

**Paytm**

रुपये

₹ ₹ ₹ ₹ ₹ ₹



संग्रह विनाश करें

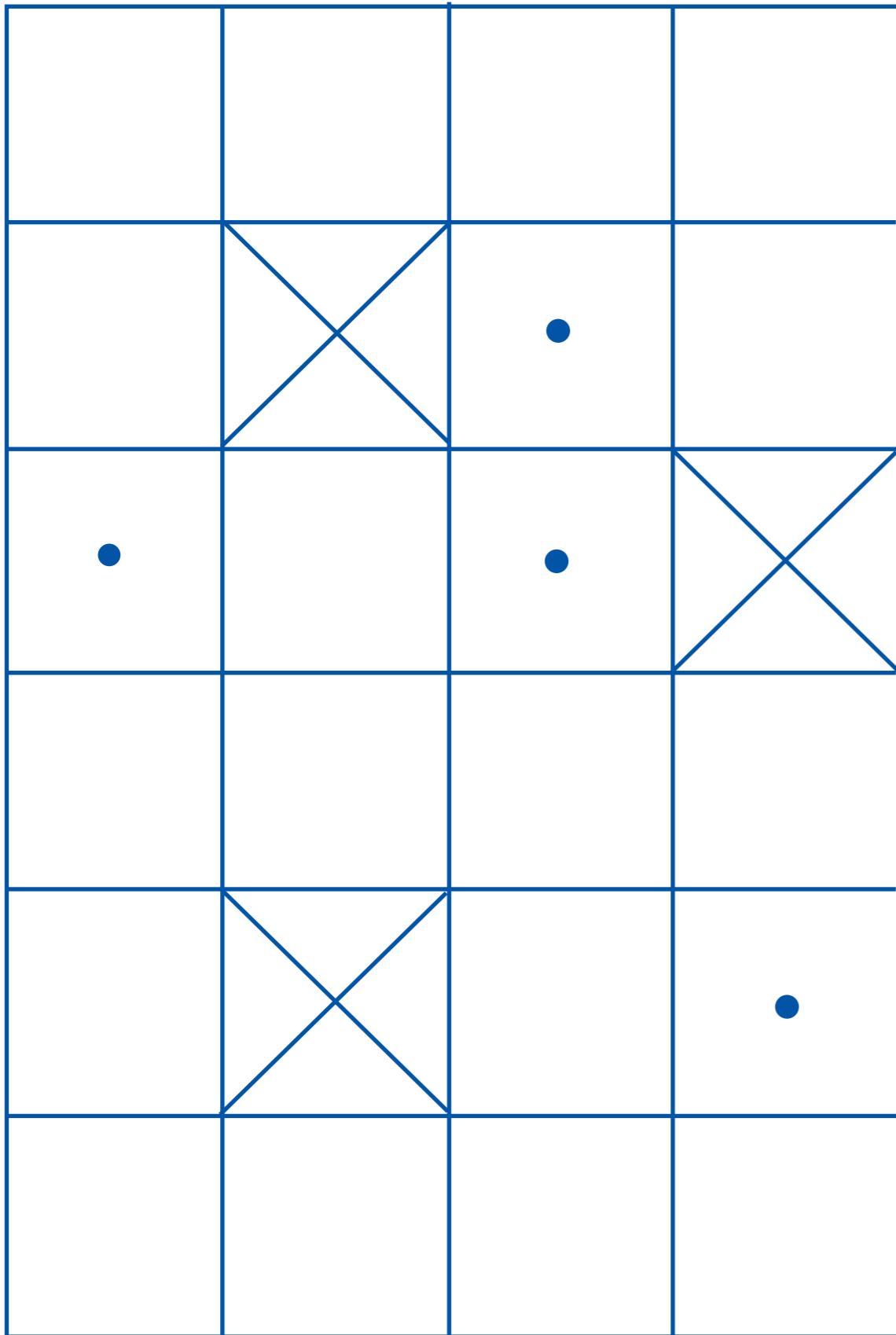


संग्रह विनाश करें

**Imagine having to  
use your money  
without being able  
to see it.**

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This is to certify that Anavi has successfully completed her Graduation Project in the area of User Experience Research in Fashion Communication Department (2015 – 2019) of National Institute of Fashion Technology, New Delhi.

This is towards partial fulfilment of the requirement for granting Bachelor of Design (Fashion Communication).

Dated:

Jury Members:

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Project Mentor: Mr. Vijay Dua (NIFT)  
Mr. Manik Sinha (UX Designer- Paytm)

Centre Coordinator, Fashion Communication: Mr. Vishesh Azad

Chairperson, Fashion Communication:

## PREFACE

Another hot day in Delhi. My goal for the next twenty days is to understand the daily experience of various people living with disabilities in this city of more than 10 million people. The notebook is out, my phone cam is rolling and Arjit, a student who is blind, is eager to share some of his experiences to help me build accessibility into products that help solve everyday obstacles for him and others.

He talks to a friend, who just asked for 500 rupees. He takes a folded paper out and asks his friend if he is right. The friend affirms and leaves. Arjit turns to me and says, "I have to trust people to tell the truth when I hand them currency." Demonetization was harsher on the visually impaired, and new currency offers them no clue as to what value they are handing out.

One of the main cognitive distortions of human nature is drawing conclusions about a diverse world by relying on personal experience. To make people like Arjit comfortable, we should abandon our ability biases and try to see the world from a wider perspective.

## ACKNOWLEDGEMENT

I would like to thank Dinesh Singh, Maanik Sinha, and Rahul Bisht at Paytm for their constant communication, and enthusiasm for this project.

I would like to extend my gratitude to my academic mentor Vijay Dua Sir for his mentorship as well as for reviewing endless drafts of information in various fidelities.

A shout out to Sunil Singh, SP Mittal, Guneet Sethi and numerous others at the reputed organizations working for benefit of the visually impaired. They made this project an unrivalled experience for me as a budding user experience researcher.

And finally, a thanks to my family for bringing out the best in me.

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## NIFT DELHI



Set up in 1986, NIFT is the pioneering institute of design education in the country and has been in the vanguard of providing professional resource to the industry.

The building designed by Dr. B.V. Doshi is based on the concept of a central step-well to conserve rainwater, a traditional Indian Baoli and is listed as one of the modern Iconic architecture of Delhi.

## FASHION COMMUNICATION

In the ever-growing world of fashion professionals, Fashion Communication happens to be one of the newest and most exciting. The importance of brand identity has come to be seen at par with what the brand sells. Fashion Communication makes it possible for brands to communicate their products, identity, and strategy.

The Fashion Communication programme encompasses integrated course study relating to the areas of visual merchandising, styling, graphic design, display/exhibit/space design, advertising and public relations, journalism, creative writing, photography, interaction design and new media design.



## introduction to sponsor

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**Paytm, owned by One97 Communications, is a digital payments platform that allows one to transfer cash into the integrated wallet via online banking, debit cards, and credit cards, or even by depositing cash via select banks and partners. Using the money in the Paytm wallet, you can pay for a number of goods without using cash.**

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Fintech is an area that is radically changing how we live as society and how we do business professionally.

Fintech, or 'financial technology,' is used to describe new tech that seeks to improve and automate the delivery and use of financial services. It belongs to the segment of the technology startup scene that is disrupting sectors such as mobile payments, money transfers, loans, fundraising and even asset management.

Fintech makes financial services more accessible to the general public.

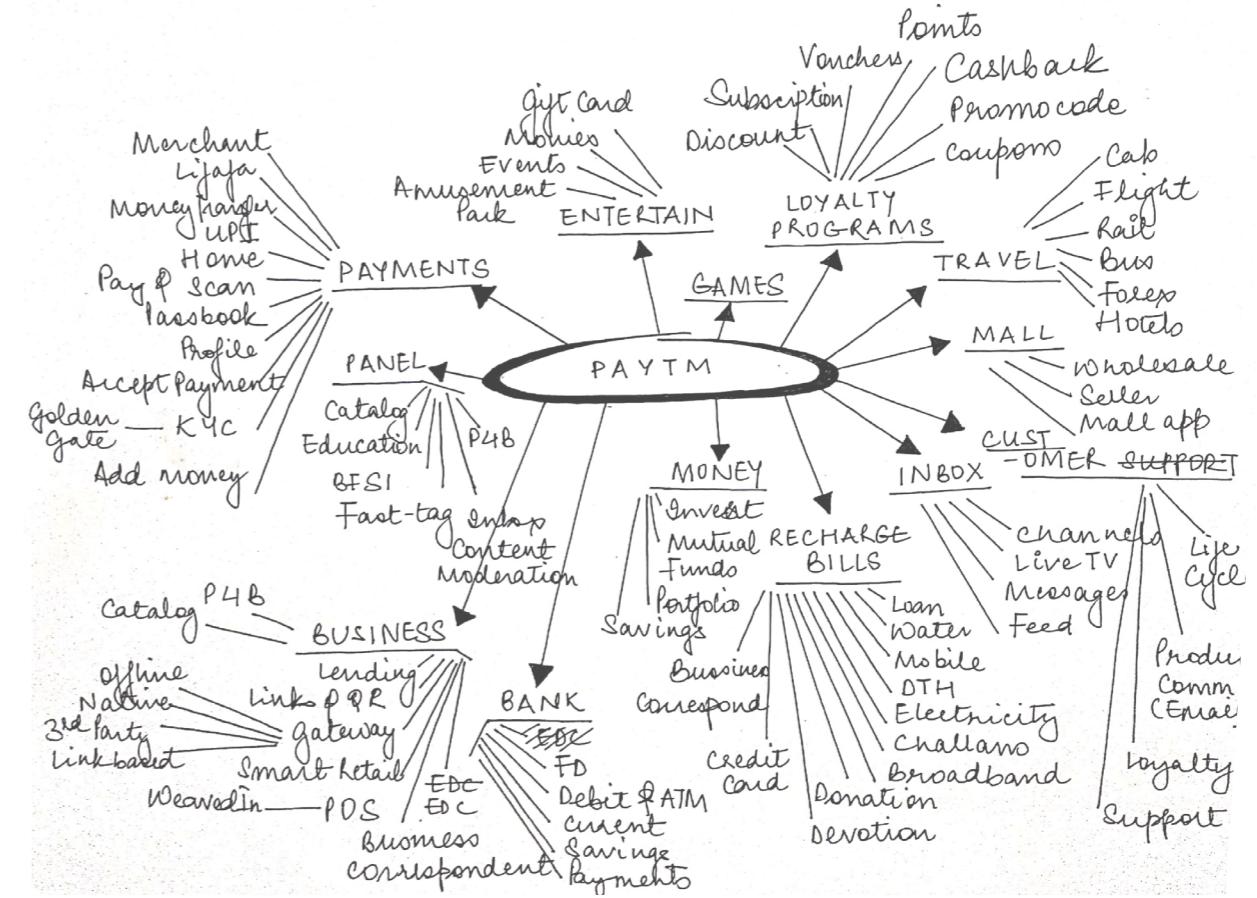


## About the Company

Paytm is India's largest leading payment gateway that offers comprehensive payment services for customer and merchants. The company offers mobile payment solutions to over 7 million merchants and allows consumers to make seamless mobile payments from Cards, Bank Accounts and Digital Credit among others.

Paytm pioneered and is the leader of QR based mobile payments in India. With the launch of Paytm Payments Bank, Paytm aims to bring banking and financial services to half-a-billion un-served and under-served Indians.

Investors of Paytm include Softbank, SAIF Partners, Alibaba Group and Ant Financial.



**"We will bring 500 million Indians to the mainstream economy.  
This is our vow; this is our game."**



## Payments Design Team

Paytm Design Team strives to maintain an open culture where everyone is a hands-on contributor and feels comfortable sharing ideas and opinions. The team spends hours, designing each new feature and obsesses about the smallest of detail that constitutes the Paytm super app.

The team, comprising of twenty four members, works at the forefront of tech to create dynamic experiences that reach millions from different walks of life all across India. The designers, researchers, writers, and animators create an experience which reaches a Dominoz franchise to your local kirana store.



## Corporate Social Responsibility

**“We aim to bring banking and financial services to half-a-billion un-served and under-served Indians. We believe in providing equal opportunity for all our people, as well as those whom we come across in our course of work.”**

- Paytm, CSR

While Paytm tends to empower disaster victims and the privileged, it lags behind in providing access to the differently abled. It is inaccessible to many, especially ones with visual, cognitive and physical impairments.

# Gap Analysis

The project started out with a holistic gap analysis to conceive the Paytm pain points and the possible payment friction scenarios.

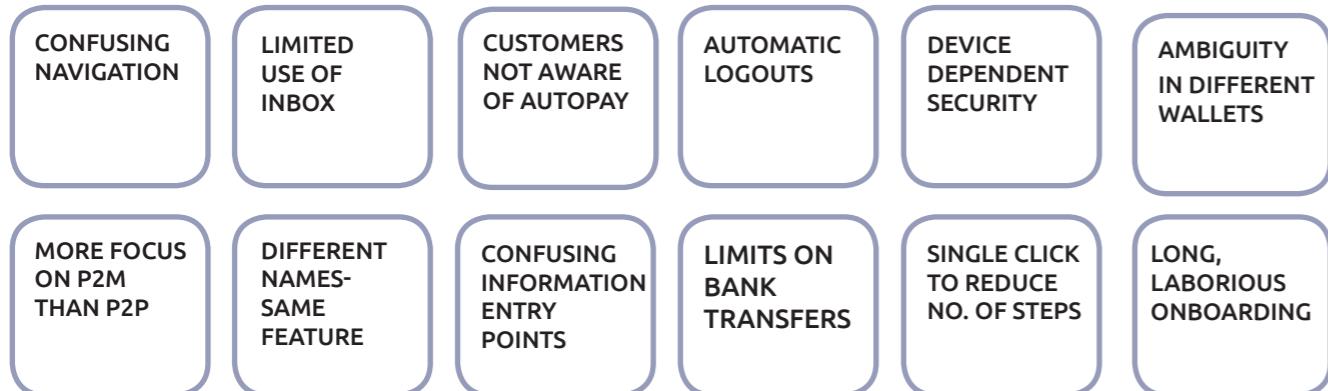
Gap analysis is the comparison of actual performance with the desired outcome-performance versus potential. Gap analysis is a process that, when applied to other business processes, becomes a reporting process used for improvement.

A market gap analysis is a way to research sales opportunities where the demand is greater than the supply. Using this process can help a company identify markets that are currently under-serviced. Market Gap Analysis differs from Market Research in the fact that it is proactive rather than reactive.

Gap analysis was done during familiarization with the business, design and development aspect of the Paytm app, to [compare the intention with the conveyed meanings](#).

The gap analysis started off with the company's strategic mission to cater to 500 million Indians, and to analyze the user bases the app was catering to. Currently Paytm has 230 registered users all over India.

An ideal gap analysis works by evaluating the current position of an organization, defining an ideal future position and creating a roadmap for bridging that gap.



## Portfolio Analysis

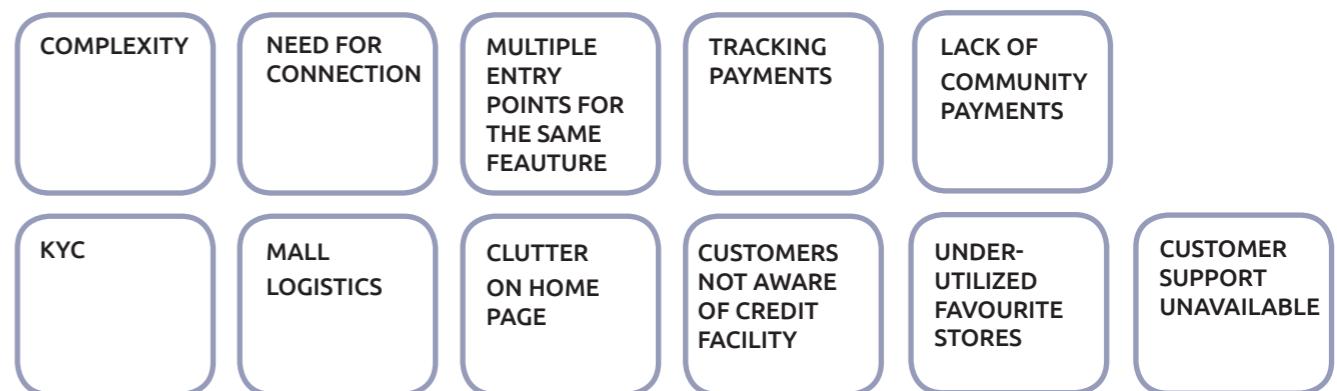
Examined Paytm's product portfolio to look for new sales opportunities, and used gap analysis to identify new products to sell. After a thorough understanding of the user bases catered by Paytm, an exclusion study was done to analyse and understand which demographic is not being covered, and how steps to best remedy it.

## Usage Gaps

A usage gap is the difference between current market size for a product or service, and the potential market size. A gap analysis in this area can help an organization see why they are not reaching the full potential.

## Competitive Benchmarking

Competitive Benchmarking was done via social platforms to understand the criteria which directs favorable usage of a platform, and what can be done to reduce further complaints. This was mainly done using the HEART (Happiness, Engagement, Adoption, Retention and Task Success) segmentation to arrive at important benchmarking variables- KYC, Loyalty, UPI and categorization.



introduction to the issue

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## WHO CANNOT USE MONEY WITH EASE?

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The Market Gap Analysis led to a study in exclusion in the process of payments and within the organization. Payments in foreign market, from a rural location, by the elderly and by the people with disabilities- are examples of how user bases are excluded from an ordinary payment system. From the ability to recognize such exclusion stems an inclusive product.



# **+** **PROJECT PROPOSAL**

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## **TO STUDY THE PAYMENT FRICTION FOR PEOPLE WITH DISABILITIES**

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### **Abstract**

Following a holistic gap analysis of the Paytm consumer app, identified the need for improving accessibility in the app design and worked to transform the fintech platform into a more usable and secure interface for the visually impaired community in India.

Proposed solutions were formulated through a research process involving manual accessibility tests and interaction with research participants including the visually impaired, accessibility experts and NGO administrators to integrate standardized guidelines.

**Keywords:** Visually Impaired, Accessibility, Usability

### **Methodology**

As an able-bodied designer, I began by asking myself what I could do to learn about the existing abilities and challenges of people with impairments. Research has shown a profound disconnect between the perceived and actual abilities of such people.

Through interviews with accessibility academics, occupational therapists, and users with visual impairments, I have pieced together an understanding of the impaired demographic.

I put on a blindfold and tried out screen readers like Chrome Vox, TalkBack on Android, or Voice Over on Apple, to see what it's like to not use a mouse and have to rely only on your keyboard for browsing the web. The personal experience with these tools gave me a sliver of insight and set the stage for the next step: exercising my empathy.

### **Objective**

To make payments easier for those who cannot make them conventionally, and are dependent on others for transactions.

# Methodology / Timeline

Gap analysis of the fintech industry led me to the communities which suffer from payment frictions, and I found immense potential there.

I began by asking myself what I could do to learn about the existing abilities and challenges of people with impairments. The first invisible challenge was to overcome my own ability bias, and replacing my sympathy with empathy.

Learning from the pioneers of accessibility and from visually impaired users, I pieced together an understanding of the problems and possible solutions.

DISCOVER

DESIGN

IMPLEMENT

Gap analysis 15 /1- 5/2  
/ finding out opportunities for growth

Secondary research 6/2- 25/2  
/ understanding existing literature on the subject

Primary research 26/2- 15/3  
/ gaining insights from real users on the field

Empathize 16/3- 22/3  
/ activities to overcome ability bias

Mind maps 23/3- 25/3  
/ brainstorming for implementation

Ideation 26/3- 15/4  
/ process of developing ideas

Conceptualization 17/4- 25/4  
/ converting ideas into feasible solutions

Prototyping 26/4- 5/5  
/ creation of new user flows and interface

Testing 6/5- 8/5  
/ testing with users on the field



introduction to the conditions

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## DISABILITIES: AN UNDERSTANDING

People with disabilities have generally poorer health, lower education achievements, fewer economic opportunities and higher rates of poverty than people without disabilities. This is largely due to the lack of services available to them and the many obstacles they face in their everyday lives.

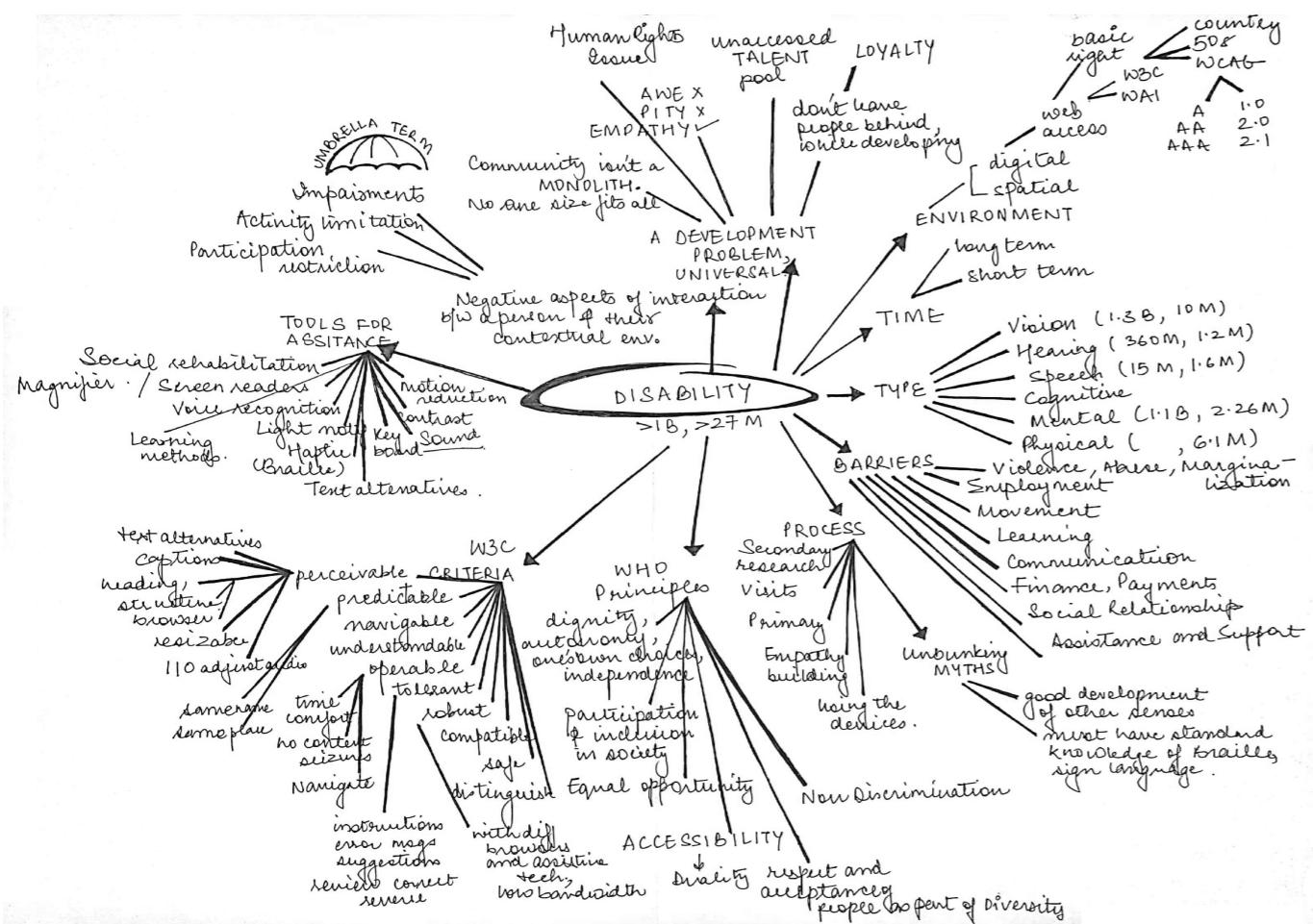
**Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions.** An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations.

**Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives.** Overcoming the difficulties faced by people with disabilities requires interventions to remove environmental and social barriers.



# Disabilities

**Over a billion people, about 15% of the world's population, have some form of disability.**



## VISUAL

Cannot see at all or has no perception of light; or has perception of light but has blurred vision even after using spectacles,



## SPEECH

Can not speak at all or she/he is unable to speak normally on account of certain difficulties linked to speech disorder; or able to speak in single words only and is not able to speak in sentences; or stammers to such an extent that the speech is not comprehensible.



## HEARING

Cannot hear at all; or has difficulty in hearing day-to-day conversational speech (hard of hearing); or if she/he is using a hearing aid.



## MENTAL

Lacks understanding/comprehension as compared to her/his own age group; or is unable to communicate her/his needs when compared to other persons of her/his age group; or has difficulty in doing daily activities; or has difficulty in understanding routine.



## COGNITIVE

Is taking medicines or other treatment for mental illness; or exhibits unnecessary and excessive worry and anxiety; or exhibits repetitive (obsessive-compulsive) behaviour/thoughts; or exhibits sustained changes of mood or mood swings or exhibits unusual behaviours like talking/laughing to self.



## PHYSICAL

Do not have both arms or both legs; or are paralysed and are unable to move but crawl; or are able to move only with the help of walking aids; or have acute and permanent problems of joints/muscles that have resulted in limited movement; or have lost all the fingers or toes or a thumb.

# Statistics

## Indian Census2011

**EDUCATION**  
62% of rural disabled female are illiterate.

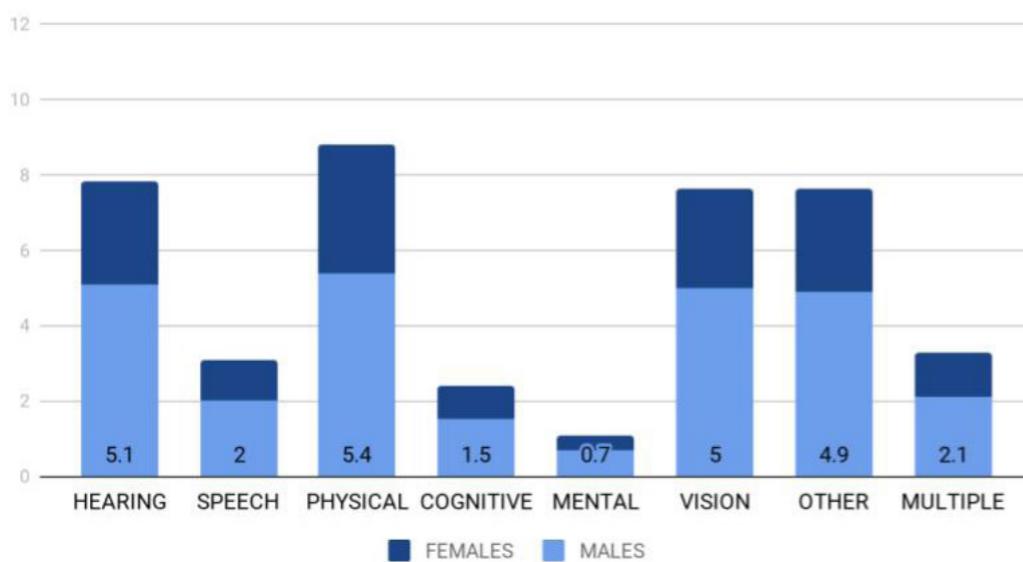
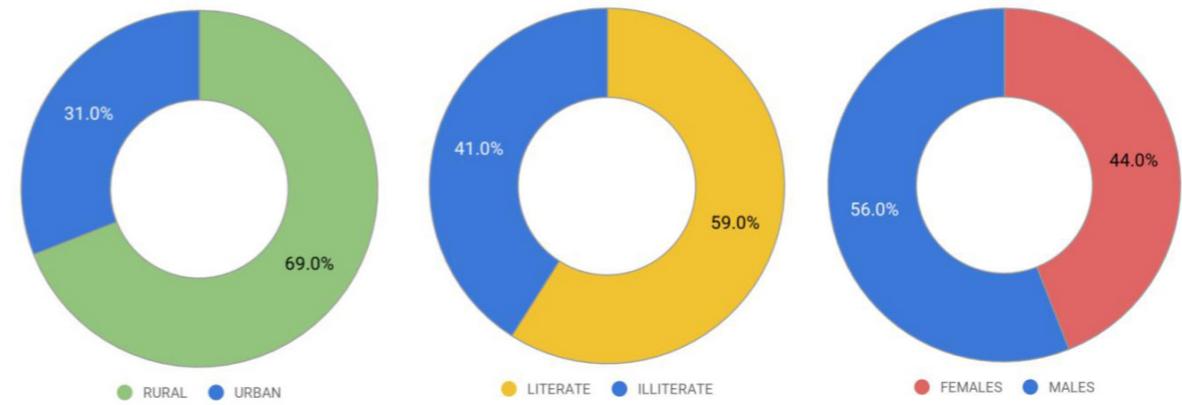
**EMPLOYMENT**  
66% disabled population is unemployed.

**COUNT**  
more than 27 million are disabled in India

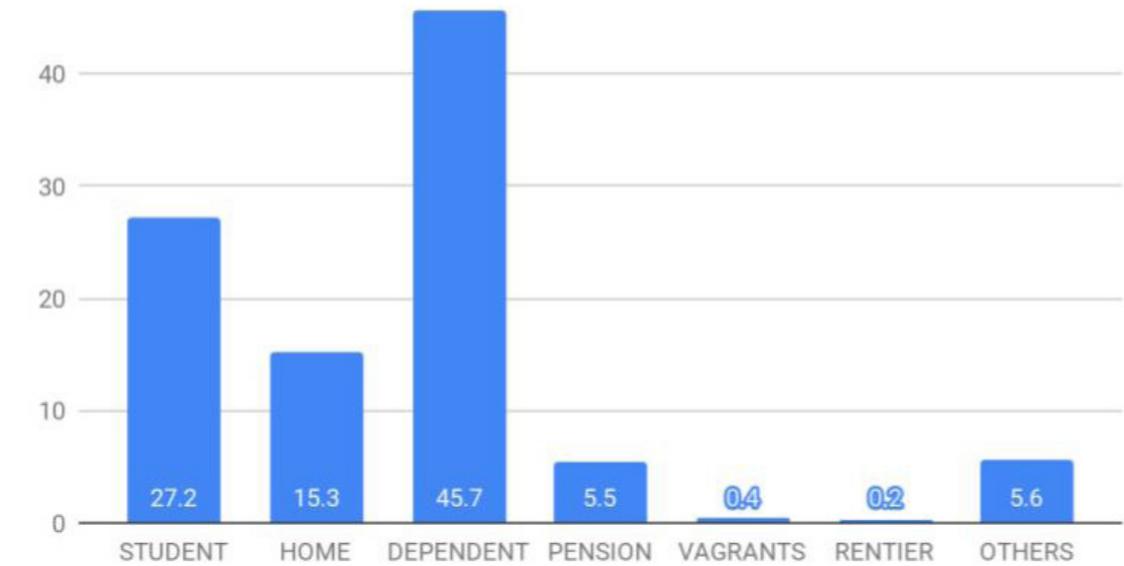
**AGE**  
Majority of disabled are between 10 and 19.

**GENDER**  
44% females are disabled.

**LIVING**  
Only 0.42% are institutionalized.



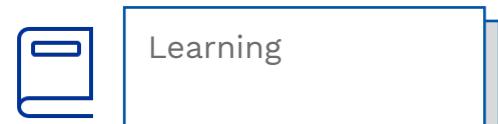
COMPARATIVE GRAPH TO SHOW THE EXTENT OF VARIOUS DISABILITIES IN INDIA (MILLIONS)



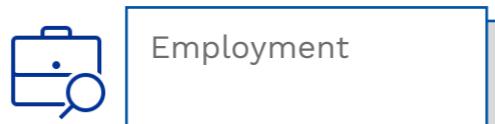
COMPARATIVE GRAPHS TO SHOW THE PRACTICES OF THE DISABLED IN INDIA (PERCENTAGE)

## Barriers for the PWD

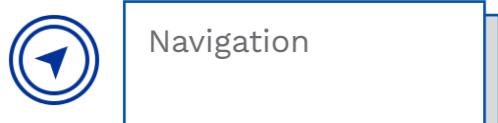
Disability, most often than not, is associated with incapacity, inadequacy, negative imagery and stereotypes. With such social attitudes, PwD find it difficult to get away from the vicious circle of lack of education, skills, low confidence, low employability and poor economic status. Therefore, the first step to tackling these challenges is to raise awareness and battle negative attitudes.



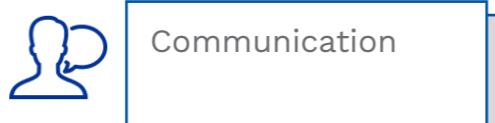
Learning



Employment



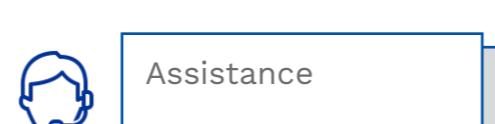
Navigation



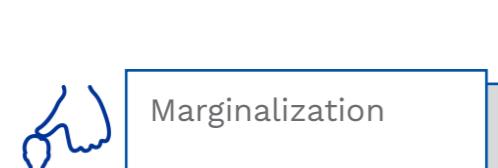
Communication



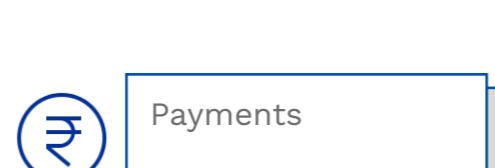
Social Relations



Assistance

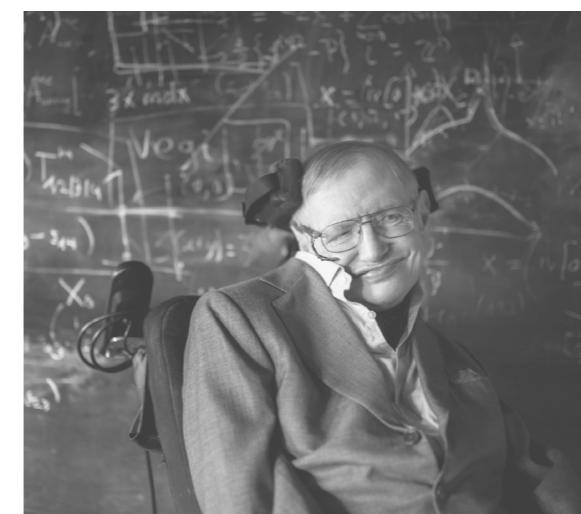


Marginalization



Payments

**Disability is universal.  
It is a development problem.  
It needs assurance that segments of community won't be left behind.**



**"Accessibility is one of the dire necessities for creating an inclusive environment. The difference between the able bodied and disabled is not so much because of physical challenges, as due to the fact that everything around us is designed from the perspective of able bodied people only. In such a scenario, accessible and adaptive technologies act as a support system to promote inclusion and empowerment of persons with disabilities."**

- Stephen Hawking

Social cognitive neuroscience studies led by Dr. Naomi Eisenberger and Dr. Matthew Lieberman, are helping to shed light on the effects of social exclusion, ostracization, and rejection.

There's evidence that feeling socially rejected activates some of the same areas of the brain that are activated when a person feels physical pain. In short, **exclusion can hurt**. Not just metaphorically, but physiologically.

# Visual Impairments

**India has  
62 million visually impaired-  
21% of the world's.**

(WHO, 2010)

**1.3 Billion people in the world live with  
some form of visual impairment.**

**Approximately 80% of visual impairment-  
globally is considered avoidable.**



**Blindness**  
  
complete or nearly complete vision loss (almost no perception of light).

**Low Vision**  
  
decreased ability to see to a degree that causes problems not fixable by usual means, such as glasses.

**Colour blind**  
  
inability to distinguish the difference between certain colors.

**Globally, the leading causes of vision impairment are:**

**uncorrected refractive errors  
cataract  
age-related macular degeneration  
glaucoma  
diabetic retinopathy  
corneal opacity  
trachoma**



63 government websites now accessible for disabled people, claims Centre. Not enough, says experts

**PM Narendra Modi suggests use of 'divyang' for persons with disability in his 'Mann ki Baat'**

**TRAI mints measures to make ICT services accessible for differently-abled**

*By 2020 end, all mobile handset manufacturers producing five or more different models should produce at least one mobile handset meeting the accessibility criteria, Trai said.*

**Years After Passage Of Disability Act, Digital Accessibility In India Still A Distant Dream**

Nipun Malhotra in Disability Rights, Society  
3 months ago

## Mandate

The Central Government, in consultation with the Chief Commissioner for PwDs is empowered to formulate rules, laying down the standards for accessibility of physical environment, transportation, information and communication, appropriate technologies, and other facilities and services provided to the public in urban and rural areas. Each of the italicized term has a defined meaning under the Act.

If you are a service provider (relevant factor to determine the same may be the service accounting code among others), then you are required to comply with the standards prescribed under Rule 15 of the Rules. The standards are termed as 'Guidelines for Indian government Websites', the latest addition of which was issued in 2018 and applies to websites and applications.

The time limit for compliance with the same is June 14, 2019.



राजस्ती सं. क्र. एस—(ए)04/0007/2003—16 REGISTERED NO. DL—(N)04/0007/2003—16



**भारत का राजपत्र**  
**The Gazette of India**

अधिकारिक  
EXTRAORDINARY  
भाग II — खंड 1  
PART II — Section 1  
प्राप्तिकार से प्रकाशित

PUBLISHED BY AUTHORITY

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No. 59] NEW DELHI, WEDNESDAY, DECEMBER 28, 2016/PAUSA 07, 1938 (SAKA)

इस भाग में पिछे पृष्ठ संख्या दी जाती है जिससे कि वह अलग संकलन के रूप में रखा जा सके।  
Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE  
(Legislative Department)

New Delhi, the 28th December, 2016/Pausha 17, 1938 (Saka)  
The following Act of Parliament received the assent of the President on the 27th December, 2016, and is hereby published for general information:—

THE RIGHTS OF PERSONS WITH DISABILITIES ACT, 2016  
(No. 49 of 2016)

[27th December, 2016]

An Act to give effect to the United Nations Convention on the Rights of Persons with Disabilities and for matters connected therewith or incidental thereto.

WHEREAS the United Nations General Assembly adopted its Convention on the Rights of Persons with Disabilities on the 13th day of December, 2006;

## ACCESSIBILITY

The Web is fundamentally designed to work for all people, whatever their hardware, software, language, location, or ability. When the Web meets this goal, it is accessible to people with a diverse range of hearing, movement, sight, and cognitive ability.

Thus the impact of disability is radically changed on the Web because the Web removes barriers to communication and interaction that many people face in the physical world. However, when websites, applications, technologies, or tools are badly designed, they can create barriers that exclude people from using the Web.

### Accessibility is being

- : able to be reached or approached
- : able to be used or obtained
- : easy to appreciate or understand

Common disabilities that affect a person's use of a mobile device include blindness or low vision, color blindness, deafness or impaired hearing, and restricted motor skills. When you develop apps with accessibility in mind, you make the user experience better, particularly for users with these disabilities.



## Four Accessibility Myths

1

### Accessible apps/ websites are ugly

Accessibility will not force you to make a product that is ugly, boring, or cluttered. It will introduce a set of constraints to incorporate as you consider your design. A key requirement of web accessibility is to separate content (HTML) from visual appearance (CSS) in order to allow those preferring - or requiring - to use their own specific style sheet to access the content. Since the visual appearance of a site is defined by style sheets, accessibility in itself should not have any impact on visual design.

2

### Accessibility is expensive and difficult

To make your app/website accessible, you don't need to add extra functionality or to duplicate any content. The key is simply to assess the requirements of those with different skills and limited devices when designing the user interface and your content.

To build from scratch an app/website that's accessible therefore, costs virtually the same as to develop one that isn't. Correcting an already inaccessible site, however, might need extra effort but is always beneficial on the long run since accessible sites are easier and cheaper to maintain.

3

### Accessibility is only for the minority differently abled segment and ROI is low.

Reaching a bigger audience - a large number of people live with disabilities (see an older study as well).

An accessible site always has better usability. An accessible website is also SEO friendly. Accessibility has other benefits like faster page download times, cross-browser compatibility and easier content management.

4

## Accessible Banking

Customers with disabilities have difficulty using a bricks-and-mortar bank or credit union because of travel barriers or time restrictions. Digital technology has the potential to be a great equalizer. Mobile financial services are a convenient "anytime, anywhere" option. But if that technology is not accessible, it only further excludes people with disabilities from engaging with your brand.

Customers with disabilities provide a large and valuable market that is currently underserved by the financial services industry.

Visually Impaired population is the largest growing minority in India. Creating sustainable, long-term relationships with this large, untapped market is an opportunity that banks and credit unions can no longer afford to ignore.

Limited financial knowledge has resulted in an unstable relationship between people with disabilities and financial institutions.



# W3C WCAG Standard 2.0

**“The power of the Web is in its universality.  
Access by everyone regardless of disability is an  
essential aspect.”**

-Tim Berners-Lee, W3C Director and inventor of the World Wide Web

WCAG 2.0 are a series of guidelines for making web content accessible for all users, especially those with disabilities. This includes users who suffer from visual, auditory, physical, speech, cognitive, language, learning, and neurological disabilities.

<b>A</b>  Highest priority and easiest to implement.  States that colour can't be used as the only means to convey information.	<b>AA</b>  More detailed than A standard.  Stresses on proper use of contrast. Text and background should have a contrast ratio of 4.5 : 1.	<b>AAA</b>  Follows the strictest guidelines and is the most comprehensive.  Visual presentation of text and images needs to have contrast ratio of 7.0 : 1.
---------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------

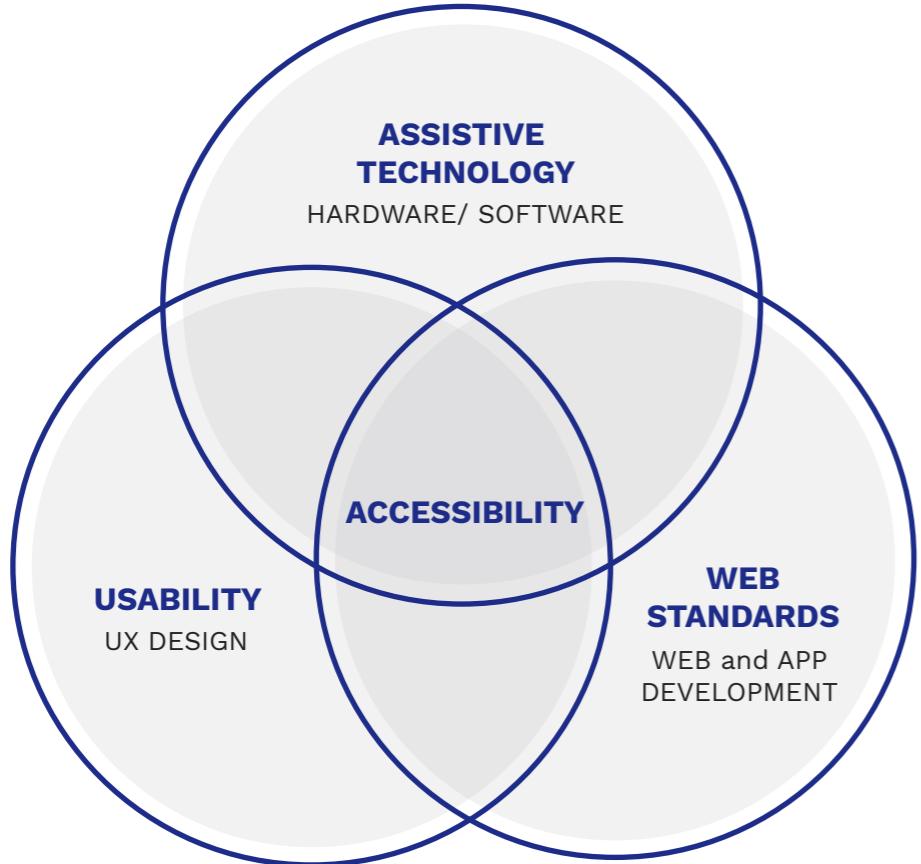
## An Accessible Product is

- 1 alternative.** text alternative for non- text content
- 2 adaptable.** content can be presented in different ways
- 3 compatible.** content is compatible with the user's tools.
- 4 distinguishable.** content is easier to see and hear.
- 5 navigable.** users can navigate, find content, and determine where they are
- 6 operable.** operable user interface and navigation.
- 7 perceivable.** perceivable information and user interface.
- 8 predictable.** content appears and operates in predictable ways.
- 9 readable.** text is readable and understandable.
- 10 robust.** robust content and reliable interpretation.
- 11 safe.** content does not cause seizures.
- 12 tolerant.** users are helped to avoid and correct mistakes.
- 13 understandable.** understandable information and user interface.

# Assistive Technology

Many user accessibility needs are met by assistive technology products installed by the user or by tools and settings provided by the operating system. This includes functionality such as screen readers, screen magnification, and high-contrast settings.

Assistive technology products include a wide variety of software and hardware. These products work through the standard keyboard interface and accessibility frameworks that report information about the content and structure of a UI to screen readers and other assistive technologies.



CC

## CLOSED CAPTIONS

Captions are a text form of audio information in video and animations. This includes the words that are spoken, who is speaking when it is not evident, and important sounds like music, laughter, and noises.



## CONTRAST

Lack of a strong colour contrast between the foreground and the background can cause problems in readability and strain on the eyes.



## TOUCHSCREEN



## ASSISTANCE

To provide help to the people with disabilities and others, a help section is often provided in an accessible format so that there is no barrier to a particular process.



## ALTERNATE DESCRIPTION

ALT text refers to invisible description of images which are read aloud to blind users on a screen reader.



## VOICE RECOGNITION

Voice-recognition software, which converts spoken words into typed text.



## KEYPAD ACCESS

A refreshable braille display displays braille characters, by means of round-tipped pins raised through holes in a flat surface.

## BRAILLE DISPLAYS

Keyboard accessibility is one of the most important aspects of web accessibility. Many users with motor disabilities rely on a keyboard. Blind users also typically use a keyboard for navigation.

Making India's most versatile payments app accessible will enable every citizen.

A blind father can send his son money for books. A low vision person can book flight tickets without asking help. A deaf person can use customer service because she forgot her password again. A person in wheelchair can get his KYC done from home.

## Why is Accessibility a Good Idea?

We aim to bring half a billion people to the mainstream economy. India has a fifth of the world's visually impaired, 12 million people, that we have left behind.

To truly become India's No. 1 payments platform. While we ignore this customer base throughout code and architecture, other players in the market take care. Phonepe is the widely accepted app in the community for better categorization and labels.

TRAI has passed the mandate to make every phone accessible by 2020. If accessibility will not be proactive, it will be reactive. Proactive accessible solutions breed goodwill. Being fully accessible will prove to the public that Paytm truly cares.

There is also a strong business case for accessibility. Accessibility overlaps with other best practices such as mobile web design, device independence, multi-modal interaction, usability, design for older users, and search engine optimization (SEO). Accessible websites can have better search results, reduced maintenance costs, increased audience reach, and demonstrate corporate social responsibility (CSR).

## Case Studies

The digital age is first and foremost a visual age, experienced through the eye. Our screens deliver an unrelenting stream of information—notifications, text, graphics, video—that feeds us quick hits of visual energy while ignoring our other senses. Working alone, the eye is limited to the surface of things. The digital world has a lot to see, but without deeper sensory engagement, there is much less to feel (both physically and emotionally).

## Bloomberg

### STOCKGROCK

Team B7G- Jayanth, Conrad Bouchard, Emily Saltz, Nora Tane, Clare Carroll

Visual cues in charts are essential in financial decision-making. The sudden plummet of a stock price, the steady rise of an index fund, the outlier within a sector: these are all visual triggers that sighted finance experts regularly use to identify investment opportunities. This report explores ways in which inaccessible data visualizations disadvantage people with severe visual impairments from entering or remaining in the finance industry.

Stockgrok is an inclusive solution designed to empower people with visual impairments assess financial trends and make buy or sell judgements non-visually.

Stockgrok uses a unique set of audio outputs that enable hearing the distance between stock charts lines, intersection points, and price position.

Some insights outlined in the studies are-

- i) Changing tools is hard, so it must be worth it.
- ii) Visuospatial metaphors are used as mnemonics.
- iii) Assistive Tech can only provide one piece of information at a time.
- iv) There is no normal.

Good design is obvious,  
great design is transparent.  
-Joe Soprano





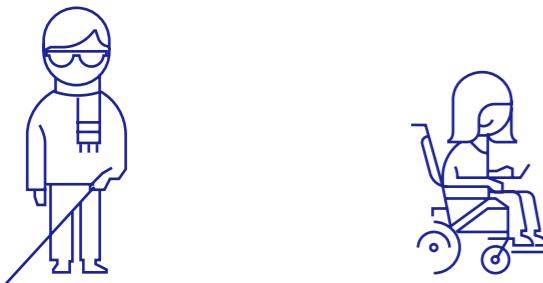
Everyone should be able to access and enjoy the web.  
We're committed to making that a reality.

Inclusive Design is a methodology, born out of digital environments, that enables and draws on the full range of human diversity. Most importantly, this means including and learning from people with a range of perspectives.

Microsoft, along with the brilliant designer Kat Holmes, has crafted an inclusive design kit which has various manuals on building empathy for building inclusive solutions.

Accessibility is part of Google's core mission to catalog the world's information and make it available to everyone.

One of Google's core principles is "Focus on the user and all else will follow." The Google User Experience (UX) team believes that usability and accessibility go together. Google integrates accessible design thinking throughout the entire product development cycle, and has been more deliberate about baking accessibility right into products.



#### Recognize Exclusion

Designing for inclusivity not only opens up our products and services to more people, it also reflects how people really are. All humans grow and adapt to the world around them and we want our designs to reflect that.

#### Solve for one, Extend to Many

Everyone has abilities, and limits to those abilities. Designing for people with permanent disabilities actually results in designs that benefit people universally. Constraints are a beautiful thing.

#### Learn from Diversity

Human beings are the real experts in adapting to diversity. Inclusive design puts people in the center from the very start of the process, and those fresh, diverse perspectives are the key to true insight.

## Seeing AI

Microsoft's Seeing AI is a free app that can narrate the world around a person. Designed for the low vision community, the project harnesses the power of AI to describe people, text, colour and objects.



## UX for the Next Billion Users

No two users are exactly alike. Physical and cognitive disabilities, as well as environmental factors, can inhibit people from fully engaging with technology: hardware, software, and beyond. Living in an increasingly globalized world means that there's an opportunity to proactively build ethical and meaningful products that are inclusive of societies and cultures worldwide. Let's continue that journey by learning more about designing for global accessibility.



Accommodate different levels of literacy and many different languages.

Empower your users when it comes to privacy, safety, and security.

Build great user experience for moderate devices.

Ensure app functions well when offline and during intermittent networks.

Treat accessibility settings is critical, and not simply as a checklist.

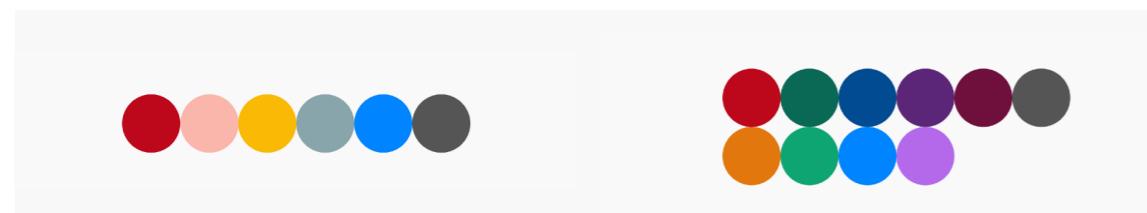
Use colour and contrast wisely.

Keep usage costs low.



Even though Pinterest uses 'images' to catch the viewer's attention, Pinterest posts are typically accessible with screen readers. While the image itself does not have alt tag descriptions, the text on the image is read aloud and the link provided in the image is accessible. Pinterest has recently added greater contrast for low vision users and better screen reader support to improve accessibility when signing up, navigating and saving pins.

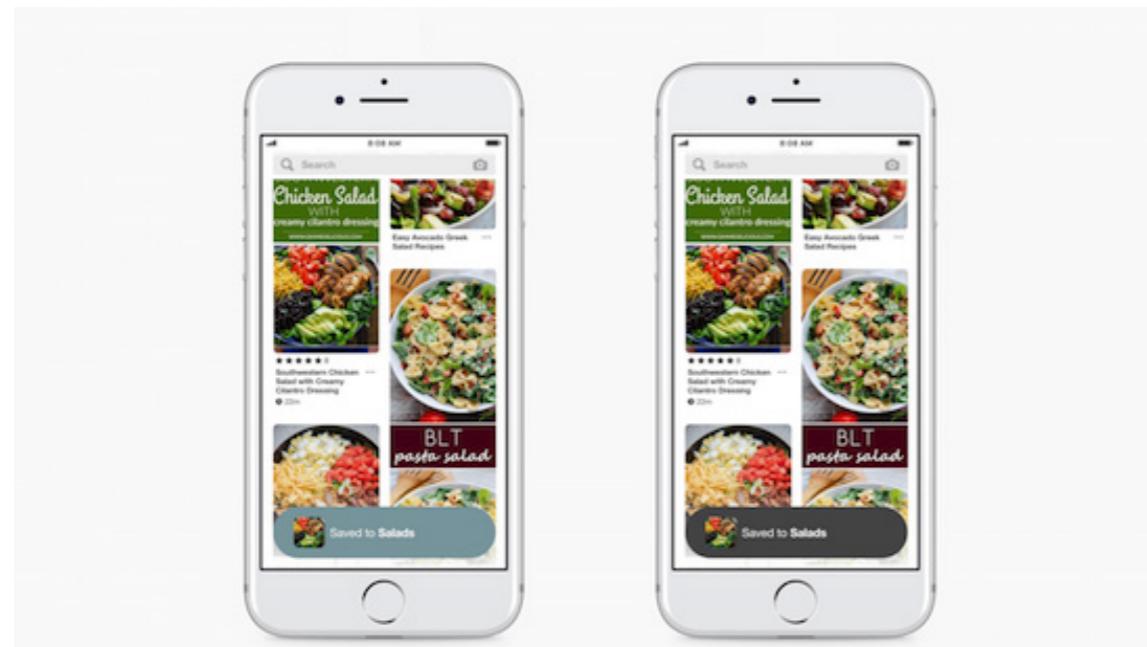
#### Increased color contrasts



Better screen reader support makes signing up, browsing and saving easier and more usable.

Color contrast sensitivity improvements make the color palettes more readable and easier on the eyes. This is especially helpful for Pinners with sensitivities to bright colors and those who have low vision.

Focus indicators help people with mobility or visual differences use a keyboard or another device to navigate to see which part of the site is in focus.



The world's most personal device was designed for every person.

#### You don't need to see your iPhone to use your iPhone.

VoiceOver is a revolutionary screen reader that lets you know what's happening on your iPhone, even if you can't see the screen. Touch the screen to hear what's under your finger, then use gestures to navigate and interact with every built-in app.

#### You say it. iPhone types it.

Dictation lets you talk where you would type. Tap the microphone button on the keyboard, say what you want to write, and your iPhone converts your words (and numbers and characters) into text. So it's easy to type — without typing at all.



#### Make your screen up to 1500 percent bigger.

Zoom is a built-in screen magnifier that works wherever you are in iOS. And it works with all apps from the App Store. Turn Zoom on for full-screen or picture-in-picture view, allowing you to see the zoomed area in a separate window.

#### Get quick access to your favorite features.

Control Center is customizable, so you can easily add and organize shortcuts for the tools and settings you use the most. You can also turn on Guided Access or get to all the Accessibility Shortcuts you have enabled.

#### Apps can automatically adapt to larger type.

When you activate Larger Dynamic Type, the text inside a wide range of apps is converted to a larger, easier-to-read size. Apps adapt to accommodate larger font sizes so text remains legible and clear as it grows.

#### From emails to books, let your iPhone read to you.

If you have a hard time reading the text on your iPhone, use Speak Screen to read. You can adjust the voice's dialect and speaking rate, and have words and sentences highlighted as they're being read.

field work

five

## PRIMARY RESEARCH

User research is about understanding the user—how they live and work, what they like, what sort of problems they have that you could potentially solve with your product.

Formative research is typically done at the onset of a project or development cycle to assess the current state of a feature, a website, or an application. It helps identify problems to be solved (for example, pain points the users experience when interacting with an application).

### What is needed to be done?

1. Accessibility tests
2. User research to understand accessibility needs.
3. Use accessibility best practices.
4. Build a better product for all users, capturing bigger market share.



## Recognising Exclusion

We're humans, which means we bring our biases to everything we do. If we don't realize that, we'll automatically create exclusion in everything we build. There's someone out there, with a different set of abilities from yours, who wouldn't be able to use or enjoy your product the way you would. Who is that person, and what would you do to even the playing field for them? That's the first principle of Inclusive Design: Recognize Exclusion.

It means examining what you build, and recognizing who would be excluded from using it. The hardest part is realizing that exclusion just happens when we don't pay attention to our biases. Designing a product from scratch that meets the requirements for accessibility doesn't add extra features or content; therefore, there shouldn't be additional cost and effort. Fixing what is already inaccessible requires some effort, though.

- IVR is inaccessible to the hearing impaired (need to promise multimodal access)
- KYC is inaccessible to the differently abled in general.
- The TalkBack doesn't respond at the entry points in Paytm.
- Predictive arrangement of features in the middle section is problematic to the VI, CI and reduces integrity of the app.

**"Our job isn't to tell them how to interact with what we create; our job is to create something that they can interact with in whatever way they choose to interact."**

## Research Participants

**NIVH  
BRA  
NAB  
AADI**



**27 Blind  
8 Low Vision  
2 Colour Blind  
4 Ophtalmologists  
5 Accessibility Experts**

27 March, 2019

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## Questionnaire for Interviews

1. Name:
2. Age:
3. Gender:
4. Occupation:
5. Education:
  
6. Disability:
7. Type: CONGENITAL/ ACQUIRED
8. Age when disability commenced?
9. Do you have any other medical conditions?
10. In case of VI, do you know how to read Braille?
  
11. Caretakers (at any particular time): YES/ NO, if YES, how long?
12. Help/ Service from an agency?
13. Do you get any benefits from the government?
  
14. What devices do you make use of?
15. Do you use a phone?
16. Who informed you about TalkBack?
17. Did you install TalkBack on your own?
18. Do you listen to it at a very high speed?
19. Do you use laptop? What do you do?
20. Which phone model do you have?
21. What do you usually do on phone?
22. What features do you make use of?
23. What apps have you downloaded?
  
24. Routine? How do you entertain yourself?
25. What do you do in your free time?
26. What do you do on your visits outside? Does someone accompany you?
27. What entertainment apps do you use? What do you like about them?
28. What apps/ portals do you trust to get information?
  
29. Do you have a bank account?
30. How frequently do you visit the bank?
31. Do you use net banking or any payments platform?
32. Are you comfortable using ATM?
  
33. What do generally pay for?
34. What is the largest amount you have sent/ transacted over internet?
35. What do you do when you have to transact/ send large quantities?
  
36. Do you have someone you trust with transactions and bookings on your behalf?
37. Do you share your bank account with them?
38. What actions require help from someone?
39. Did you ever have to share sensitive information with a person you don't trust?
40. What is the best customer support you have come across?
41. What sites/ portals do you trust? Why?



## Persona Spectrums

Persona Spectrums are tools that can introduce diversity into our design process. Spectrums instead of definitive personas help us check and balance the inclusivity of our designs. The model of creating spectrums ensures that we focus on a range of customer motivations, contexts, abilities and circumstances instead of creating a fake average.

Disability is situational. The inability/ disability to interact with an interface may depend on the context. For example, a person might have a permanent condition due to being blind since birth. They could also be recovering from eye surgery and have limited or no vision. Another person might face this barrier in certain environments, like operating a device during daytime under the glare of the sun. Different people, similar needs.

By gathering real insights from real people who share the motivations we are designing for, we can start understanding and incorporating the full range of human diversity, designing for individuals and their aspirations.

"Persona spectrums aren't perfect, but they help us create more equitable experiences. They use the power of personas to ground and humanize user insight while keeping different human attributes distinct. By designing along a spectrum of need and motivation, we avoid the biases and assumptions built into a persona. We design for a diverse range of real users instead of one average, theoretical Ted."

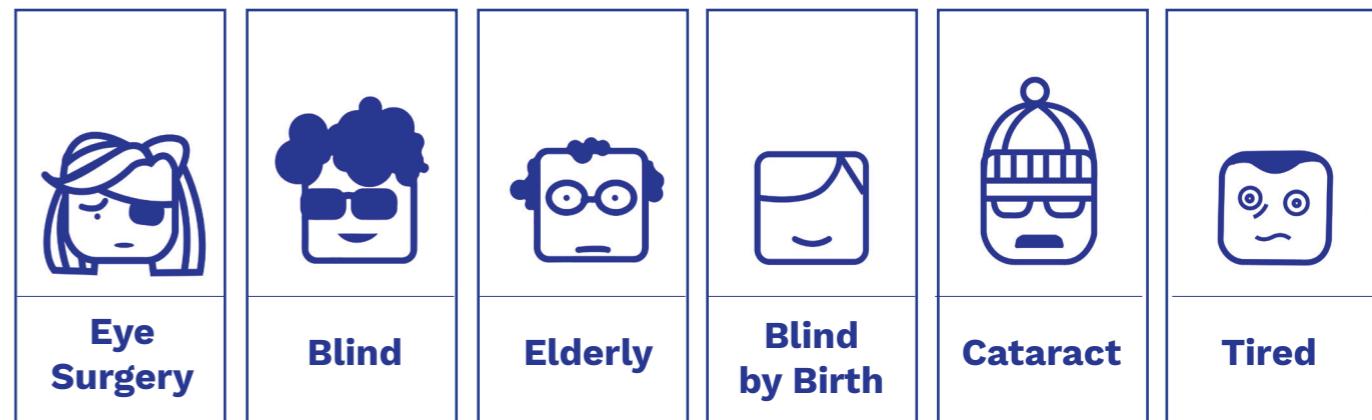
We can further use these persona spectrums to ideate in our design process alongside a series of physical, social, economic, temporal and cultural contexts.

## What is wrong with Personas?

"Personas are inherently an amalgamation, an average of attributes that we imagine our average customer has. And there's no such thing as the average customer."

Microsoft Blog, Kill Your Personas

The more human I try to make my subject, the more I stereotype them. Every detail I give someone according to my imagination, the less they represent the audience I wish to help with my solution. Our technology needs to build an intelligent, responsive system that furthers the Indian diversity and provides for multiple contexts and capabilities.



## Fresh insights from the field.



Visually impaired customers prefer PhonePe and Google Pay to Paytm.

- 1 Interface of the app changes often, user flows change often.
- 2 Navigation and Searchability in the app are limited.
- 3 Users find it hard to customize layout, content and structure.
- 4 KYC is a major hurdle in smooth onboarding. The visually impaired still use Paytm due to the ease of agent visit available earlier.
- 5 One-click system of Paytm is not suitable to an understandable 1-D navigation. Categorization is preferred.
- 7 Typing PIN is risky and there are different methods PWVI use to ensure safety.
- 8 Spatial changes in personalization in the features drawer act as a hindrance.

## Modes of Payment



### CURRENCY

The currency implemented after demonetization is inaccessible to the visually impaired due to similarity in sizes. Carrying cash is quite unpopular amongst the community due to higher vulnerability too. Apps are now being developed to help recognize currency denomination.



### ATMs

Indian banks have stratified ATMs with sound feedback which greatly helps the visually impaired manoeuvre the device to transact cash. But, the interface of different banks is unsimilar, causing memorability issues.



### CREDIT CARDS

There has been a shift towards using credit cards due to low popularity of cash. The cards are easier to use, and typing PIN is sometimes an issue if the person is new to the system.



### MOBILE PAYMENTS

The younger age cohort of the visually impaired are embracing mobile payment systems and find them to be more reliable than any other mode of payment.



### SOCIAL REHABILITATION

Many low vision members of the society are dependent on others for their finances and transactions. They may rely on family, friends, or caretakers to help perform private tasks, such as paying bills and creating accounts- often at security risk.



### MOBILE PAYMENTS

The unemployed visually impaired receive a pension of Rs. 1500 per month from the government, through a singular bank branch. The person usually knows everyone at the said branch and takes help from them.

providing access

# IMPLEMENTING ACCESSIBILITY

After an organization makes a commitment to make its Web site accessible, it is important to plan the process for implementing accessibility. This chapter details on how the plan was formulated to ensure that the visually impaired were able to use the app with no barriers. Guidelines were developed on how to weave accessibility implementation throughout the process to minimize overhead and improve the overall quality of the final outcome.

**Accessibility tests**

**Labels**

**Touch Targets**

**Colour Contrast**

**Website**

**Guidelines**



# Accessibility Tests

Testing for accessibility lets you experience your app from the perspective of your users and find usability issues that you might otherwise miss. Accessibility testing can reveal opportunities to make your app more powerful and versatile for all your users, including those with disabilities.

## 1. Manual Tests

Interact with your app using Android accessibility services. Manual testing puts you in the shoes of your user. Android Accessibility Service objects change the way your app's content is presented to the user and how the user interacts with the content. By interacting with your app using accessibility services, you can experience your app as your users would.

TalkBack/VoiceOver are built-in screen readers. When turned on, users can interact with their device without seeing the screen.

Android: Settings > Accessibility > TalkBack  
iOS: Settings > General Settings > VoiceOver

Swipe left or right to navigate all elements in sequence or drag your finger over the screen to hear what is under it.

Explore your app with TalkBack. As you navigate, look for the following issues:  
Does the spoken feedback for each element convey its content or purpose appropriately?  
Are announcements succinct, or are they needlessly verbose?  
Are you able to complete the main workflows easily?  
Are you able to reach every element by swiping?  
If alerts or other temporary messages appear, are they read aloud?

## 2. Testing with Analysis Tools

Testing with analysis tools can uncover opportunities to improve accessibility that you might miss with manual testing.

### Accessibility Scanner / APP

The Accessibility Scanner app scans your screen and provides suggestions to improve the accessibility of your app. Accessibility Scanner uses the Accessibility Testing Framework and provides specific suggestions after looking at content labels, clickable items, contrast, and more.



### Google Lighthouse / WEB

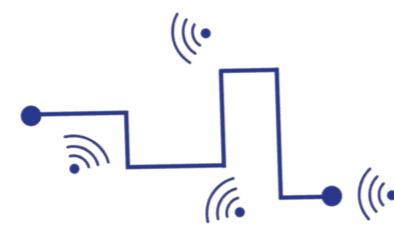
Google Lighthouse is a tool developed by Google that helps web developers test the load times, accessibility, and search engine optimization of web pages.<sup>[1][2][3]</sup> It includes the ability to test progressive web applications for compliance with standards and best practice.



## 3. User Testing

Let's get out of the building, nothing beats testing with real users on the field and getting feedback on our app. NIVH, BRA and NAB are some organizations where you can find people with visual impairments at work.

## Labels



Accessibility text refers to text that is used by screen readers to read text and UI elements on screen aloud, including both visible and nonvisible alternative text.

Accessibility text includes both visible text (labels for UI elements, text on buttons, links, and forms) and nonvisible descriptions that don't appear on screen (such as alternative text for images).

When both visible and nonvisible text is descriptive and meaningful, it helps users navigate using headings or links on a screen.

## Contrast

Low-contrast screen designs are often particularly challenging for people with low vision to decipher. If the contrast between design components and the background is not large enough, important information and affordances might get lost or overlooked.

Sufficient contrast is defined as having contrast ratio of 4.5:1 or higher for normal text, and 3:1 for large text greater than 18pt.



PMS 2995 C PMS 7479 C PMS 2010 C PMS 294 C PMS 178 C

#00ACED #26D07C #FFAD00 #002F6C #FF585D

Original Paytm Colours

## Touch Targets

### Size

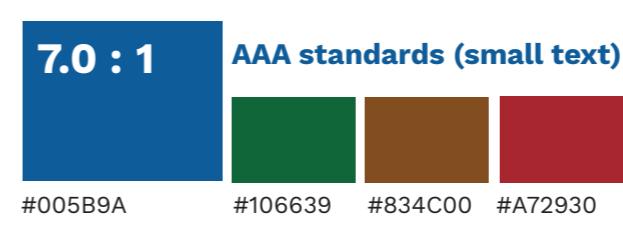
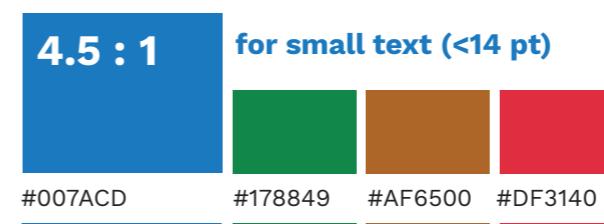
Average human finger tip is 8mm-10mm, touch targets should be 48dp x 48dp.

We have touch targets are as small as 12dp x 16dp. Touch targets shouldn't exist where there are no UI elements.

### Groups

Associated information should be grouped under a single container, so that it may be read together.

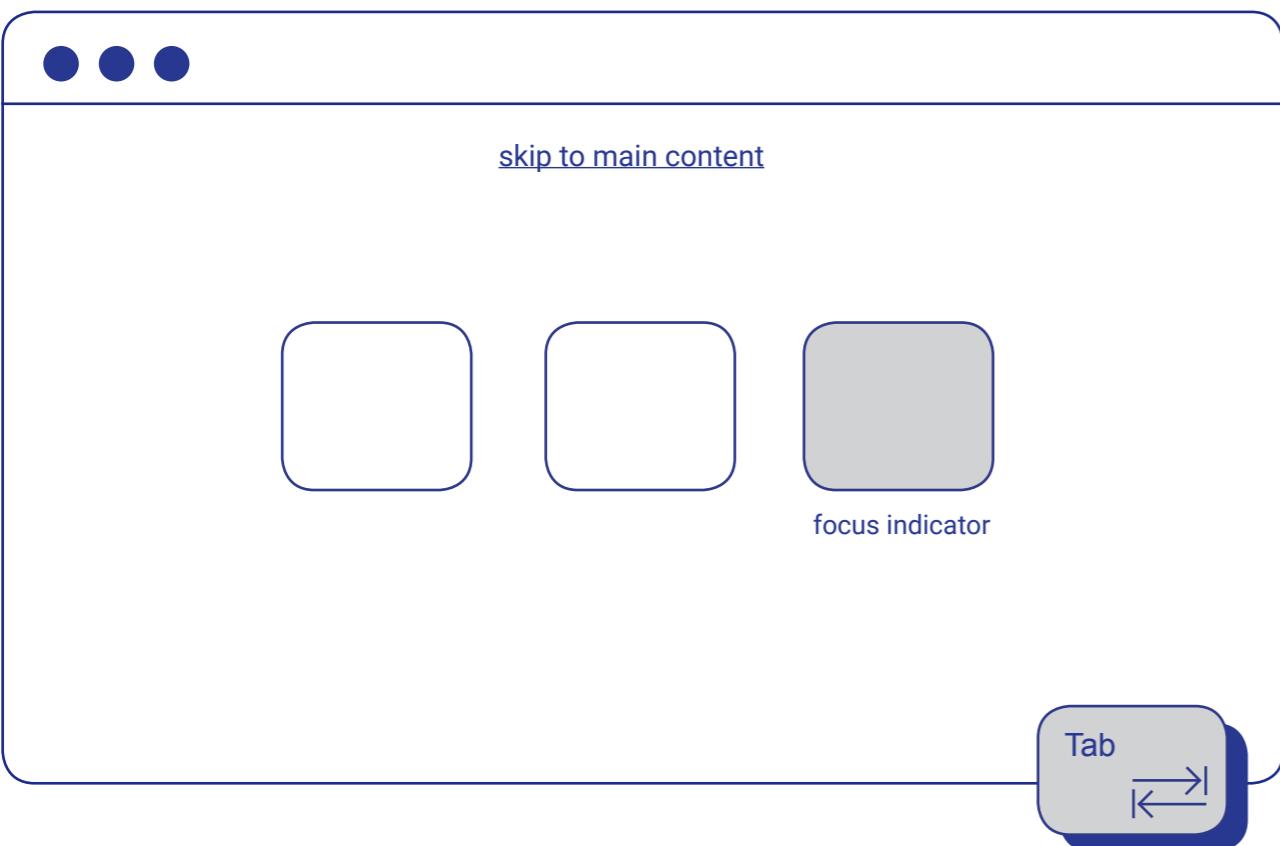
Eg: Checkboxes with their form fields should be combined in focus.



# Website

## Keyboard friendly website-

Many assistive technologies rely on a keyboard only navigation. This is made possible by using Tab key to jump linearly through all elements in a website. Visible focus states helps users with keyboard to know where they are navigating.



## Design Your Forms for Accessibility-

Forms are a useful addition to most sites but must be designed carefully. What's most important is to ensure that each field is clearly labeled. You should also aim to place the labels adjacent to the respective fields. While a sighted user can easily match a label to the corresponding field or option, this may not be obvious for someone using a screen reader.

## Using ARIA where required-

For dynamic changes in websites, ARIA landmarks can be used to tag these as live regions, to invoke the screen readers when the changes occur. ARIA also lets a user skip to the main content for convenience.

## ALT text for all images-

For dynamic changes in websites, ARIA landmarks can be used to tag these as live regions, to invoke the screen readers when the changes occur. ARIA also lets a user skip to the main content for convenience.

## Enable Resizable Text That Doesn't Break Your Site

Most devices and browsers will enable users to resize text, which can be helpful for those with visual impairments. A good practice is to avoid absolute units, such as specifying text size using pixels. Instead, use relative sizes, which enable the text to scale depending on other content and screen size.

You should also never turn off user scalability as this will make it difficult for users to resize the text at all.

## Avoid Automatic Media and Navigation-

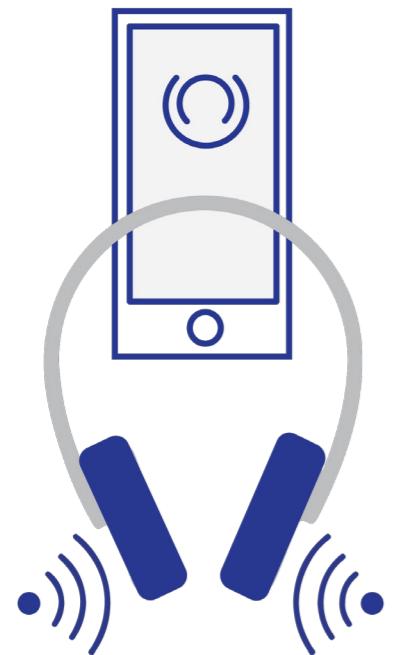
As annoying as it can be to have music or videos start when a page loads, this is an even bigger issue in terms of accessibility. It's also best to avoid automatic navigation, such as carousels and sliders. This can be incredibly frustrating if the viewer needs more time to absorb all the information before moving on to the next slide or section.

# Guidelines

Implementing accessibility long after the creation of a complex system is an intricate process, and requires a well-structured plan.

To ensure a smooth transition of the Paytm platforms into an accessible platform, guidelines were created and shared with the team.

The guidelines comprise a set of design and development audit checklists for quality assurance.



providing access

# IDEATION

The ideation stage led forward from accessibility to usability of the app. Leaving disabled individuals out of usability testing creates a gap in testing methodology. Usability relates to the how easy things are to use. Generally, usability is measured against five criteria—memorability, efficiency, errors, learnability, and satisfaction (MEELS).

Usability is defined as the “extent to which a product can be used by specified users to achieve specified goals effectively, efficiently and with satisfaction in a specified context of use”. (ISO 9241-11)

## Accessibility test Results

### Redesigned flows

- Onboarding
- Search and navigation
- Pay
- Metro
- Passbook

## Accessibility Guidelines

### Social Rehabilitation

- KYC
- Sub wallets
- Customer Service

## Haptic Pin Entry

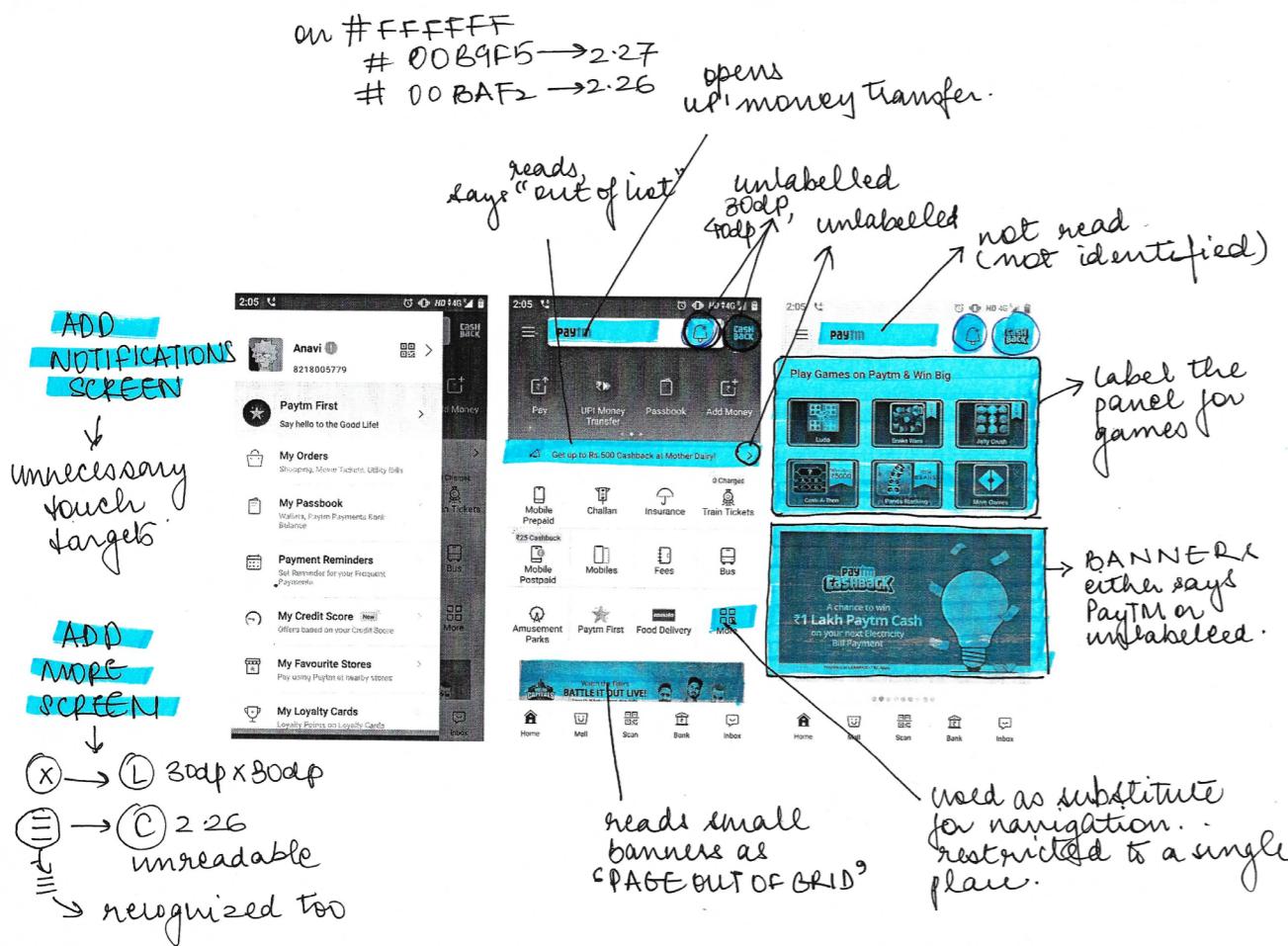


# HOMESCREEN

Paytm Consumer App has more than 28 elements on the home screen, before it is scrolled. While PhonePe and GooglePay contain their homescreens within a limited area, Paytm home extends infinitely.

With low customizations and preference settings, the app seems to be pushing business more than the users need.

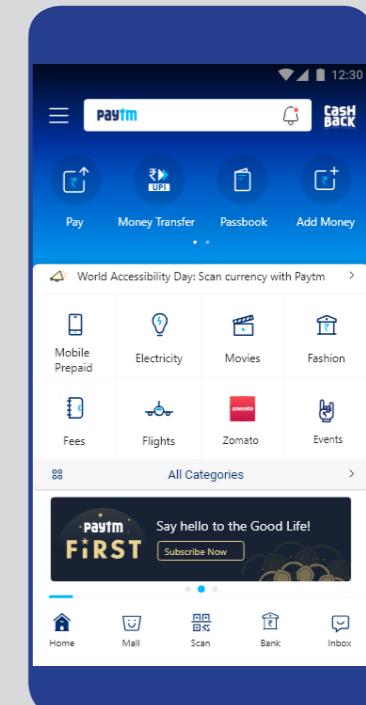
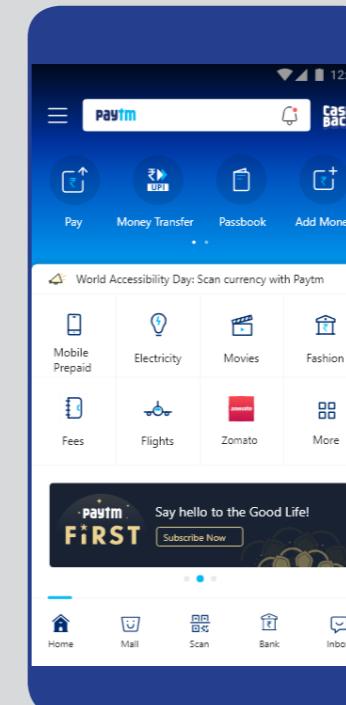
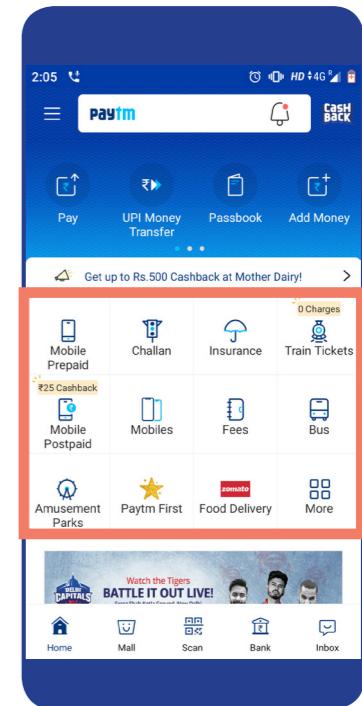
Whilst conducting gap analysis, the emergent frustrations with the app became evident. Paytm believes in reducing the number of clicks as much as possible, making everything available on home, but losing any categorization of large verticals it contains.



## HOMESCREEN Feature Drawer

There are various business verticals trying to nudge some space on the app forefront. The more you access a feature, the higher chance it has on being available on your home screen. This lends to the unpredictable featuring of various options on the screen, and consumer fails to commit it to the memory.

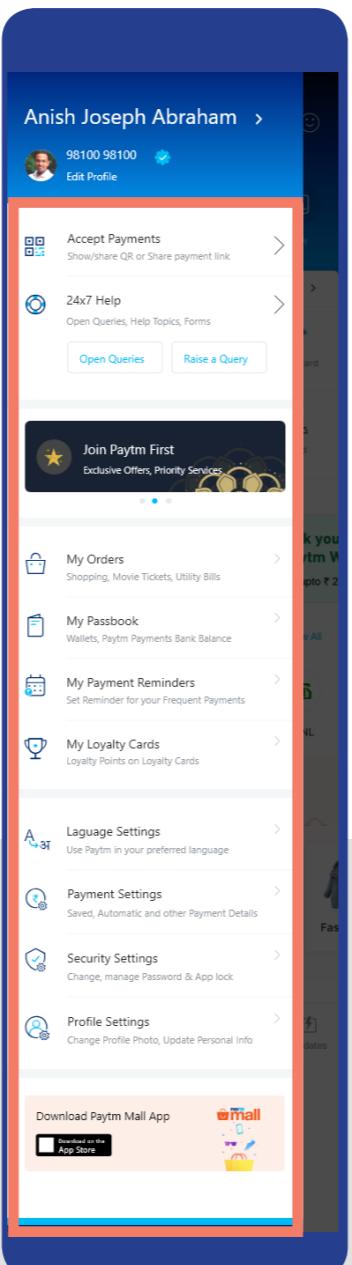
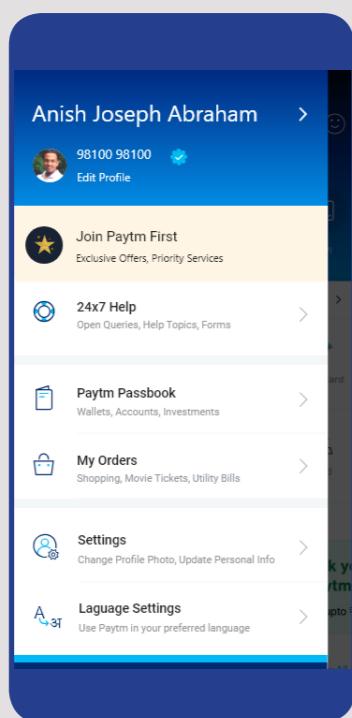
According to a usability study, people don't make use of more than an average of 4 features on Paytm. I pitched the reduction of options in the feature drawer.



## HOMESCREEN

### Feature Drawer

Worked to reduce the options to 10 from 21, almost halved. This included removing the banners, the dysfunctional and the uncategorized.



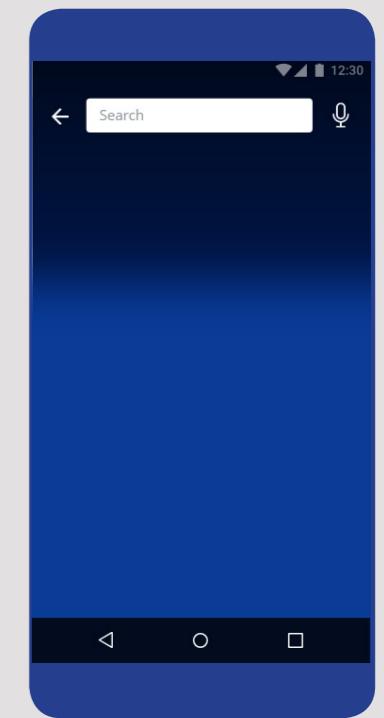
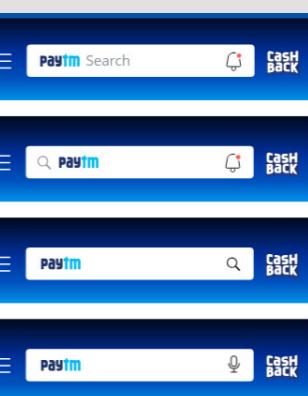
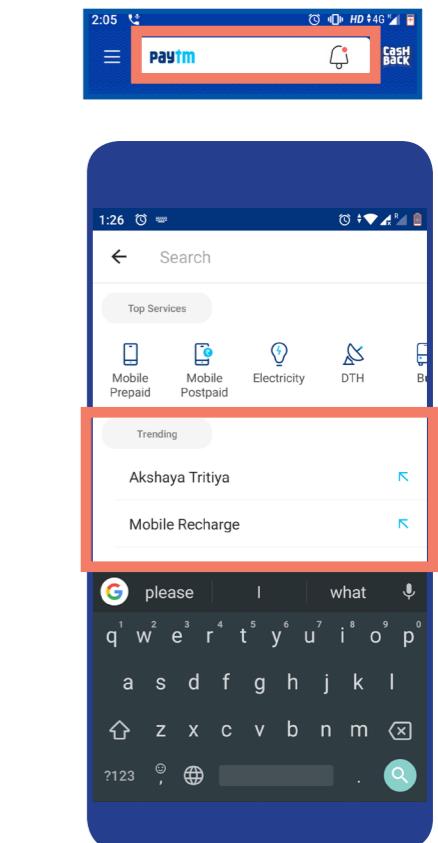
## HOMESCREEN

### Search Bar

The Search Bar, present as a branding element is quite underutilized in the Paytm consumer app.

Variations were developed to make searchability a recognizable attribute of the UI element.

The Search results redirect to products of mall before app verticals. Eg. A movie search will lead to Guru Dutt's movie CDs in the mall, and not movie bookings. A solution was to override the search results with search from the 'More' section of the Home Screen.

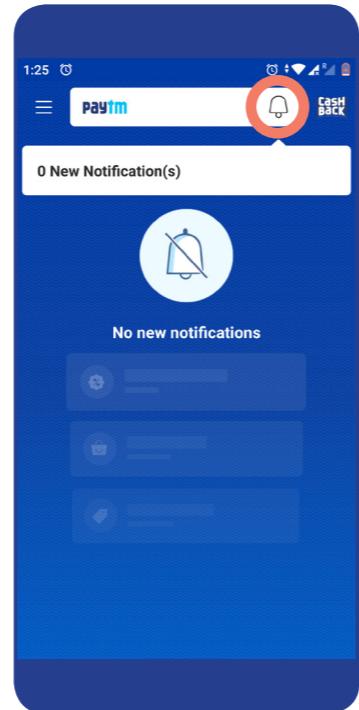


## HOMESCREEN

### Notifications

Lack of back button visibility created confusion for users, and it replaced the profile button.

Suggestions were given to make notifications more informative.

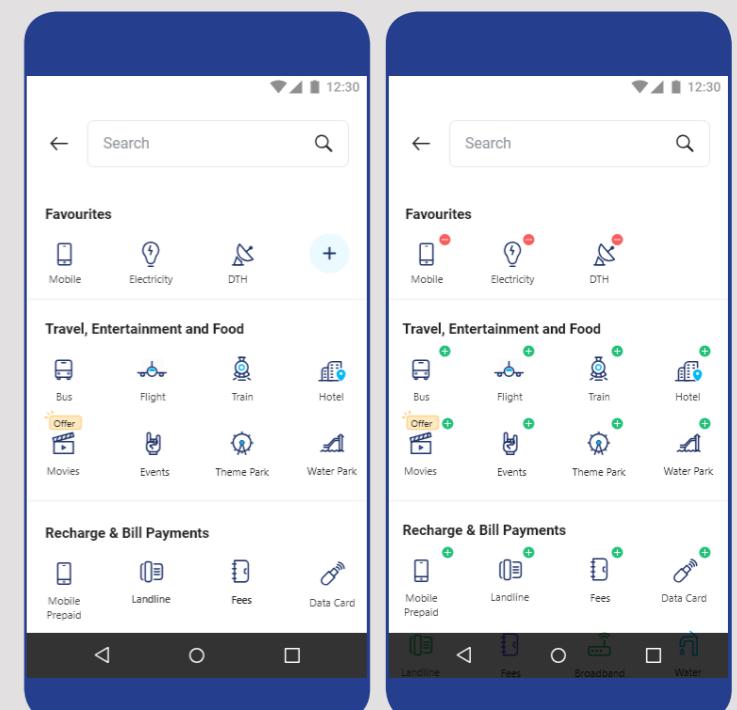
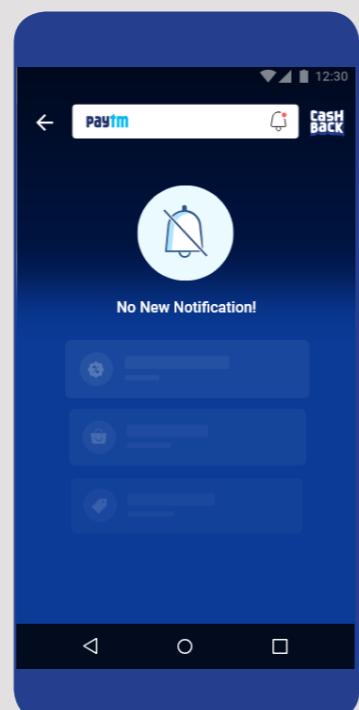
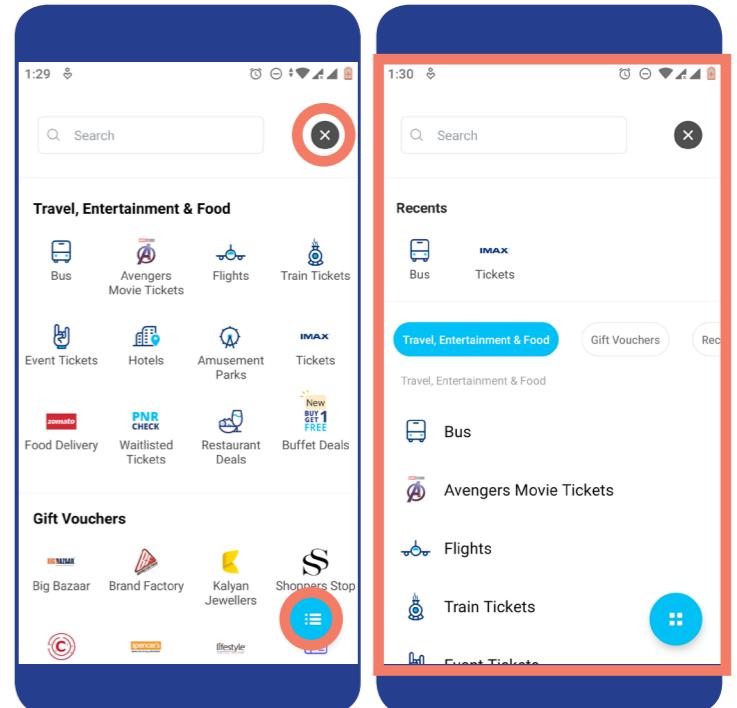


## HOMESCREEN

### More Section

Android More has dysfunctional option to change the view, with an inconvenient rail menu, and close button makes it appear as if it were a sheet pulled down from the bottom. The blue CTA was removed and close button was replaced with back button.

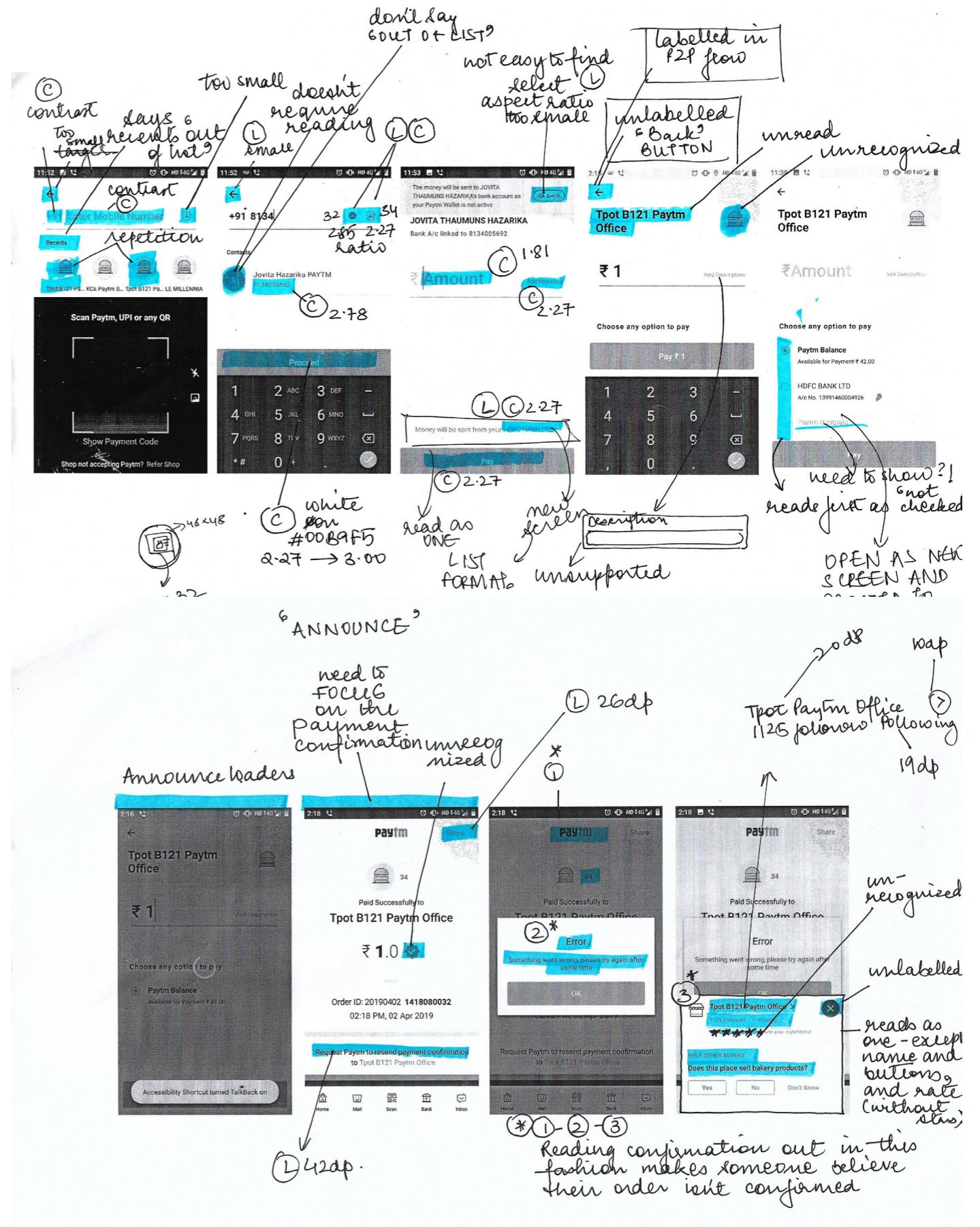
The customization to add favorites was added, favorites being shown on home screen with 3-4 business options. Search bar design was made consistent throughout app.



## PAY VIA WALLET

Pay via Wallet is the most used workflow of the Paytm consumer app, and offers the user a hassle-free payment in few steps. Internship duration started with a Scan and Pay Heuristics study, resulting in a better understanding of the possibilities which could improve the experience.

This flow has been reviewed in terms of contacts access, error prevention, entry field redesign, more focus on payment instruments and standardized contrast guidelines enlisted in WCAG 2.0 AA standard.

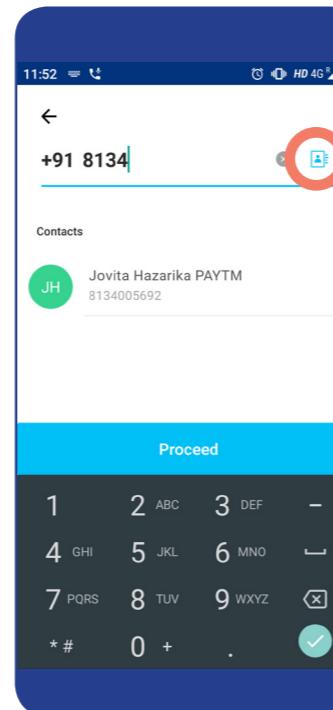
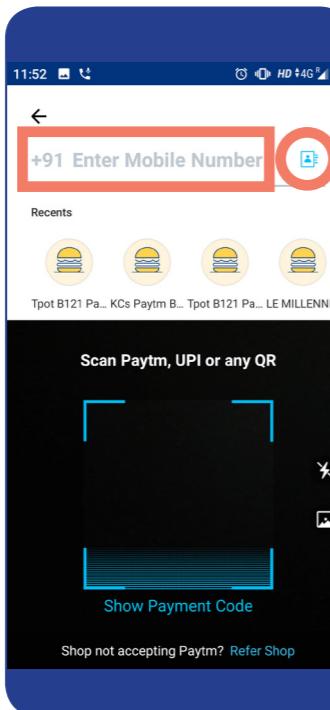


## PAY via WALLET

### Contacts

Search option was given to type both name and number to reduce the use of contact book and low memorability of numbers. Recents were replaced with frequent.

Contact book icon was removed and Proceed button became active only after the full typing of the name and not before.

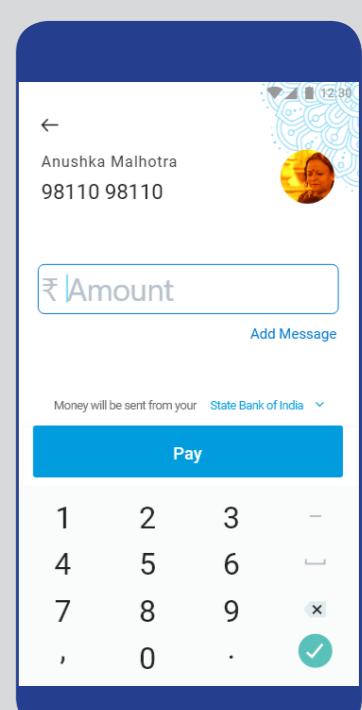
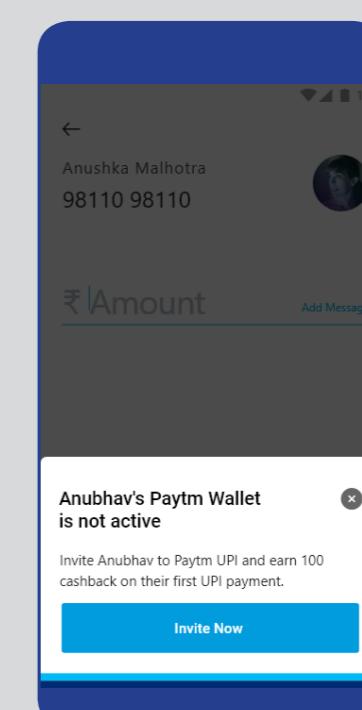
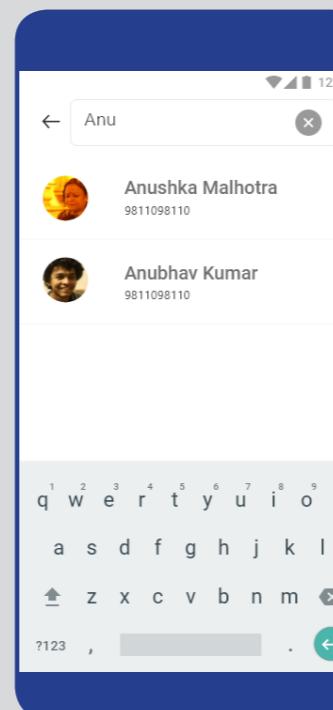
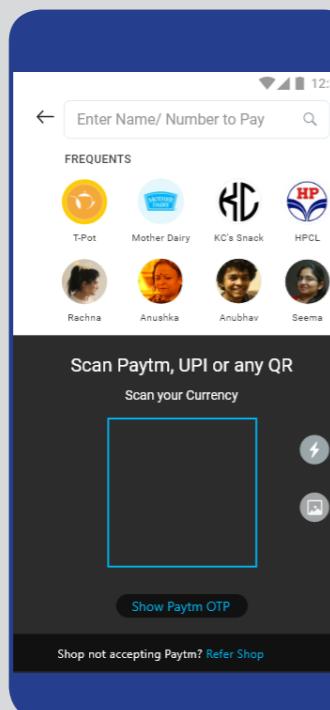
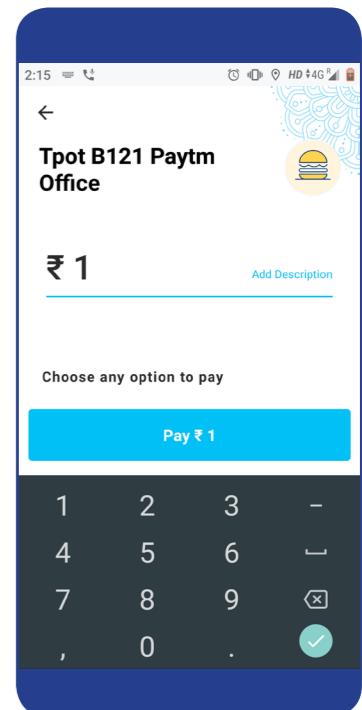
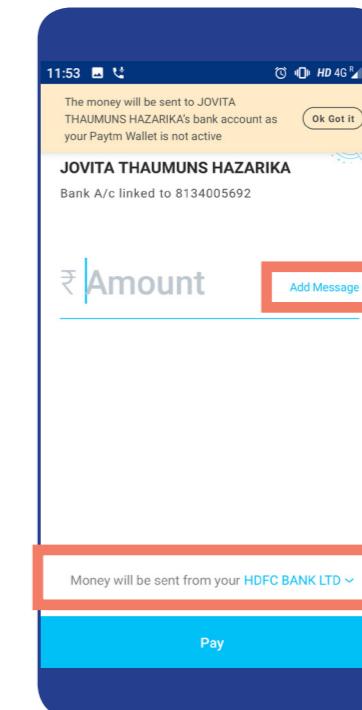


## PAY via WALLET

### Amount Entry

A bigger entry field was made to ensure recognition. Add Message was made into a bigger touch target. The CTAs across the screens were made consistent in size too.

Error screen was shown before typing in of the amount, to reduce the frustration of the user.

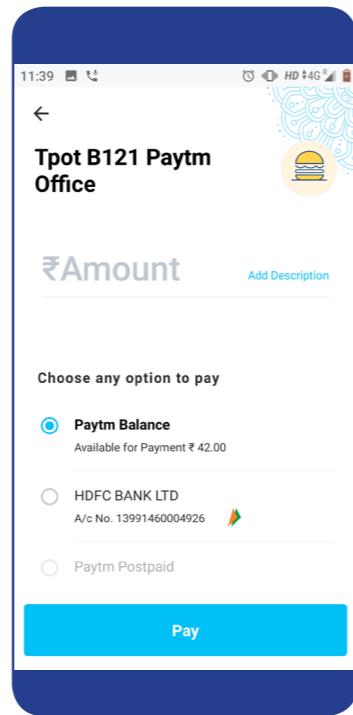


## PAY via WALLET

# Payment Instruments

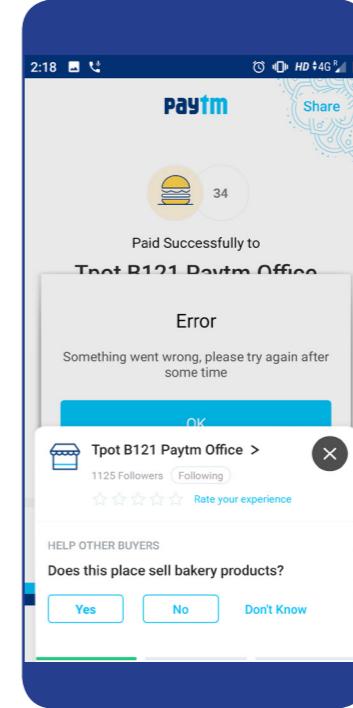
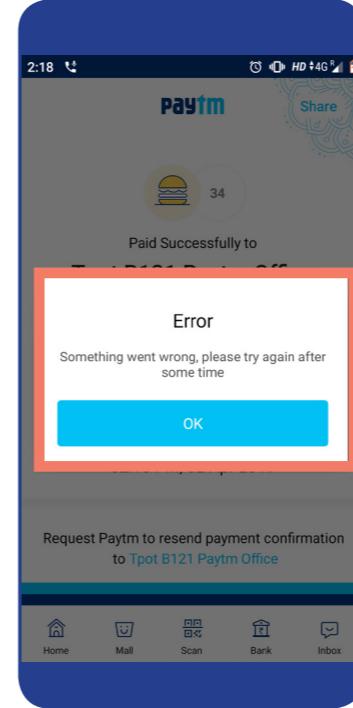
Payment instruments were given an entire screen instead of a card when clicked upon.

Lists made the design more accessible than radio buttons.

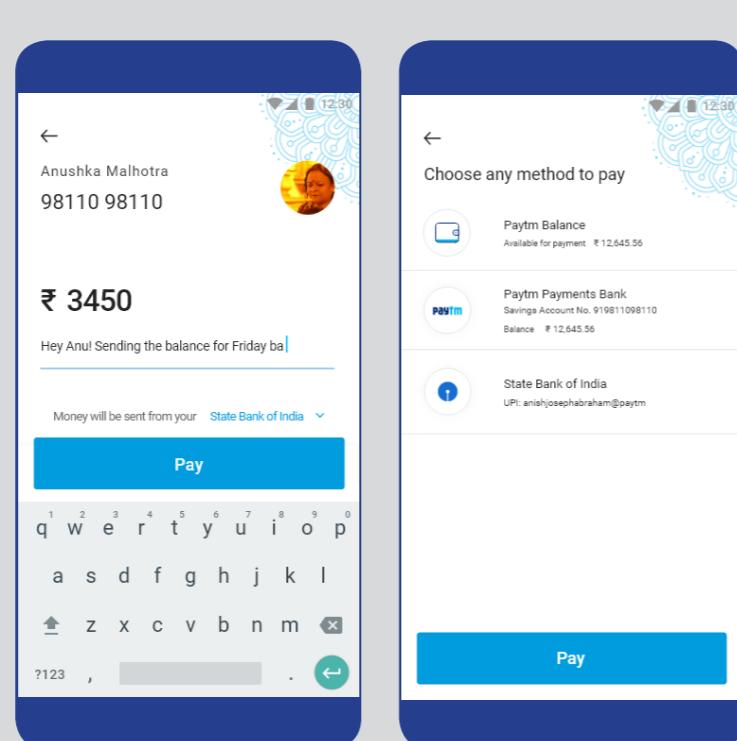


## PAY via WALLET

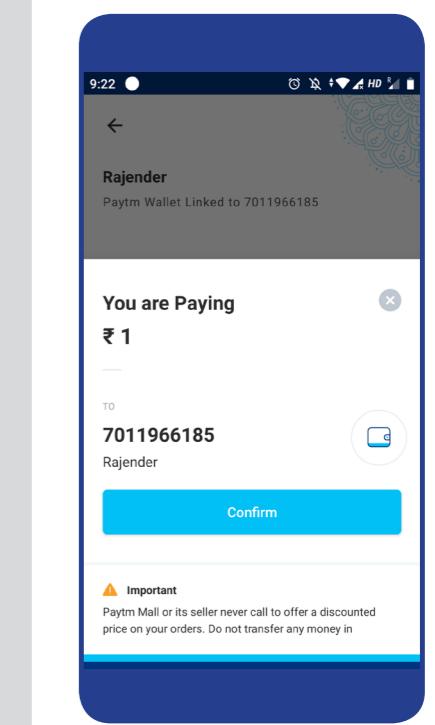
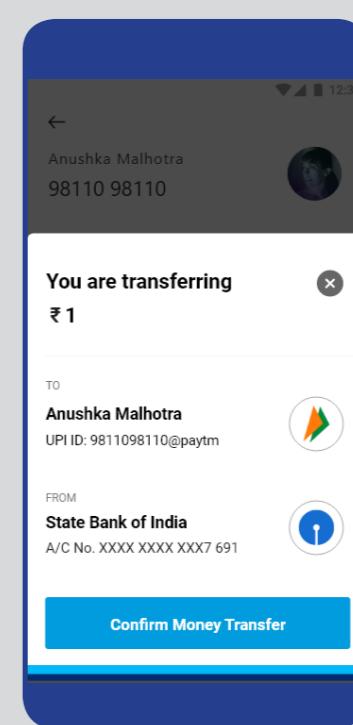
# More Section



This flow of error and rating, which is a common occurrence, makes a blind user believe that the payment has failed.

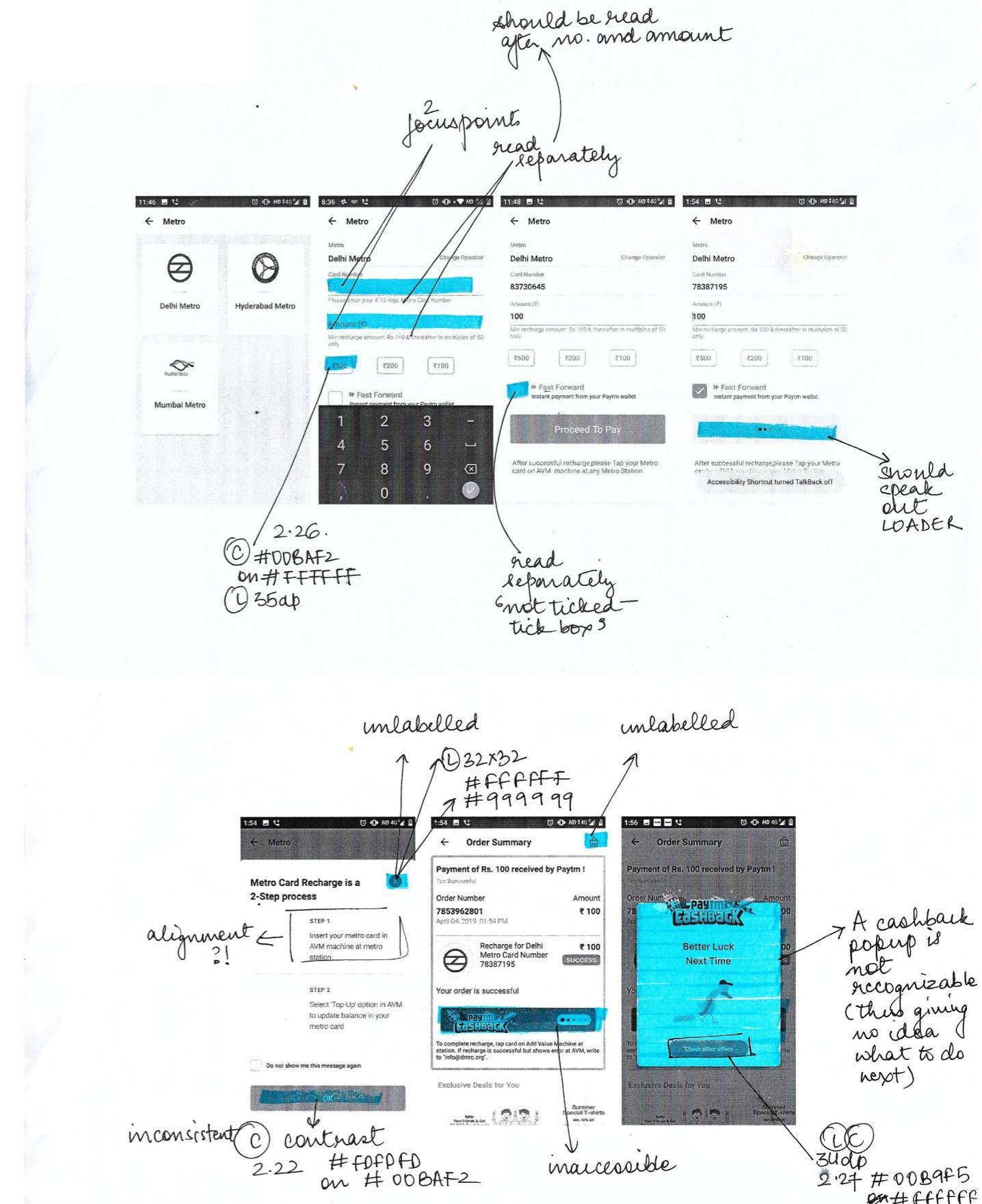


This confirmation screen was critiqued as a part of the Pay and Scan Heuristics study, and was changed into a more informative UI.



# METRO

DMRC has ensured that it provides hassle free service to people with disabilities. With Braille button in lifts, tactile pathways and facility to sit in the first compartment (women's) ensures that metro is one of the most accessible intra-city transit for the people with visual impairments. After conversations with blind research participants who commuted as much as 20 kms daily, and with other metro travellers, an attempt was made to recreate the metro card recharge flow. Soon, Delhi stations will install QR code readers like in Delhi. This use case covers only the current situation.

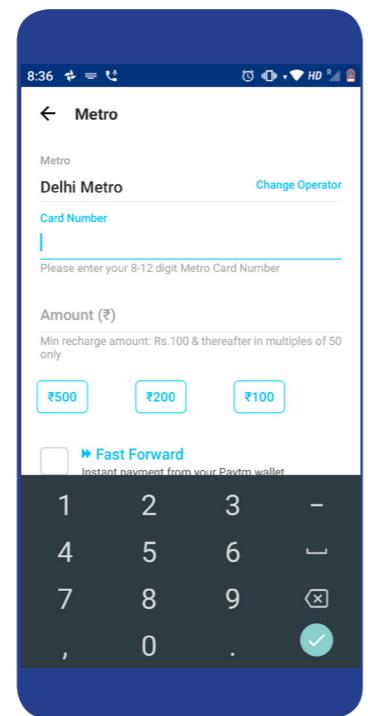
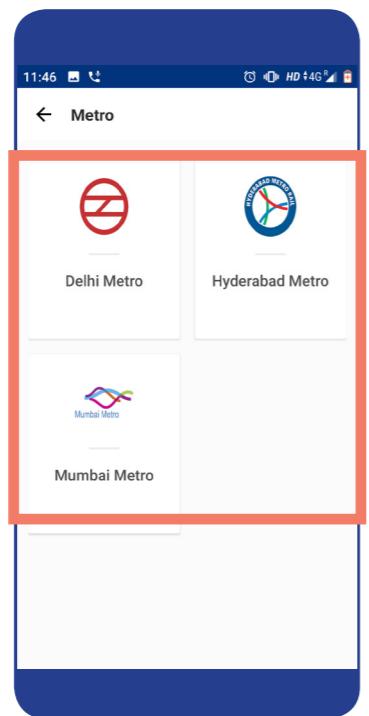


## METRO

### Metro Options

Skewed, rectangular cards were replaced with a list of metro options.

Attempts were made to label the loaders, or convey processing time through slight vibrations.

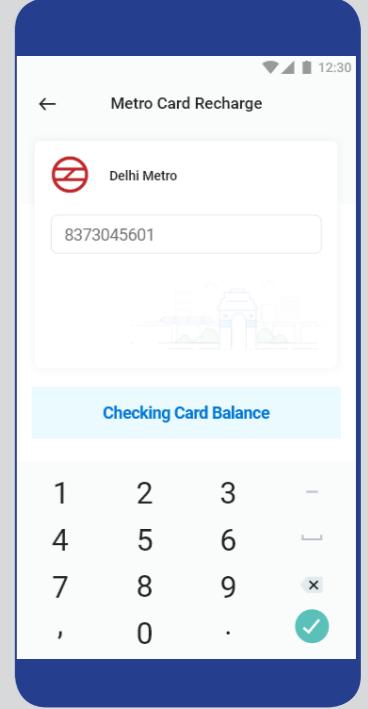
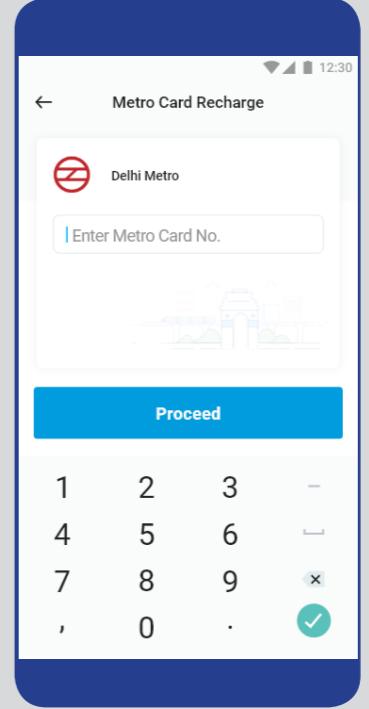
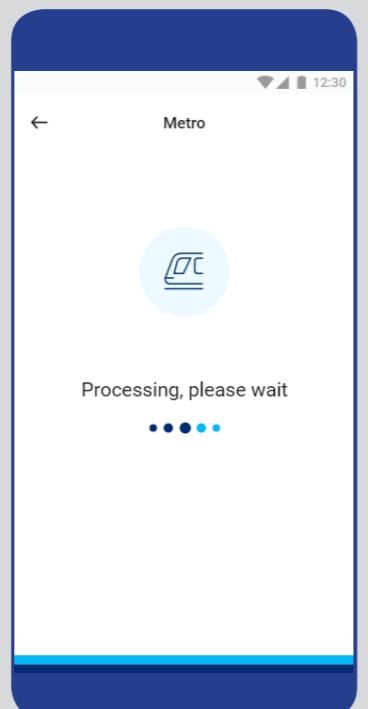
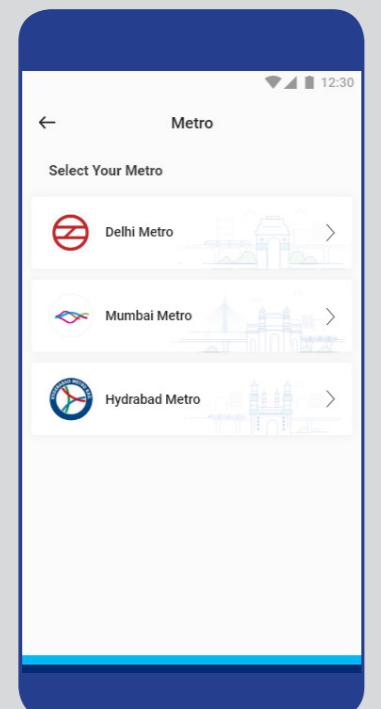
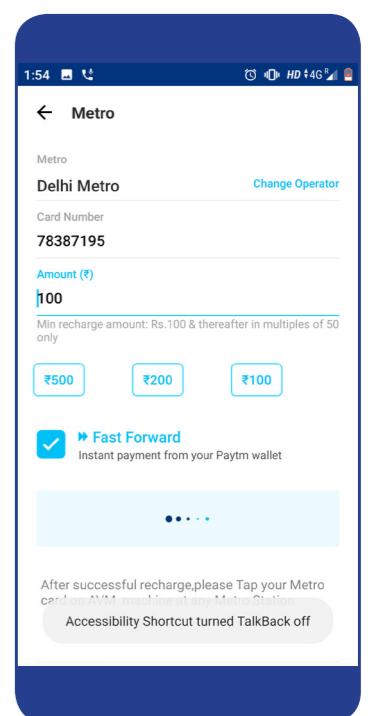
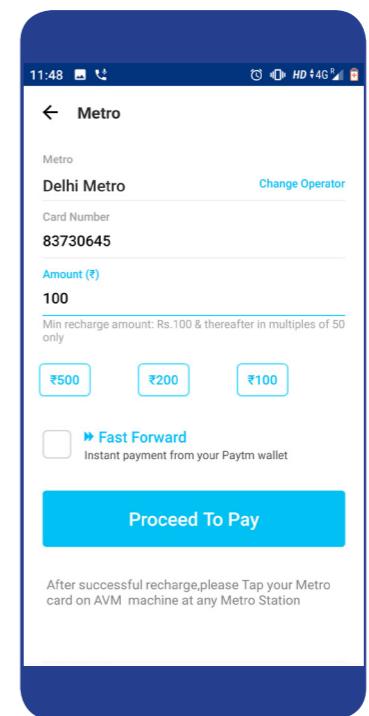


## METRO

### Amount Entry

The process was divided into sections for easier, smoother journey, light on cognitive energy.

The process checks for the balance left in the card before moving further on.

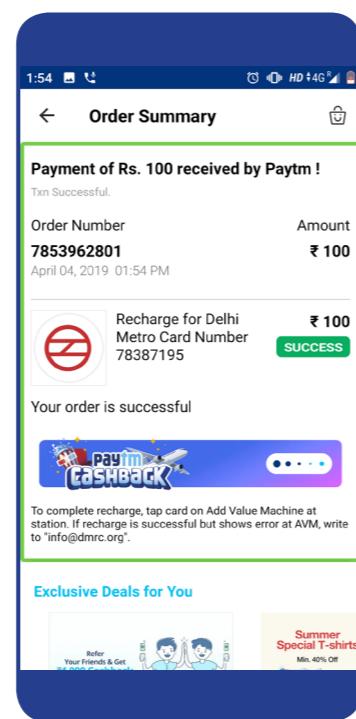
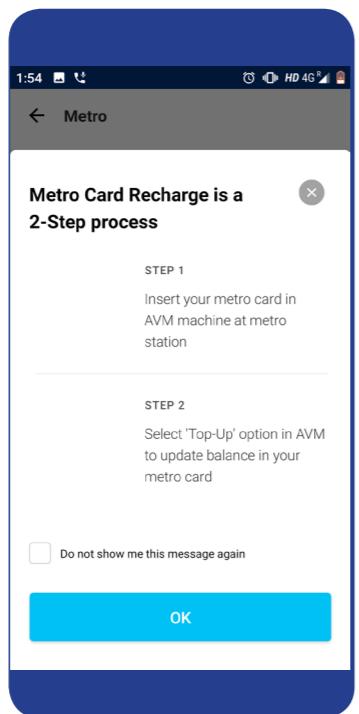


## METRO

# Order Summary

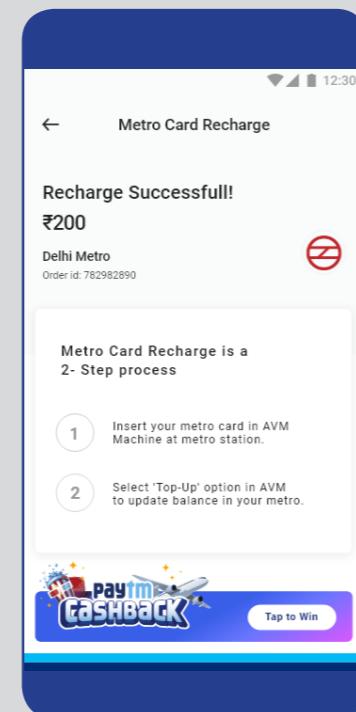
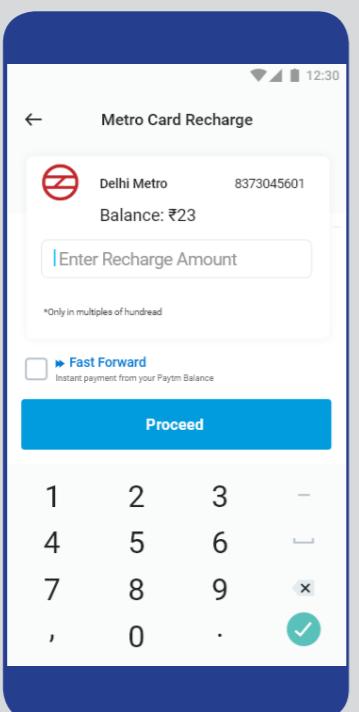
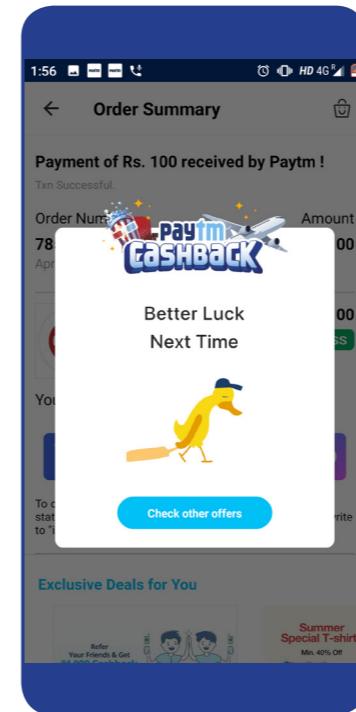
The AVM machine sheet is replaced at the end of the payment process.

The order summary is summarized in efficient language, removing the repetition and the unnecessary information.



## METRO

# Cashback



The cashback prompts are entirely inaccessible to the blind, giving user no idea how and where to proceed from the screen, or how to avail the offers.

# ONBOARDING

Customer onboarding is the nurturing process that gets new users acquainted with a product. An exceptional customer onboarding program is user driven, involves step-by-step tutorials, unlimited guidance and support, and milestone celebrations when a customer achieves success through your solution.

"Hello there, before I tell you what my app does- I need access to your notifications, location, SMS, file storage, contacts, camera, microphone, calendar and Bluetooth."

The major problem that arose while onboarding new visually impaired customers were-

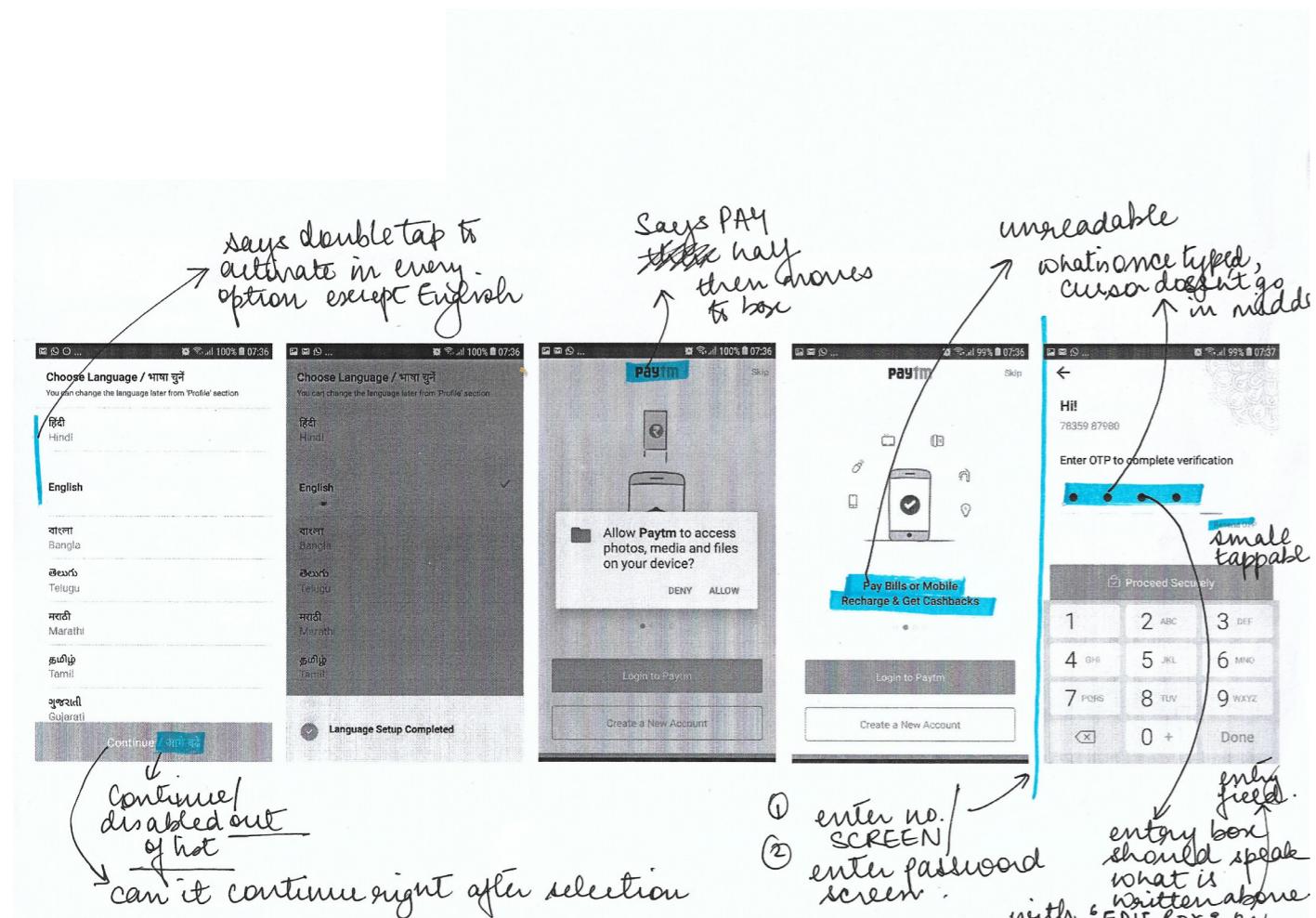
No mention of requirement of registering with SIM card linked with bank account to make use of UPI.

CTA buttons present at varied locations.

No automatic retrieval of OTP from messages.

Small touch targets- resend OTP, use email etc.

Mistrust regarding the various permissions app requires.



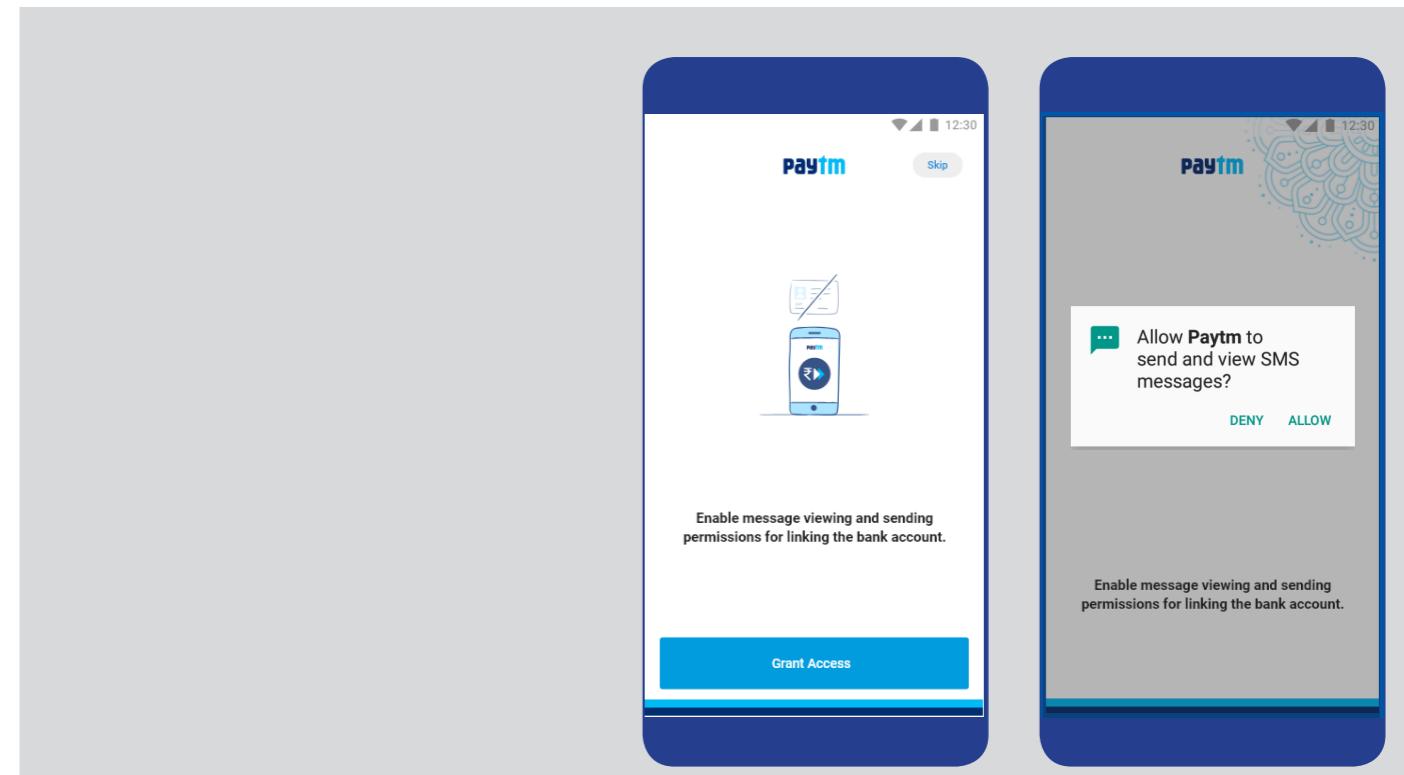
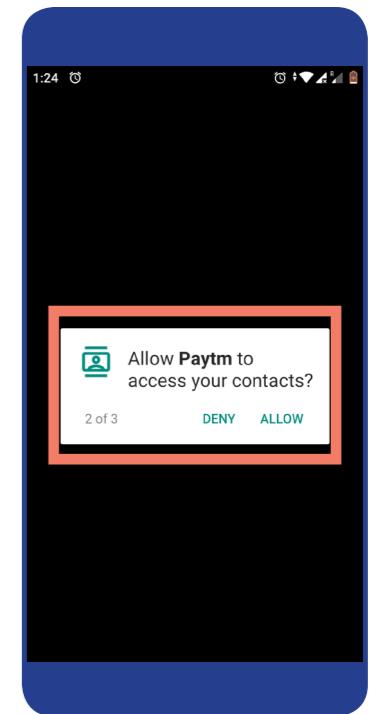
## ONBOARDING

### Permission Priming

Paytm's prompts for 3 notifications back to back are further overlapped by the Login Modal, leading to 5 notification prompts in total. All of this before a user can enter their credentials or understand what is happening in the background.

Suggestion was given to ensure app has the ability to retrieve OTP for login by asking for message permissions earlier in the flow.

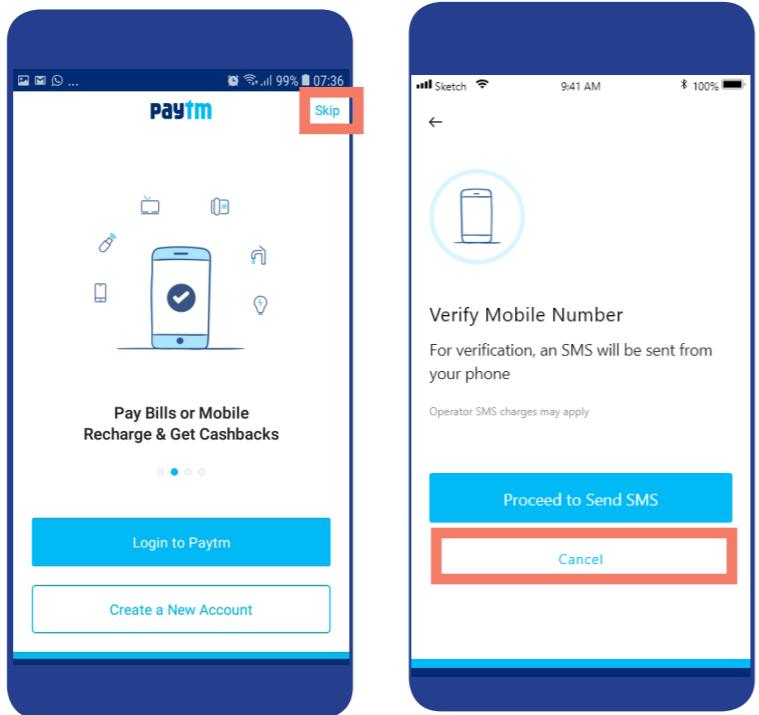
While iOS lets its developers give permission prompts to its users, Android permission content can't be customized. The reason for asking a permission can only be prompted before the dialog appears. The design can be less obtrusive by asking permissions over an uncluttered background.



## ONBOARDING

### Contrast

The less preferred options were not given a background. According to the consistent CTA size, they were remade with grey backgrounds.

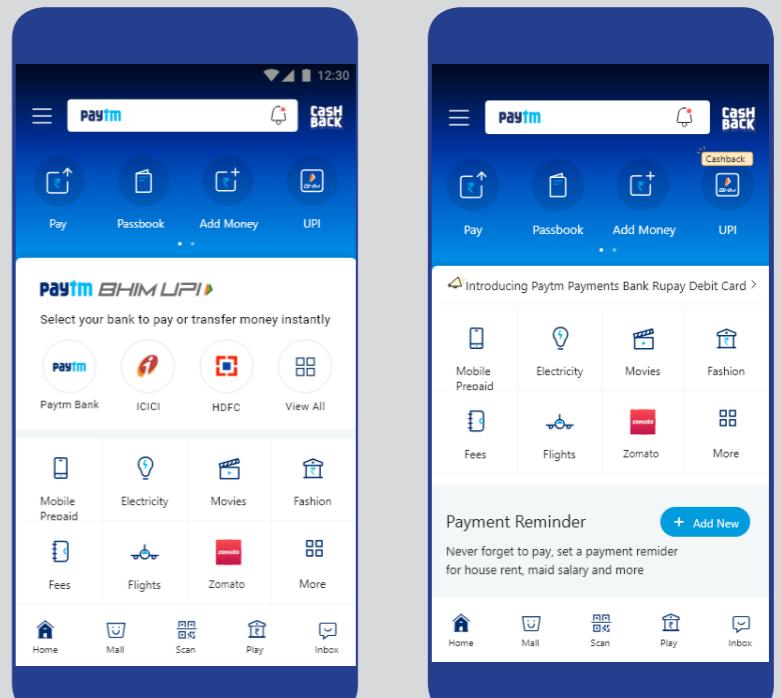
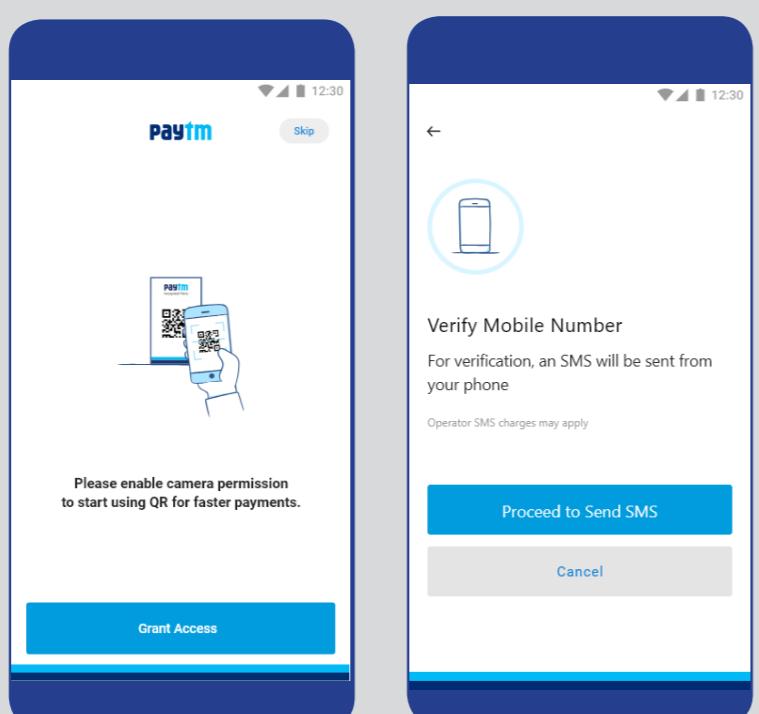
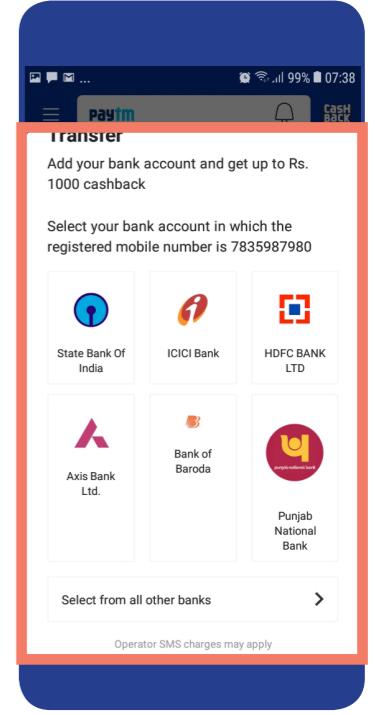


## ONBOARDING

### Bank Linking

To ensure more usage of the payment gateway, Paytm pushes reminders. To ease this process, for anyone who uses it- reminders are introduced for the first one week of use.

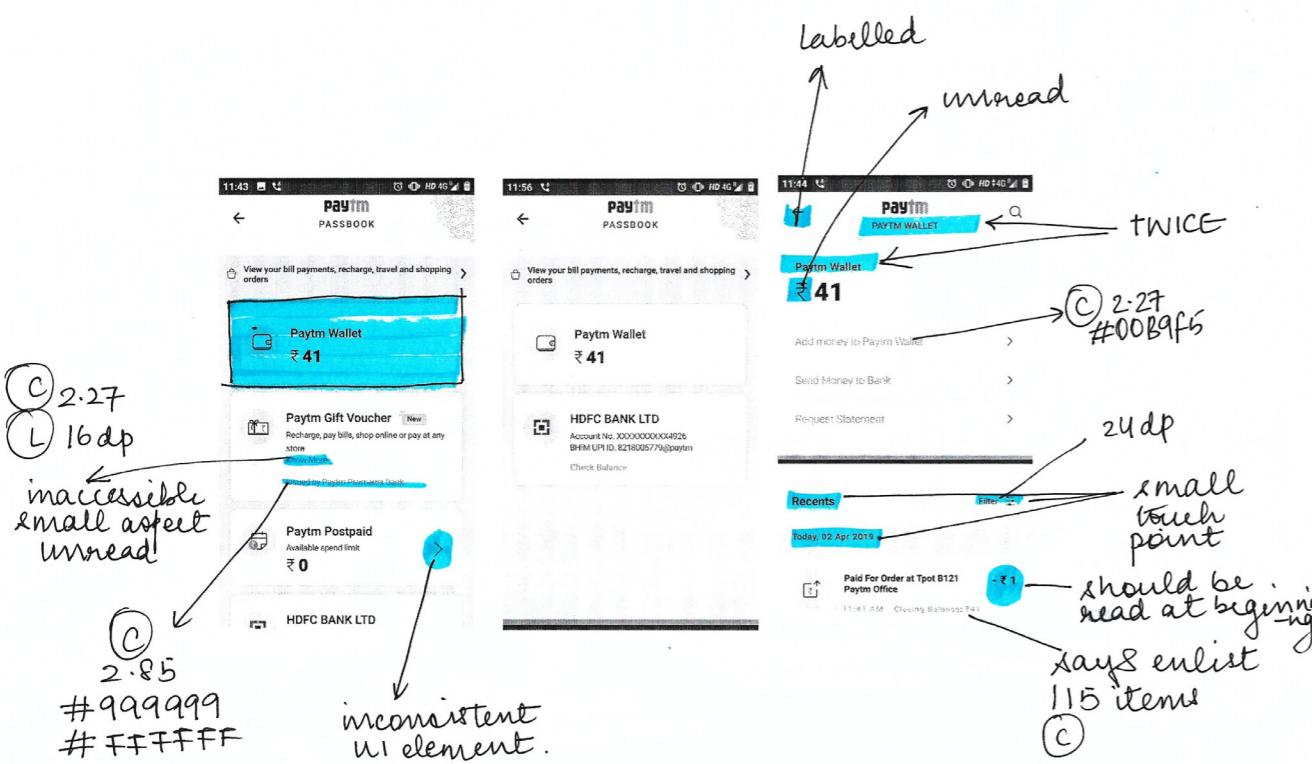
Paytm pushes an uncontained sheet to link bank first onto the user. That design was changed into a card on the home screen, which lets the user link accounts as per convenience.



# PASSBOOK

The need to maintain sumptuous records is evident amongst many people with visual impairments. Many participants recorded their phone conversations. Many appreciated the ability to group text messages into a reliable ledger.

Amongst many, the ability of a passbook and orders in Paytm is similar, both giving information on varied ranges of transactions. Many often get confused about the thin line that differentiates the two. I attempted to make my orders a subset of the transactions present within passbook, for easier cognition.

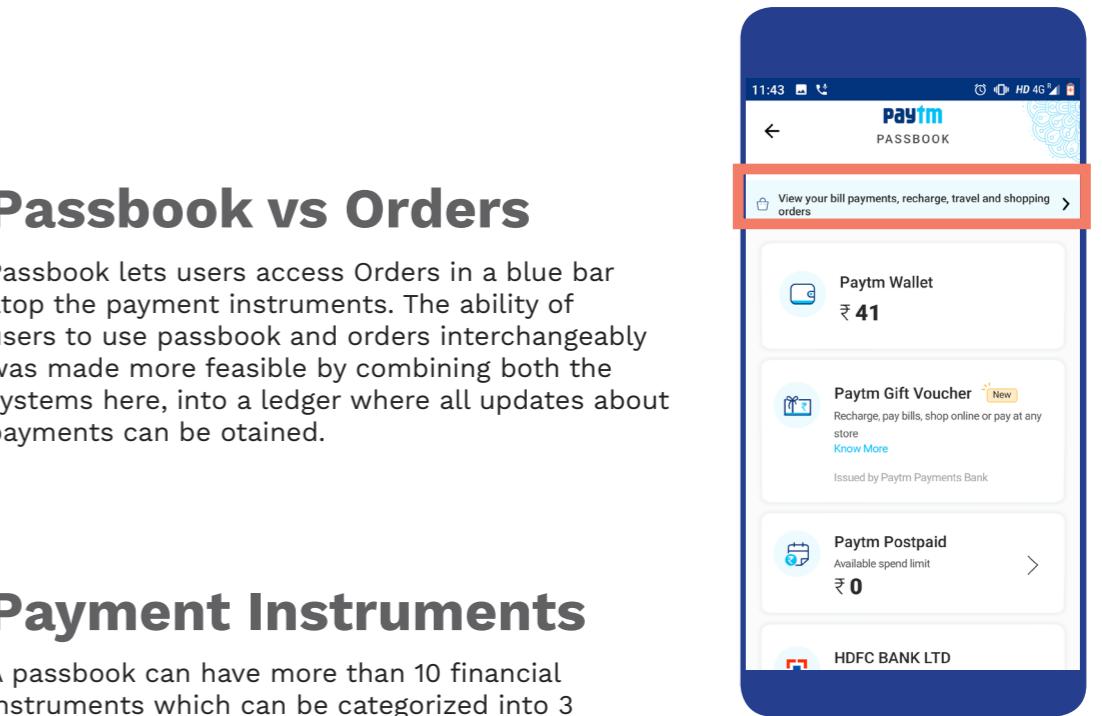


## Passbook vs Orders

Passbook lets users access Orders in a blue bar atop the payment instruments. The ability of users to use passbook and orders interchangeably was made more feasible by combining both the systems here, into a ledger where all updates about payments can be obtained.

## Payment Instruments

A passbook can have more than 10 financial instruments which can be categorized into 3 separate categories, improving on categorization.



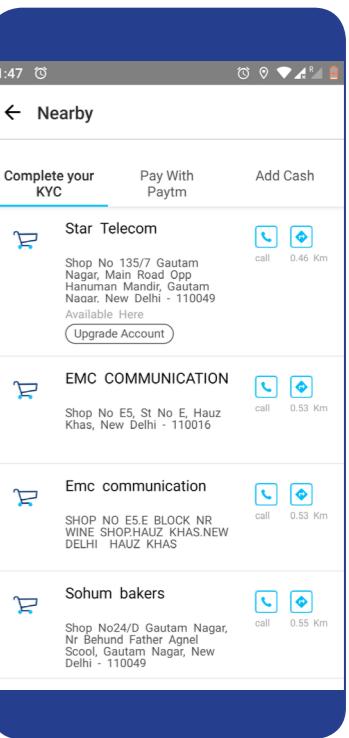
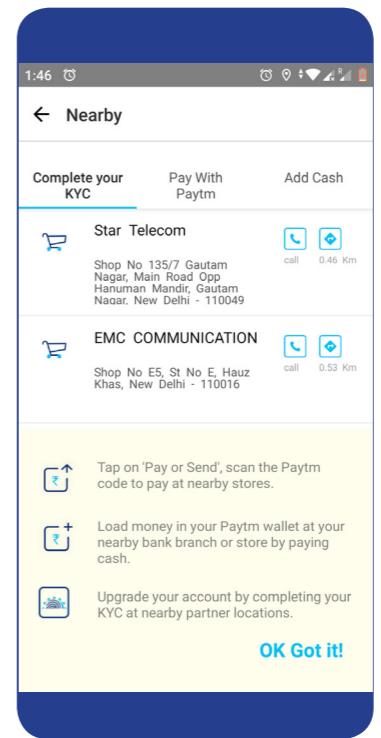
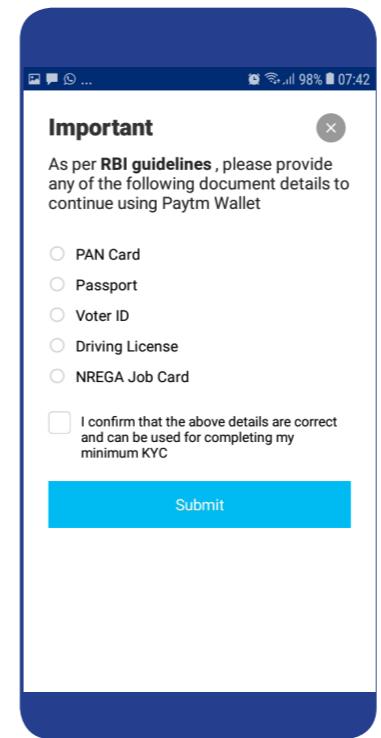
# KYC

Physical KYC is a major hurdle for the people with disabilities- especially visual, cognitive and physical. Many potential users prefer PhonePe and Google Pay.

Only one seventh of all research participants were currently making use of Paytm consumer app. They availed the service due to availability of door-to-door KYC agents some years ago. User experience was developed to avail the benefits of a complete KYC through various options.

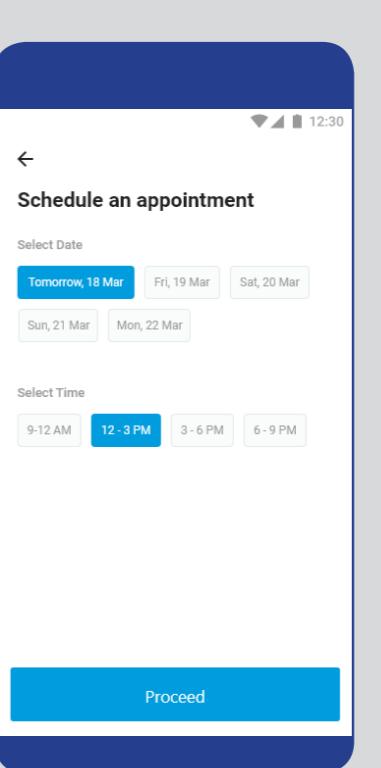
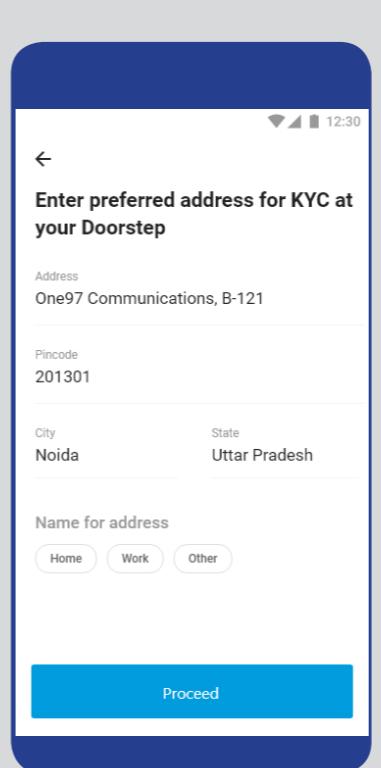
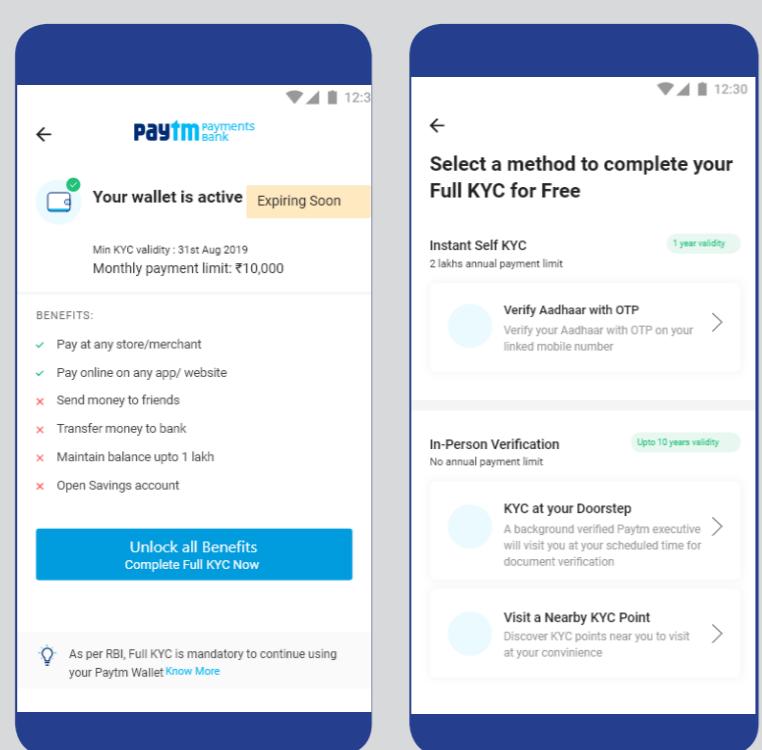
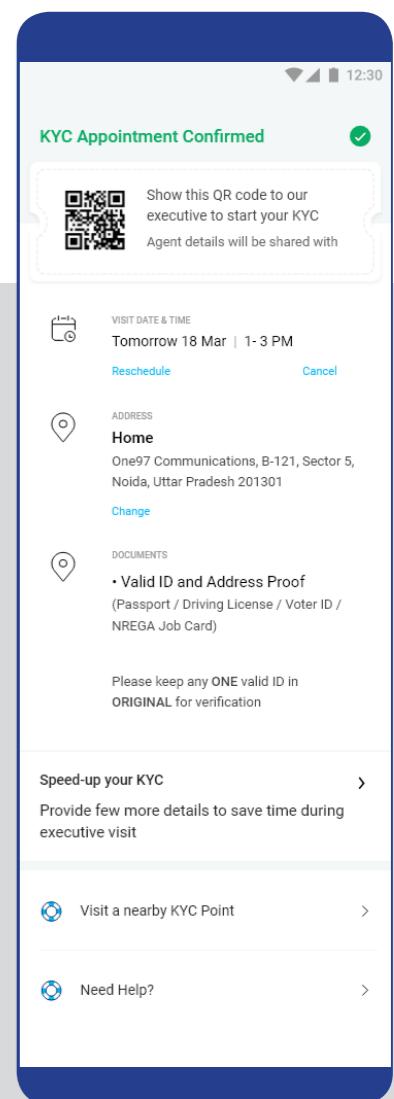
The user flow that existed back in January 2019 asked the user to choose the part of Delhi they resided in, select the Pin Code and would show an even more complicated list of centres- with phone numbers and address (not directions). The flow has been redesigned three times in the last three months.

The unpopularity with the inefficient method required re-implementation of the doorstep service.



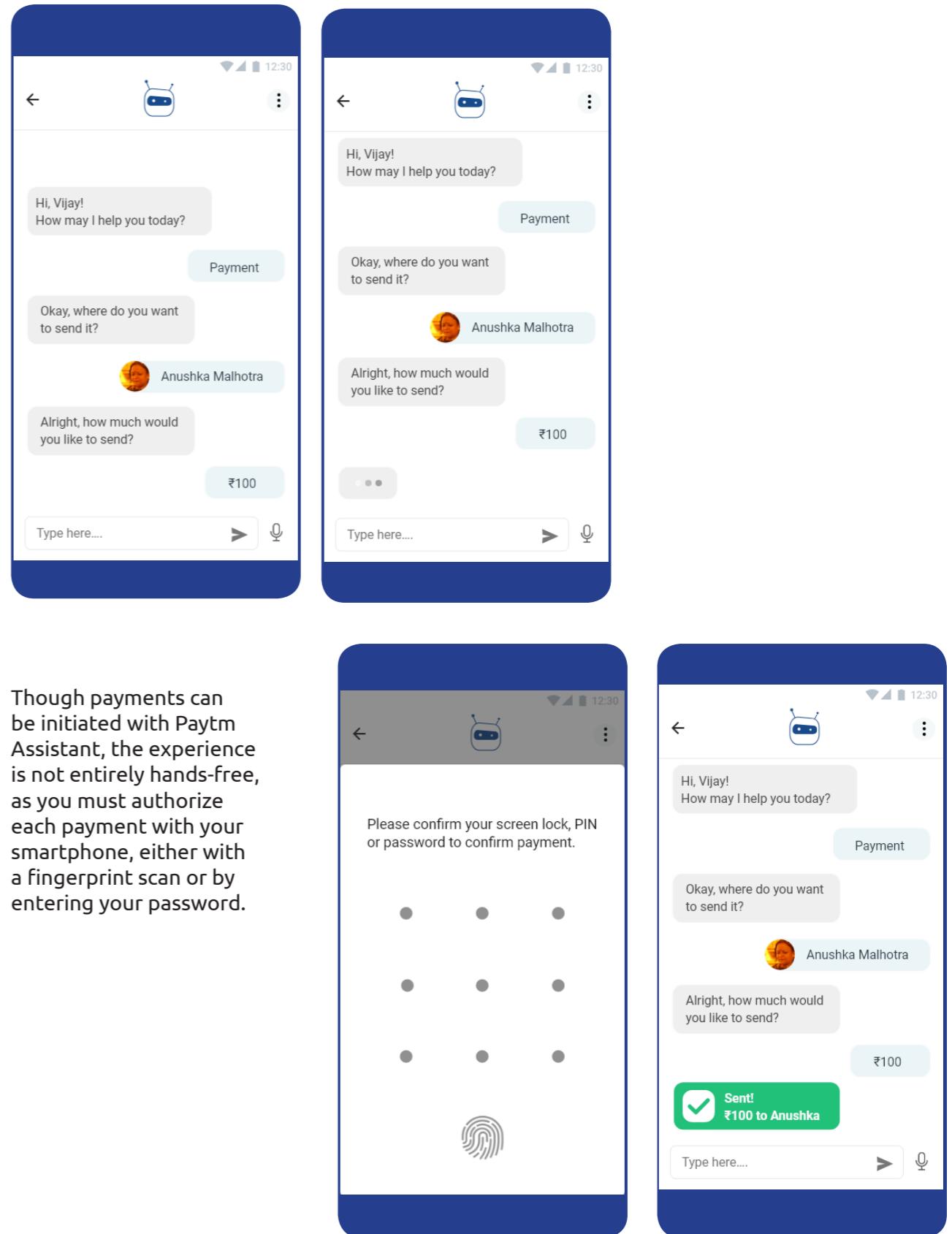
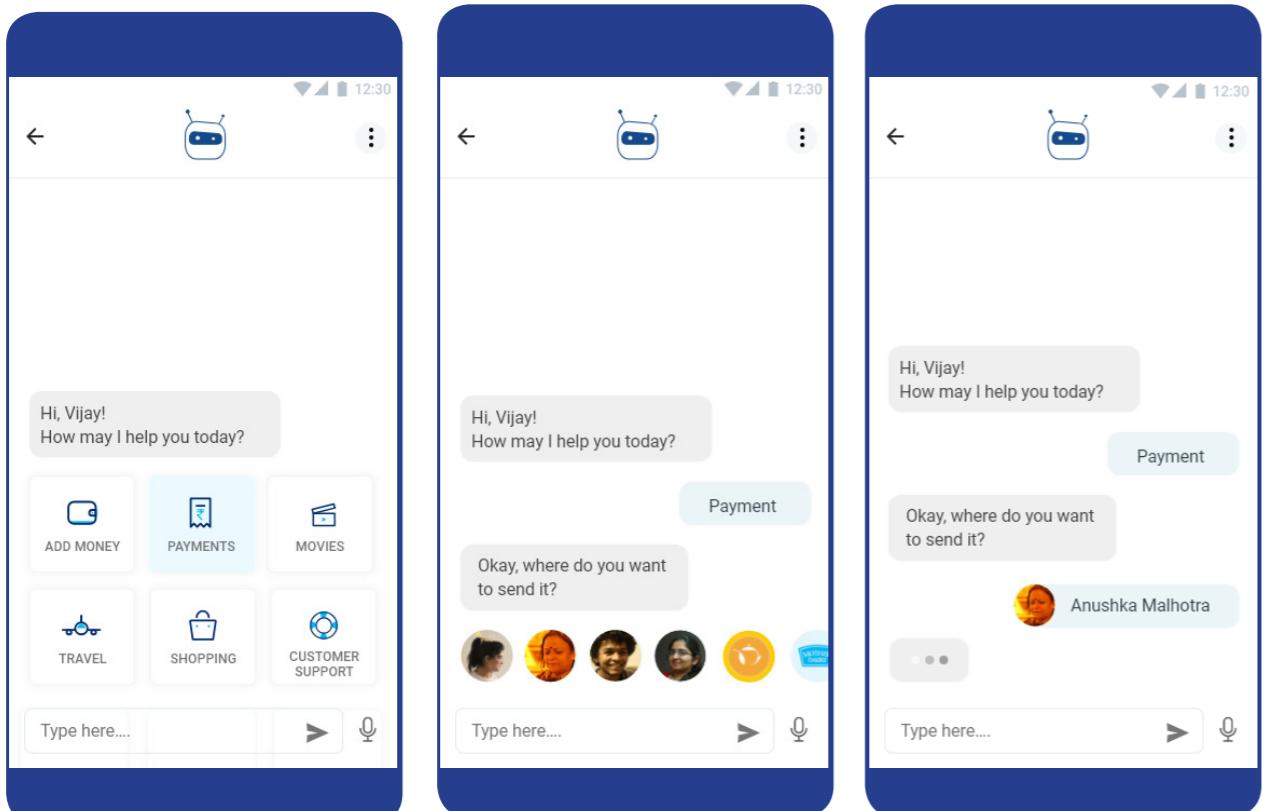
The current method asks for the official information of the user to complete minimum KYC.

In KYC option from the Payments Blue Bar, Paytm shows a cluttered list of centres you can get your KYC done.



## ASSISTANT

Navigation in the Paytm app can be helped a great deal with the help of an efficient assistant. Paytm is in conversation with developers to create an assistant that can help the users do actions as easily as possible. Below is an amateur attempt at understanding and building conversational user experience.



Though payments can be initiated with Paytm Assistant, the experience is not entirely hands-free, as you must authorize each payment with your smartphone, either with a fingerprint scan or by entering your password.

## Know Your Currency

Demonetization was harsh on the blind in India. With the new currency, it is harder for blind to know the denomination of the note due to similarity in sizes. Paytm Scanner might be an easy solution to this problem with similar tech already in use within the system. Paytm scan has potential to offer the assistive technology which reads money value aloud and with ease. Created with accessibility in mind, the option will be easy to use. Users will be able to point their phones' camera in a direction of a note and the app will tell them the denomination in real-time. No need to worry about the light, angle or focusing! The testing will be done by accumulating a rich dataset of numerous images of INR currency notes under varied real-world conditions. If the image is not clear or not focused, or the desirable minimum prediction accuracy is not achieved, the user would be provided aural notification to "try again".

Option to switch to silent mode will transform the banknote denomination into vibration. This can be used in noisy places or when privacy is needed. Privacy mode uses an audible beep for the pulses. The patterns follow an easy sequential pattern:

- Ten Rupees is 1 pulse.
- Twenty Rupees is 2 pulses.
- Fifty Rupees is 3 pulses.
- Hundred Rupees is 4 pulses.
- Two hundred Rupees is 5 pulses.
- Five hundred Rupees is 6 pulses.
- Two thousand Rupees is 7 pulses.
- Error is one long pulse with heavy vibration.

The feature could be reliable offline and work even without internet connection.

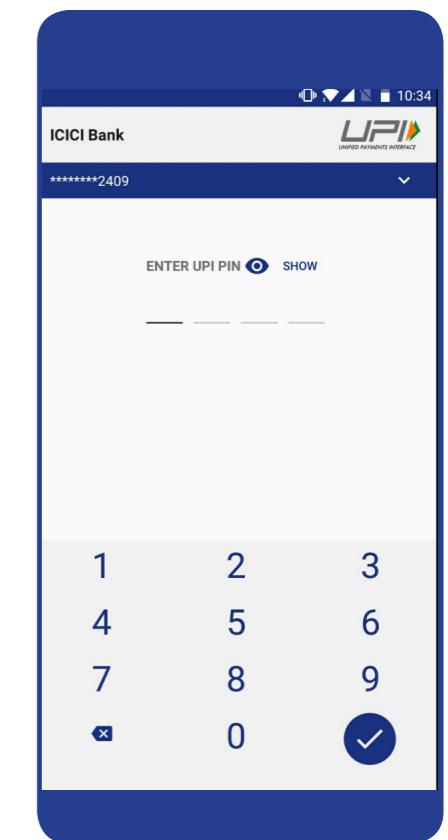


## PIN Entry

People who are visually impaired often depend on others for daily activities. They may rely on family, friends, or caretakers to help them get places or perform private tasks, such as paying bills and creating accounts. Users who listen to content via screen readers or who hear audio-visual cues may face privacy issues because people around them may hear their personal content.

People with disabilities are especially hesitant to share personal information like phone numbers or pictures, which can make online participation even harder.

Experience of sound is primal and intuitive. We're not aware of it because we don't need to be. Our brains have evolved to process sound quickly and unconsciously. The sounds around us are always shaping how we feel, how we process information, and how we interact with our environment and one another. Understanding sound as sensory experience means tapping into the wisdom of these intuitive processes to design experiences that resonate more deeply with the body and mind.



## Going Forward

This project was focused on developing an understanding of accessibility and usability as two possible lenses to analyse user experience for a particular app. The project was started from Android Consumer App, mainly payments. Android covers more than 80% of Paytm's user base.

Paytm iOS happens to be more inaccessible than on Android.

With these opportunities in mind, I will spend the summer prototyping and testing a range of voice solutions to enable visually impaired users to confidently make use of their money.

## Learning Outcome

This project offered me a great opportunity to learn and work on accessibility. Instilled empathy for users in me, from the lenses of accessibility and usability. Throughout the design education, I had learnt to design for visual appeal and function, this project gave me a holistic idea on how to design for the senses. It was very satisfying to take a holistic perspective on a scenario and coming up with human-centric design process.

## Challenges

Replacing sympathy for empathy.  
Creating a business case for accessibility  
Defining contrast accessibility standards.  
Building the balance between beautiful Interface and good accessibility.

## Recognition



"I will always be grateful for the fact that Anavi in her capacity as intern understood the need to make Paytm accessible, which I have been trying to make understand to some of the most educated minds of this country for last so many years. The fact that a student understood it proves that all you require is a mindset to understand and commitment to improve."

- Amar Jain, Accessibility Advocate



eight

company research studies

## SIDE PROJECTS

Smaller projects were taken up during the internship duration. These constituted UX studies on various verticals of Paytm, doing a heuristics analysis and strategizing on improving them. These activities helped with gaining a deeper insight into the functioning of these systems through workflow analysis, group discussions and field research.

### UPI vs Wallet

To understand user perceptions & preferences for UPI based payment platforms in India.  
To cater to the rising concern that Paytm is majorly used as a direct wallet instead of a UPI platform.



### Pay and Scan Heuristics

Heuristic analysis to find gaps and opportunities in the current process of paying.



### Cashback Loyalty

Understanding how customer engagement works on the basis of instinctual behavior.  
Mapping user journeys on platforms to define gratification and misery points.  
Managing moments of interruption.  
Brainstorming how the experience ends.

### Gamepind

Gamepind is an upcoming vertical in Paytm with new user flows and icons. A heuristics analysis was done of the copy and icons semantics to suggest improvements.

# Important Terms

**ARIA**- Accessible Rich Internet Applications (ARIA) is a set of attributes that define ways to make web content and web applications (especially those developed with JavaScript) more accessible to people with disabilities.

**Assistive Tech**- Tools used to maintain, improve, or increase the capabilities of people with disabilities. Frequently AT is used to expand the capabilities of people without disabilities.

**Button**- An input that allows for user-triggered actions when clicked or pressed.

**Checkbox**- A checkable input that has three possible values: true, false, or mixed.

**Contextual Inquiry**- A user-centered research and interview method. Part of Contextual Design.

**Dialog**- A dialog is an application window that is designed to interrupt the current processing of an application in order to prompt the user to enter information or require a response.

**Exclusion**- The process of excluding or the state of being excluded.

**Group**- A set of user interface objects which are not intended to be included in a page summary or table of contents by assistive technologies.

**Heading**- A heading for a section of the page.

**Menu**- A type of widget that offers a list of choices to the user.

**Navigation**- A collection of navigational elements (usually links) for navigating the document or related documents.

**Persona Spectrums**- A persona spectrum is not a fake person. It's an articulation of a specific human motivation and the ways it's shared across multiple groups. It shows how that motivation can change depending on context.

**Progress bar**- An element that displays the progress status for tasks that take a long time.

**PWVI**- People or Person with Visual Impairments. Because "blind" encompasses a wide range of visual abilities, this term is used throughout the book to include legally blind people with varying levels of vision.

**PWD**- People With Disabilities

**Search**- A landmark region that contains a collection of items and objects that, as a whole, combine to create a search facility.

**Screen Reader**- Screen reader software generates synthesized speech based on text and other content in a digital interface. Many visually impaired users interact with applications on mobile and desktop devices through screen reader audio.

**Talkback**- TalkBack is the Google screen reader included on Android devices. TalkBack gives you spoken feedback so that you can use your device without looking at the screen.

**Universal Design**- Designs that create accessible environments and tools for both people with and without disabilities.

**VoiceOver**- VoiceOver is a screen reader built into Apple's products. By using VoiceOver, the user can access their Macintosh or iOS device based on spoken descriptions and, in the case of the Mac, the keyboard. The feature is designed to increase accessibility for blind and low-vision users, as well as for users with dyslexia.

**WCAG**- The Web Content Accessibility Guidelines are part of a series of web accessibility guidelines published by the Web Accessibility Initiative of the World Wide Web Consortium, the main international standards organization for the Internet.

**W3C**- The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. Led by Web inventor and Director Tim Berners-Lee and CEO Jeffrey Jaffe, W3C's mission is to lead the Web to its full potential.

# Resources

## ACCESSIBILITY

<https://www.w3.org/WAI/fundamentals/accessibility-intro/>  
<https://developers.google.com/web/fundamentals/accessibility/>

## STANDARDS

<https://material.io/design/usability/accessibility.html#>  
<https://www.w3.org/TR/WCAG20/>

## LAW

Rights of Persons with Disabilities Act, 2016

## ACCESSIBILITY GUIDELINES

<http://design.samsung.com/global/contents/one-ui/>  
<http://accessibility.voxmedia.com/>  
<https://design.google/library/designers-guide-accessibility-research/>

## ACCESSIBILITY PIONEERS

<https://www.microsoft.com/en-us/accessibility/>  
<https://www.google.com/accessibility/>  
<https://www.apple.com/accessibility/>

## CASE STUDIES

<http://mhci-capstone.hcii.cs.cmu.edu/2017/stockgrok/>  
<https://www.behance.net//WhatsApp-case-study-for-visual-impairment-conditions>

## TOOLS

<https://material.io/tools/color/#!/?view.left=0&view.right=0>  
<https://developers.google.com/web/tools/lighthouse/>  
<https://webaim.org/resources/contrastchecker/>  
<https://contrast-ratio.com/#%2300aced-on-white>  
<http://www.color-blindness.com/coblis-color-blindness-simulator/>  
Accessibility Scanner

## APPS HELPING WITH ACCESSIBILITY

Google Accessibility Suite  
Microsoft Office  
Seeing AI  
Roshni  
Be My Eyes

## INCLUSION KITS AND GUIDELINES

<https://theblog.adobe.com/inclusion-doesnt-stop-accessibility/>  
<https://design.google/library/ux-next-billion-users/>  
<https://medium.com/microsoft-design/kill-your-personas-1c332d4908cc>  
<https://mismatch.design/>  
<https://www.microsoft.com/design/inclusive/>  
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Automating Inequality- Virginia Eubanks

The Inclusive Dividend- Mark Kaplan, Mason Donovan

Adaptive Web Design- Aaron Gustafson

Building Access- Aimi Hamraie