Improving the Rideshare Experience of Users Who Are Blind or Have Low Vision

Designing Accessible Rideshare Experiences for Blind or Low Vision Users

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Ridesharing apps such as Uber and Lyft have the potential to significantly enhance mobility for people who are blind or have low vision (BLV). Despite this promise, users with BLV encounter challenges that hinder their ability to use these services independently and safely. This study explores the rideshare experiences of four BLV individuals using Uber, through in-depth interviews, aiming to identify key barriers and co-design potential solutions. Our findings reveal issues related to driver communication, pick-up and drop-off logistics, inappropriate driver behavior, and app accessibility. Participants proposed various solutions, including haptic feedback, enhanced real-time notifications, and mandatory accessibility training for drivers. These insights not only address accessibility gaps but also demonstrate the broader applicability of inclusive design, benefiting all users through the "curb-cut effect." The study concludes with actionable recommendations for rideshare platforms and outlines future directions to build more equitable and supportive transportation services for the BLV community.

Author Keywords

Low vision, Blindness, Ride sharing, Accessibility

ACM Classification Keywords

Human-centered computing~Accessibility~Accessibility design and evaluation methods

Human-centered computing~Accessibility~Empirical studies in accessibility

1 INTRODUCTION

Ridesharing apps, such as Uber and Lyft, provide users with on-demand transportation and door-to-door service, offering access to locations that may not be easily reached using public transportation [2]. Given this convenience, one might expect high adoption rates among people with disabilities, as these services can enhance mobility and independence. However, research indicates that people with disabilities are actually less likely to use ridesharing apps [2]. Still, those with disabilities who do use rideshare services rely on them more frequently than individuals without disabilities [2].

Rideshare experiences can vary significantly from one driver to the next, as these services operate on a peer-to-peer model. Users who are blind or have low vision (BLV) are among the most vulnerable population susceptible to poor driver behavior. Reports indicate that blind passengers have been dropped off at incorrect locations [2]. This can degrade the passengers' trust in rideshare drivers. Users with BLV heavily rely on their surrounding network and trust in the driver is a critical factor during the ridesharing experience. They must rely on the altruism of drivers to be picked up [1]. Designing accessibility solutions based on these findings would reinforce the charity model rather than promote systemic change guaranteeing an accessible experience for all. The proposed design solutions to counter this remain narrowly focused, offering only minimal suggestions such as incentivizing small talk between drivers and passengers [6]. Similarly, some passengers were verbally harassed by drivers who mistakenly perceived their guide dog as a pet [9]. A 2024 survey by Guide Dogs for the Blind revealed that over 83% of guide dog users have been denied rideshare access, underscoring the urgent need for improved accessibility practices [3]. Driver biases also play a huge role in ride sharing experiences among users with BLV. A study revealed driver biases toward certain disabilities over others depending on the perceived inconvenience to the driver [9]. Rideshare companies have even faced lawsuits due to driver discrimination [8]. To counter this, the National Federation of the Blind has established an ongoing survey for individuals who have experienced discrimination to share their encounter [7].

Furthermore, personal stories shared in blogs, podcasts, and news reports illustrate frustrations encountered by BLV individuals when navigating rideshare services. These included challenges with driver communication, vehicle accessibility, and the inconsistency in service quality [6]. While these stories are valuable, their value is limited to anecdotal evidence of a formal study. Similarly, a study placed BLV participants in a "quasi-naturalistic" field setting to observe their experiences in real time. While they reflected briefly on the significance of their observations, their discussion primarily focused on how future researchers can recreate their study for further investigation [4]. The needs of BLV passengers and practical recommendations were left to be discovered by those who intend to mimic their work. While existing research has explored various aspects of ridesharing for BLV passengers, it falls short of providing actionable solutions for improving accessibility and equity in ridesharing for users who are BLV.

This study seeks to bridge that gap by identifying tangible solutions that enhance accessibility beyond the limitations of prior research. We conducted in-depth interviews with four individuals who are completely blind and actively use Uber to verify pain points revealed in previous studies and discover any new issues. Our findings highlight three key challenges in the ridesharing experience for users with BLV: inconsistent and often inadequate communication with drivers, difficulties around pick-up and drop-off logistics, insensitive or discriminatory driver behavior and problems around app functionality and their compatibility with assistive technologies. Through collaborative design discussions, our participants proposed potential design solutions to the most significant issues identified. These consisted of in-app haptic feedback to help locate arriving vehicles, en route audio notifications to improve trip awareness, more frequent and informative pre-pickup updates, and mandatory accessibility training for drivers.

Our study concludes with three major recommendations which include implementation of automated messaging and feedback features to improve transparency, provide additional Support, Services, and Training for Drivers, and making UI

improvements within the Uber app to improve usage efficacy, starting with a formal accessibility report. Beyond this study, it would be worthwhile to compare driver behavior between Uber and Lyft to understand how differing accessibility guidance impacts user experiences.

By completing this study we hope to equip the ride sharing industry with actionable measures to improve the user experience of all passengers. Furthermore, our study fills the gaps created by other studies in this field, helping to build a more comprehensive knowledge base from which future researchers and designers can reference in their work.

2 METHODS

The following describes our participants, data collection and materials, and data analysis.

2.1 2.1 Participants

For this research we sought participants that met the following criteria:

- 18 years older
- Blind or have low vision
- Have used a rideshare app within the last five months at the time of the participant request
- Have or would be able to download the mobile rideshare application Uber for their interview.

With the help of our professor, we obtained four participants. All were completely blind and lived nationwide, though most were from the Chicagoland area. The following table (Table 1) lists their demographic information.

Table 1: Participant Demographics

Participant	Age	Gender Identity	Location	Level of blindness	Assistive technology used	Preferred rideshare app
P1	72	Female	Chicago, IL	Complete	Cane	Uber
P2	39	Male	Houston, TX	Complete	Cane	Uber
P3	61	Female	Chicago, IL	Complete	Guide Dog	Uber
P4	74	Female	River Forest, IL	Complete	Guide Dog	Uber

2.2 Data Collection and Materials

We held one interview session with each participant. Each interview had two moderators, one to lead the session and the other to observe, take notes, and signal to the primary moderator to make adjustments as needed. The interviews were all conducted virtually on Zoom.

The goal of the interview was to identify each participant's biggest challenge and then design a potential solution for this problem. Each interview began with moderators reading aloud a consent form to confirm the participant’s consent to

conduct the interview while recording the meeting audio. The moderators used a pre-written script to conduct the interview ensuring consistency and comprehensive questioning. The participants were compensated for their time.

2.3 Data Analysis

We collected qualitative data, capturing participants' firsthand experiences and solution design ideas. We recorded audio from each session and later transcribed it to text for easier analysis. These transcripts were then loosely coded using NotebookLM, an AI-powered research assistant, to identify the common challenges participants encountered throughout their rideshare experience. These codes were organized into buckets on Figjam, where we then performed a second, manual analysis of the transcripts. From this analysis we were able to draw conclusions of the most significant challenges encountered by BLV passengers and potential solutions.

3 FINDINGS

We identified three major challenges encountered by our participants and four common features in their solution designs.

3.1 Challenges

3.1.1Communication

One of the biggest sources of frustration for our participants was communication between both themselves and the driver as well as themselves and the rideshare companies. To start, The participants described how locating drivers and confirming their destinations could prove difficult when the driver did not speak the same language as them. P1 shared, “So a couple months ago a new ... driver, he didn't speak English. … I guess there's a translate program but I don't know how to use it, so I didn't know how to translate so he let me off and I got out of the car and I was on the other side of street, and I didn't know where I was, so I had to just sort of walk along this this really narrow...space between a curb and a fence and I didn't have the vaguest idea where I was”.

Drivers who don’t communicate at all, including updating the participant on the status and current location of their trip were another source of frustration. P3 recounted, “I've had drivers show up and not speak at all. They just pull up and don't speak well. They assume that I see them, so I don't want to assume anything. I want them to know what I need from them. I need them to speak.” In addition to helping participants locate the driver, communication during the drive helped them feel confident that they are being taken to the correct location.

Participants also discussed the issue of frequent ride cancellations. More specifically, drivers would cancel rides without reason or response when asked. One participant lamented that she once experienced six cancellations in a row while she waited in the rain for a rideshare. Though she could not prove it, she suspected the cancellations were caused by her indicating to the driver that she had a guide dog. Though only two participants use a service dog, all of them kept their Uber profiles updated regarding their blindness and use of a service animal in addition to notifying the drivers of the same, hoping this would mitigate the problems experienced above.

When such problems did occur, participants discussed attempting to reach out to the rideshare companies themselves to receive additional support, but facing further frustration in the lack of access to an appropriate support line. As illustrated by P3 when asked about her biggest challenge with rideshare apps, “I would say communication with Uber…they're hard to get a hold of. And whenever you talk to them, they're really pleasant. They're really nice…and then they…don't follow through,” She went on to describe a navigation problem where she requests drop off to one address, but the driver takes

her to another similar address. “And this is not the first time this has happened. It's the second. It's navigation needs to be fixed, and…they agree with me, but yet they haven't fixed it…” Furthermore, participants felt as though the customer support agents were not adequately trained on how to communicate and support individuals with disabilities and this lack of training was reflected in the drivers as well.

3.1.2 Passenger Pick-Up and Drop-Off

Participants reported multiple challenges around pick-up and drop-off, especially in crowded or congested areas. Most of them mentioned that it was hard to find the driver and just as hard for the driver to find them. Drivers often did not attempt to locate the rider and instead expected the rider to find them. They frequently asked for details that a BLV passenger would not be able to provide. For example, P2 shared that drivers asked him to describe visual cues at the location, such as the color of the building or what it looked like. He also shared that drivers honked to signal their arrival, but honking didn’t help him figure out where the car was or which car it was.

Participants also noted that during pick-up, they only received a generic notification that the Uber had arrived, without any information about where exactly the vehicle was. While users with vision could see the car’s location on the map, screen readers did not convey that information, leaving our BLV participants without essential location updates.

Drivers also consistently dropped participants off at the wrong location. P3 shared that she was dropped off at the wrong therapy clinic because there were two therapy places equidistant from her home. Upon confrontation, the driver ignored her concern and proceeded with the drop-off anyway. She also recalled a time when a driver dropped her off on the wrong street, a block away from the correct location, while insisting it was the right place. Surrounding this, many participants faced problems with GPS accuracy and two of them incorporated the use of external GPS apps such as Blind Square and Four Square Swarm to get a sense of their surroundings and location while enroute.

3.1.3Inappropriate Driver Behavior/Disability Insensitivity

Our participants shared multiple instances of unpleasant interactions with drivers. P3 recounted a relatively mild encounter: “I've had them try to drop me off at the wrong street and I tell them we're not on my street. Ohh…they must have changed the name of the street. I mean stupid answers.” In contrast P1 recalled a more distressing experience that led to her dangerously exiting the vehicle in an unknown location: “He kept asking me what building is this? The building that I lived in, and I said I'm sorry. I can't tell you what building. I mean, I can tell you the address, but I don't know where we are. And so I can't tell you if this is the building that I live in. And actually he got mad at me and really basically swore at me and everything because I couldn't tell him what building I was in and so eventually I just got out of the car, which was probably not the smartest thing in the world to do.” Participants also reported instances of drivers yelling at them for being out by themselves without assistance, arguing with them about their location, and discriminating against them for having service dogs.

3.1.4Miscellaneous

Participants encountered additional challenges that did not fit into the major categories above, either because they were not widely shared or were difficult to classify. Both P3 and P4 reported issues with drivers canceling their rides or refusing entry due to their service animals. As P4 noted, “[A] lot of people have complained about how drivers don't want to allow service dogs in their vehicle. They don't care that they're required to do that, that it's against the law to deny us”. P3 also cited problems with the Uber UI, specifically difficulty in finding the ride cancellation button. Additionally, P2 and P3 expressed frustration with the app’s screen reader compatibility, particularly the presence of unlabeled buttons. As P3

described, “there's some issues on the app where it'll just say button, button, button and it's not clear. On what? What it is so their app should be labeled better”.

3.2 Solution Design Features

In our discussion, the participants brainstormed potential design solutions for their main challenges when using rideshare applications. The design solutions primarily consisted of in-app solutions as well as training recommendations.

3.2.1Haptic feedback

P1 and P2 desired a way to help determine the driver’s location in the app, especially in more congested areas like cities. P2 ideated a design solution where their phone would gradually provide greater and more intense haptic feedback through vibrations as the driver got closer to the passenger: “[S]o when the driver has arrived, and it's, like, a loud environment… we can get the vibration of ‘they're here.’ If we can't hear our voiceover…if we're…in louder environments…that way, again, we know that the ride is there, because…we depend on our hearing as blind people.”

3.2.2En route Notifications

Both P1 and P4 recommended en route notifications that would provide users with spoken updates throughout their trip so they can have a better understanding of where they are located. It would provide the users with updates on passing landmarks, turns being made, and major streets being passed.

3.2.3Frequent Pre-Pickup Notifications

P1 and P2 recommended more frequent pre-pickup notifications that would provide the users with a greater sense of where the driver is, how far away they truly are from picking them up and what may be causing a delay. P2 described the solution in detail, “The one I feel like I think needs more modification is… the part where…the driver is en route to you. We could tell… [the driver is] getting closer by [counting down the] minutes, but if it's stuck… there for, like, 10 minutes and they're taking forever. … I hope, in the future, there could be, like, a little caption or something that says, 8 minutes, and then, like, the little caption… or a message that pops up that says ‘In traffic,’ or… Stuck by a train, or… have another… client in [the] vehicle.”

3.2.4Accessibility Training

P2, P3, and P4 all recommend accessibility training as a design solution. This would be provided to drivers to help accommodate passengers with disabilities such as users with BLV. The drivers could be educated prior to taking on rides about how to provide service for individuals who need greater assistance or accommodation for a better overall experience. Accessibility training could include different assistance techniques or setting up greater communication standards.

4 DISCUSSION

In this study we looked at rideshare experiences of users with BLV and identified their greatest challenges when using the service. We also performed some light brainstorming sessions with participants to look at potential solutions that current rideshare platforms lack. Ridesharing services present specific challenges for users who are BLV. Each ride involves several variables, including coordinating with the driver, finding the precise pick-up spot, and confirming the drop-off location. These variables contribute to the anxiety during the ridesharing experience for users with BLV.

After analyzing our research, we identified three key ways to improve the rideshare experience for people who are blind or have low vision: implement more automated messaging and communication features, provide additional support, services, and training for drivers to assist blind or low vision users, and create an accessibility report for rideshare mobile apps.

4.1 Automated Messaging and Communication Features

Driver communication can be inconsistent, leading to a wide range of experiences. We also found driver communication affects pick-up and drop off experiences as well. While some participants were worried about language barriers, the lack of communication from the driver, and cancelled rides, our participants were more likely to try and create solutions that solve issues more closely related to pick-up, drop off, and en route navigation.

Some of the ideas brainstormed involved automated messaging and communication. For instance, the app would provide en route notifications regarding the trip, pre-pickup communication to inform the driver a user is BLV and to inform the customer of the driver's current status (i.e. that they're stuck in traffic), and using haptic feedback for both notifying when a car arrived and as a tool to help find the car.

More broadly, automated messaging can help create transparency for riders. This transparency in turn helps build trust between the passenger and driver. This trust, Brewer and Kameswaran have noted, is important to have between passengers who are BLV and drivers [8].

4.2 Additional Support, Services, and Training for Drivers

Ridesharing is a peer to peer service, meaning driver behavior and experience can vary wildly between drivers. Sentiment surrounding rideshare drivers was mostly positive but the bad experiences stood out for all of our participants. The solutions we brainstormed with participants to better standardize this experience primarily involved rideshare companies providing additional training for drivers, allowing them to better interact with users with BLV. Our participants showed some level of anxiety regarding their service animals and improved driver training around accessibility could help address issues of disability discrimination that have impacted Uber in the past [8]. Training can also address certain biases that drivers have as discussed by Petrovich [9].

Not only could support and services for drivers include training to improve driver conduct with passengers with accessibility needs, but it could also help address users' challenges with communication, pick-up, and drop off. Potential solutions could include translation services when needed and developing a standard process for pick-up and drop off for users who are BLV.

4.3 Accessibility Report on Rideshare Apps

All of our participants use Uber, and for most of them at a subsidized cost through government assistance programs due to their disability. Despite the cost benefit of the app, Uber's mobile application user interface presented several challenges for our participants. Participants specifically noted that there are issues with buttons not being properly labeled for screen readers and that the process to cancel a ride is more challenging than necessary. Although our research didn't focus on Uber's in-app accessibility, our interviews revealed enough UI challenges that we feel an accessibility report could more comprehensively identify the areas for improvement in the user experience of individuals who are blind or have low vision.

4.4 Curb-Cut Effect

The curb-cut effect shows how features originally designed to improve accessibility often result in benefiting everyone. As we analyzed our data, we realized almost all the solutions our participants created could also be beneficial to sighted users.

For example, automated messaging and communication features increase transparency. Driver training and processes can help set stricter expectations and could create more empathetic drivers. Lastly, an easier way to cancel would benefit almost everyone.

4.5 Future Work

One study we believe that would be worthwhile to research would be to look at the difference in driver behavior between Uber and Lyft. During our research, we noticed that Uber provides little guidance to users and drivers regarding accessibility [10]. In contrast, Lyft's accessibility page contains much more information [5]. This could help provide insight on the difference resources and training make.

4.6 Limitations

Our limitations mostly stem from our small sample size of four, but even within that, diversity among our participants was lacking. Three of our participants were women who were over 60 and live in the Chicagoland area and all participants use Uber as their primary ridesharing app Additionally, our participant criteria inadvertently limited our pool size by requiring users to have the app downloaded for the interview when we did not use the app in the interviews.

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