities are reluctant to issue licenses, and sometimes deny licenses altogether.	Public Life	Enable disability identification to ensure users are able to avail affirmative action measures, benefits, and communicate disable identity.	Review disability identification processes to allocate relevant services according to disability type and socio-economic categories	Introduce spectrum-based markers on ID cards to identify vulnerable disabled groups		Digital and Media Platforms State Road Transport Departments	Tech
15	<b>Sports can be liberating, but inaccessible:</b> A number of people with disabilities take part in sports but report not being able to access sporting arenas, fields, and further being discriminated against on site by coaches, referees and other stakeholders	Public Life	Design 'universal' sporting arenas	Design accessible sporting arenas (for ex: turfing)	Height adjustable basketball hoop	Sensitize all stakeholders about a) sports for disability, b) including people with disabilities in sports/field games. This would include sensitizing on-field personnel and players	Digital and Media Platforms	Policy + Tech
		Sociability				Review and sensitize role of AT for disabled sports, including recognition of essential aids for communication on field	Sports Arena Planners/Field Designers	
		Financial Independence				Revise existing sporting guidelines to make them more inclusive, with people with disabilities associations	Sports Association of India, other sporting associations	
		Education					Advocacy Groups Coaches	

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
16	<b>Sports aren't an option for people with disabilities:</b> They are actively discouraged from stepping into public, crowded, physically demanding spheres. This, despite the demonstrated positive impact on people with disabilities' lives. This is a cross income-group issue, and starts at home with parents, as well as with doctors and physio or speech therapists	Public Life  Sociability	Launch sensitization drives for parents, extended families and peers to access	Create networking platform for disabled sports professionals to interact with people with disabilities	Introduce sports under career counselling at school and college level	Sensitize parents, peers, stakeholders in sports, to the benefits of sports for people with disabilities, and the mid-to long-term benefits of sports as a recreation and professional option for people with disabilities, as well the benefits to their social networks.  Make sporting guidelines more inclusive, and illustrative of benefits to people with disabilities and their family and peer networks	Digital/Media Platforms  Support Centres and helplines	Policy + Tech
17	<b>The metro system is most disabled-friendly, but with human assistance:</b> While built metro ecosystems are disabled-friendly to a great extent, they rely mostly on human assistance to allow ease of travel for people with disabilities.	Public Life  Sociability	Enable ease of navigation through audio-visual aids and new ICT interventions  Train metro personnel to effectively assist disabled passengers.	Embed navigation systems on metro paths to enable easy movement.	Create accessible announcement systems  Create audio-visual alarm/signal systems to request assistance and access emergency information	Include people with disabilities in urban infrastructure planning conversations.	Public Transit Design  New ICT Design (for transit spots)  Advocacy Groups  City and Urban Planning Depts  Website Redesign - Rollout  Restaurant Design  Digital Tech Platforms	Policy + Tech

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
18	<b>Lack of information about disabled-friendly recreation options:</b> People with disabilities have little prior knowledge about which places are accessible for them while booking hotels, restaurants, etc. making it difficult for them to plan barrier-free recreation.	Public Life Sociability Education Financial Independence	Enable people with disabilities to access information on disabled-friendly travel and eating options	Equip online/digital travel and recreation booking platforms with systems to shortlist disabled friendly options  Create accessible menu cards  Ensure easy navigability inside spaces of recreation	Include disability filter in booking options (flights, trains, buses, hotels, etc.)  Create 'accessible travel' scoring system for travel services and hospitality  Sensitize transport service staff, officials, security  Sensitize restaurant staff and owners  Create Braille menus or digital menus.		Website Design  App Design  Restaurant Design  Digital/ Tech Platforms	Tech
19	<b>Helplines and support platforms aren't always useful or helpful:</b> Helplines, online forums, and customer service platforms aren't always accessible, via phone or online	Education Public Life	Equip helplines and support platforms to assist people with disabilities to independently access help/support.	Provide visual and audio communication alternatives to emergency response numbers and customer care helplines	Create integrated (audio-visual) communication channels for registering complaints	Include accessibility provisions in consumer support guidelines, and emergency response systems.	Digital/Tech Platforms	Policy + Tech

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>EDUCATION</b>								
20	<b>Inordinate emphasis on oral learning for deaf children/ youth:</b> While mainstream schools lag in providing adequate support to children with speech and hearing disabilities, even within specialised schools, teachers are under-equipped. A continued emphasis on oral learning and correcting disabilities ensures that teachers are not skilled in sign language, deaf students rarely understand or participate in class, and clear their exams through rote learning.	Education  Financial Independence  Sociability  Public Life	Develop learning delivery systems that are accessible and encourage participatory behaviours for HI	Make learning accessible in non-hearing formats (or in languages that do not follow hearing formats), and equip teachers and special educators to impart learning in non-audio formats.	Sensitization and an up-skilling program  Provide alternate (sign language videos) lecture formats for deaf students  Design inclusive curriculums  Leverage EduTech to optimise learning delivery; use non-verbal techniques such as pictures, drawing, and photos which help children with cognitive disabilities.  Hire/ skill/ sensitise teaching staff  Provide alternate (sign language videos) lecture formats for deaf students  Design inclusive curriculums	Review the curriculum design system under the national certification bodies, to incorporate accessibility features and mainstream education for the disabled.	E-Learning/ EduTech Modules  Sign Language Training  Central and State Education Departments  E-Learning/ EduTech Modules  Sign Language Training  Digital and Media Platforms  Advocacy Groups  Central and State Education Departments  Support Centres	Policy + Tech
21	<b>Visually impaired students are not given accessible reading material in mainstream schools:</b> In mainstream schools, children with visual impairments rely mostly on hearing lectures and getting friends and family members to read out books. They often scan and translate material texts into accessible formats on personal time and at personal expense, since schools do not provide accessible learning materials.	Education  Financial Independence	Develop learning delivery systems that are accessible and encourage participatory behaviours for VI	Make learning accessible in non-visual formats	Introduce non-visual learning materials  Design inclusive curriculums  Hire/ skill/ sensitise teaching staff	Review the curriculum design system under the national certification bodies, to incorporate accessibility features and mainstream education for the disabled.	E-Learning/ EduTech Modules  Central and State Education Departments  Advocacy Groups  Support Centres	Policy+Tech

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention				
22	<b>Educators, exam certifications boards and other authorities not sensitized to VI learning challenges:</b> Limited subject options are available to VI and blind students after class 8. No concerted efforts have been made to translate science texts into braille, or to render mathematic concepts (trigonometry, geometry, calculus etc) into VI-friendly learning media/forms. This points to poor curriculum design, as well as school facilities, public and private included. This extends to college and post-grad schools too, and VI respondents report having to pursue subjects based on availability of learning materials rather than based on their own interest, potential or propensity.	Education	Creating accessible learning tools and materials to facilitate higher learning for the VI	Develop tools for imparting higher education in STEM (science, technology, engineering, and mathematics), Geography, and other visual disciplines.	Design tactile tools for teaching the VI segment	Review the learning delivery system under the national certification bodies, to incorporate accessibility features and mainstream education for the disabled.	E-Learning/ EduTech Modules	Policy+Tech				
					Training teachers to use the already existing learning materials		Central and State Education Departments					
		Financial Independence					Advocacy Groups					
							Support Centres					
23	<b>Number of disruptions, different types, to education:</b> people with disabilities face disruptions to their education process for a number of reasons, including those to do with discrimination, insensitive/unsensitized teachers, poor teaching methods, poor design of facilities, layout and curriculum, and lack of appropriate visual and non visual learning materials - these, among several others. Public versus private school differences, gender, socio-economic status and systemic inadequacies also have a role to play.	Education	Ensure continuity of education by creating learning environments outside classrooms to impart formal and informal education	Provide alternative, home-based opportunities for imparting learning to students confined to their homes.	Leverage EduTech to optimise non traditional learning delivery.	Review the education delivery methods, to incorporate accessibility features and mainstream education for the disabled.	E-Learning/ EduTech Modules	Policy+Tech				
							Advocacy Groups					
		Financial Independence					Support Centres					
							Central and State Education Departments					

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>EMPLOYMENT</b>								
24	<b>Employment opportunities are limited:</b> Most professions do not show any representation of people with disabilities in the workforce. This is mostly because of lack of opportunities, and the unwillingness to hire people with disabilities, due to their perception as a heavy investment and low return group. Among those who do get hired, only people with lower degrees of impairment are selected for professional work.	Financial Independence  Sociability	Design competitive programs to incentivise disability and diversity hiring	Create opportunities for disabled job seekers and professionals to network.  Sensitise employers and recruiters to promote disability hiring.  Incentivize organizations to hire people with disabilities	Design a disability inclusion index for the workplace, which assigns scores to organisations based on different metrics of inclusion (such as accessible infrastructure, accessible working spaces, workflow and time planning, mentorship programmes, cross-disability representation, and so on)  Conduct workshops and job fairs with special focus on hiring people with disabilities into the workforce.	Create diversity cells which ensure compliance to existing legal frameworks on disability, gender, and so on.  Provide blueprint for making reasonable accommodations in the workplace (in terms of workflow, work-time, flex working and remote working, accessible infrastructure, accessible navigation of the work space, and so on)	Central Human Resources Development Department  Building/ Workspace Design  Digital and/ or Media Platforms  Central Human Resources Development Department	Policy+Tech
25	<b>Hearing Impaired segment least represented in workforce:</b> Most workplaces are more accommodating of people with locomotor and/ or visual impairments, and the hearing impaired segment reports maximum difficulty in getting employment opportunities in the formal sector.	Financial Independence  Sociability	Design support structures at the workplace to promote HI inclusivity and hiring  Design accessible workplace communication systems	Create platforms for hearing impaired job seekers and professionals to network.  Design on the job peer support programmes for HI employees	Design disability mentorship programmes as an essential component of company onboarding and on-the-job learning practices.	Create diversity cells which ensure compliance to existing legal frameworks on disability, gender, and so on.	Workplace Accessibility Guidelines  Digital/ Tech Platforms  Assistive Technology at the Workplace  Reasonable Accommodation at the Workplace  Central Human Resources Development Department	Policy+Tech

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>FINANCIAL INCLUSION</b>								
26	<b>People with speech and hearing impairments face communication barriers in banks:</b> Communicating in person with bank officials and staff poses barriers to those with speech and hearing disabilities. In addition, there is also lack of compliance with existing inclusivity guidelines.	Public Life	Enable speech and hearing impaired to independently access financial services	Make information and announcement systems accessible for hearing impaired and sign language speakers	Provide sign language support in banks (through dictionaries and apps where in-person support is not possible)	Review/ revisit banking guidelines	Digital/ Tech Platforms	Tech
		Financial Independence			Provide voice-to-text interfaces at points where customers and officials interact		Advocacy Groups	
							Regulating Bank Guidelines	Policy
27	<b>Visually impaired people face accessibility barriers in online banking and e-commerce services:</b> Banking websites, e-commerce platforms, and third part digital banking platforms pose accessibility issues for people with visual impairments. These platform are either not accessible at all, or often don't render well to non-visual platforms after using text to speech software.	Financial Independence	Enable VI to independently access digital financial service interfaces	Ensure security measures (passwords and captchas) are accessible	Design an accessibility compatibility app—one which digitally assess an e-commerce app, or a banking website, and tells the user whether the platform is accessible, pinpointing where the user might have to use either a different platform, or ask for human assistance.	Draft accessibility guidelines for digital banking and e-commerce platforms.	Digital/ Tech Platforms	Policy+Tech
		Private Life		Enable user to assess accessibility and readability of existing platforms			Advocacy Groups	
		Public Life			Provide security, website, and app update information in accessible formats.		Internet Banking Guidelines	
							Regulating Bank Guidelines	
28	<b>Hearing Impaired segment are denied government mandated loans:</b> Despite the existence of financial inclusion schemes for people with disabilities, banks often do not comply, specifically with the hearing impaired segment. This restricts entrepreneurship and self-employment prospects for the hearing impaired segment, further constraining an already limited pool of choices.	Financial Independence	Enable disability identification to ensure users are able to avail affirmative action measures, benefits, and communicate disable identity.	Review disability identification processes to allocate relevant services according to disability type and socio-economic categories	Monitor implementation of financial inclusion schemes	Link schemes, benefits, and rights-based information in disability ID processes so that sharing the disability unique ID can pull out a list of targeted schemes and inclusive guidelines.	Financial Inclusion Guidelines	Policy+Tech
		Private Life					Regulating Bank Guidelines	
		Public Life		Sensitise bank officials and staff			Advocacy Groups	
							Support Centres	
							Central Disability Finance Departments/ Cells	

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
29	<b>Visually Impaired segment faces challenges in availing ATM cards and cheque book facilities:</b> Inability of banks to comply with existing financial inclusion mandates and inability of the visually impaired segment to produce identical signatures lead to denial of certain financial services such as ATM cards and chequebooks.	Financial Independence  Private Life  Public Life	Redesign financial service processes to enable maximum and easy participation of VI persons	Design alternatives to pen and ink signatures for people with visual impairments.	Design a unique digital signature pattern for people with visual impairments.  Sensitise bank officials and staff to promote compliance	Include biometric/ digital signatures as legal signatures for better financial inclusion.  Incentivise disability inclusion in banking services	Financial Inclusion Guidelines  Advocacy Groups  Support Centres	Policy+Tech
30	<b>Visually impaired respondents are unable to distinguish between different currency note denominations:</b> Similar sized currency with no specific markers makes it difficult for people with visual impairments to distinguish between different denominations, making cash transactions risky and inconvenient.	Financial Independence  Private Life	Enable faster and easier financial transactions digitally and in cash.	Design easy currency identifying mechanisms	Include dots, dashes or other tangible markers on newly designed currency to indicate denominations.  Introduce differentiating markers in currency in circulation and new currency	Introduce accessible currency in current circulation and phase out older currency.	Regulating Bank Guidelines  Advocacy Groups  Digital/ Tech Platforms	Policy+Tech

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>ACCESS TO HEALTH CARE AND EMERGENCY SERVICES</b>								
31	<b>Persons with disabilities are dependent on others during emergencies:</b> There was significant lack of awareness about emergency response services, with most people with disabilities saying they would ask their families or their neighbours what to do.	Private Life	Target and revamp emergency response systems to include disabled people	Make existing emergency infrastructure (alarms, lights, etc.) accessible	Create text-based response channels	Mainstream disability provisions in existing emergency guidelines.	Emergency Response Guidelines	Policy+Tech
		Public Life		Create specific response channels catering to people with disabilities, the elderly, and other vulnerable groups.			Disaster Management Guidelines	
							Digital/ Tech Platforms	
							Support Centres	
							Central and State Disaster Management Departments	
							Advocacy Groups	
32	<b>Persons with disabilities face navigation issues in public hospitals:</b> Public hospitals, like other crowded, public places posed barriers for people with disabilities. Navigating the built space of the hospital, and effectively communicating with hospital administration and negotiating with paperwork and forms all posed challenges.	Public Life	Promote access to healthcare by designing accessible public hospitals and health centres, and creating healthcare communication tools.	Design wheelchair accessible corridors, rooms, common spaces, and bathrooms.	Design accessible self check-in kiosks for hospitals, with an option to do preliminary paperwork, access a route map to relevant department, and show where closest elevators/ escalators are.	Create Universal Healthcare Accessibility Guidelines	Building Guidelines	Policy+Tech
				Create accessible communication and information systems within hospitals	Provide Braille and visual maps at key points		Digital/ Tech Platforms	
					Introduce different queues for disabled and elderly		Advocacy Groups	
							Public Health Departments	

Problem Area Long list and Interventions Development

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of Intervention
33	<b>Hearing impaired face barriers in communication with health service providers:</b> People with speech and hearing impairments face barriers while communicating with healthcare professionals. This includes conveying symptoms and understanding diagnoses. Health outcomes are at risk for all segments with communication barriers.	Public Life Sociability	Promote access to healthcare by designing accessible public hospitals and health centres, and creating healthcare communication tools.	Create communication interfaces to ease communication barriers between health service provider and hearing impaired	Design primary healthcare communication interfaces using sign language to communicate symptoms.  Sensitise hospital staff, medical professionals, and public health workers	Create Universal Healthcare Accessibility Guidelines	Public Health Guidelines  Digital/ Tech Platforms  Public Health Departments	Policy+Tech
<b>AWARENESS OF AND ACCESS TO GOVERNMENT SCHEMES AND BENEFITS</b>								
34	<b>People with disabilities struggle to procure govt certification, IDs:</b> The problem begins with poor awareness, on part of people with disabilities and their families and support networks, on disability rights, the UDID and other important certifications and ID proofs that are due to all citizens. Even those who are aware struggle with the bureaucratic process of procurement, poor information on websites, poor legibility and design of digital information platforms. Besides this, many people with disabilities cite experiences of discrimination by govt officials, meant to help them, as key reasons behind their own recalcitrance and inability to follow through with any bureaucratic procedure in a timely manner.	Public Life Public/ Social Identity	Streamline and redesign disability ID and certification processes to allow people with disabilities from disparate education, income, and geographical backgrounds to independently navigate government/ bureaucratic systems.	Create platforms to widely disseminate knowledge about disability certification and identification processes  Make online application processes accessible  Reduce repeated visits to hospitals and issuing agencies	Provide network of e-platforms and local centres for supporting UDID applications  Sensitize government officials and medical professionals  Create integrated, digitised platform for acquiring disability certificate.	Identify and authorise private actors (clinics and hospitals with requisite certification) to assess and certify disability.	UDID Application Rules and Guidelines  Digital/ Tech Platforms  Advocacy Groups  Central and State Disability Departments  Revised and Redesigned Disability Certification Guidelines  Advocacy Groups  Digital/ Tech Platforms  Central and State Disability Departments  Chief Medical Officers in Govt Hospitals	Policy + Tech

# Appendix 2

S. No.	Problem Areas (Patterns)	Choice Framework Metric	Design Principle/ Policy Direction	Examples of Design Brief	Possible Solutions	Policy Recommendation	Facilitators/ Platforms	Type of intervention
<b>ICT AND AT</b>								
35	<b>Updates across different digital devices, software, and website can hamper disabled friendly access and use:</b> When smartphones and websites are updated, the changed layout and inconsistent accessibility updates make navigation difficult for people with visual impairments.	Sociability Public Life Education Financial Independence	Streamline system updates keeping accessibility features in mind	Ensure consistent design for disability principles across prototypes and larger rollouts; unbroken accessibility of ICT devices post system and/ or other updates.	Clearly communicate accessibility and interface changes.		ICT Accessibility Guidelines Product Design System Updates	Tech
36	<b>ATs that are obviously visible identify a people with disabilities ahead of engagement:</b> Devices such as white canes, smart canes, cochlear implants, callipers and crutches, i.e. external aids, are sometimes rejected, even before they can be used and adjusted to, because people with disabilities feel discriminated against by non-disabled on basis of these alone	Public/ Social Identity Sociability	Design unobtrusive assistive devices with an objective to get away with subtle identification markers.	Design alternatives that are unobtrusive and customizable as per aesthetic requirement of people with disabilities's that help break away from stigma attached with traditional devices.  Enable the smartphone platform to perform greater assistive functions			Assistive Technology Design Assistive Technology Manufacturers	Tech
37	<b>Without Wifi or strong mobile networks, ICT as AT is inaccessible:</b> In areas of network blackholes or with weak signals, else in buildings that disrupt network coverage, people with disabilities using ICT as assistive aids face issues.	Sociability Public Life Financial Independence Private Life Education	Ensure greater, more evenly distributed internet access.	Design ICT apps that can function with weaker signals and bandwidths.  Optimize the existing internet infrastructure to ensure even distribution	Provision of 'lite' versions of apps that can function with a weaker bandwidth  Increase public WiFi services  While ensuring maximizing and optimizing internet infra, Enhance network security options	Make telecommunications networks stronger and more consistent.	Digital/ Tech Platforms Advocacy Groups Central Telecommunications Department	Policy+Tech