



RIDE

HCDE MS Capstone
Winter 2016

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Introduction

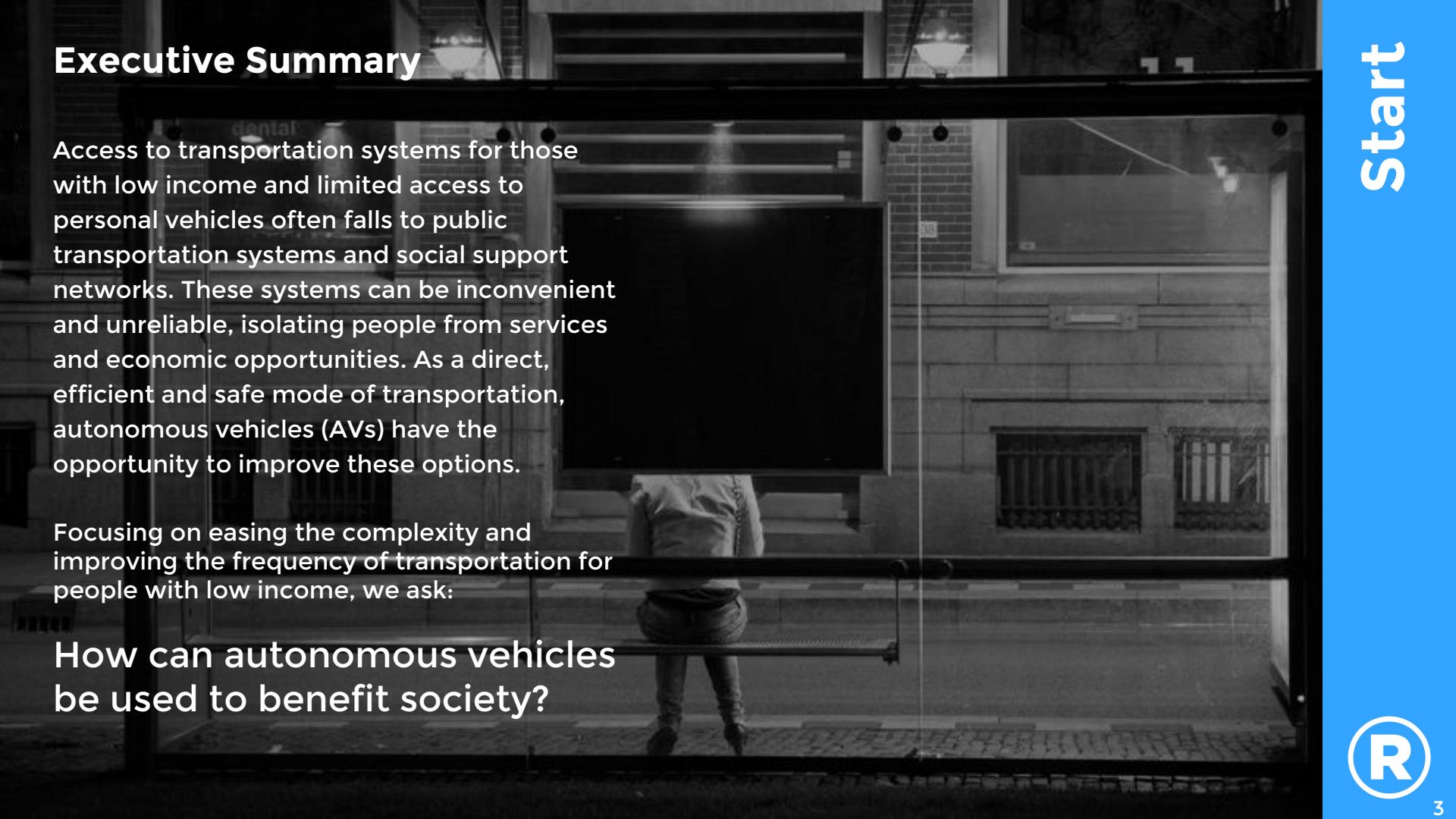
Intel asked University of Washington master's capstone students how autonomous vehicles may exist in the future, and how the changing industry may affect people.

We wanted to narrow to specific users to try to answer that.

This document is intended for the University of Washington Human Centered Design and Engineering department, Intel, King County Metro, transportation non-profit organizations, cab companies, autonomous vehicle manufacturers, and anyone interested in improving transportation.



Executive Summary



Access to transportation systems for those with low income and limited access to personal vehicles often falls to public transportation systems and social support networks. These systems can be inconvenient and unreliable, isolating people from services and economic opportunities. As a direct, efficient and safe mode of transportation, autonomous vehicles (AVs) have the opportunity to improve these options.

Focusing on easing the complexity and improving the frequency of transportation for people with low income, we ask:

How can autonomous vehicles be used to benefit society?



Process



Research

We learned that people who are income insecure struggle when unexpected trips arise.



Ideation

From multiple concepts we converged on a set of design requirements that informed our iteration.



Iteration

Usability studies with users and social service agencies guided our many prototype iterations.

Over the course of ten weeks, our team completed a literature review, Tesla test drive, interviews with potential users, interviews with social service agencies, and sorted results into themes. We ideated on those themes, sketching together as a team, and working individually to generate as many ideas as possible.

Once we settled on a vision for the system, we built a proto.io digital prototype, and completed user studies with potential users. Because we used the Rapid Iterative Testing and Evaluation (RITE) method, we iterated on the design while completing testing. The updated prototype reflects the results of that process.





Research



Literary Review

We reviewed over 70 articles, papers, and current business models on topics including general AV news and business predictions, safety and trust with respect to technology, and legal and ethical issues relating to self-driving cars. Additionally, we researched car sharing businesses and other sharing economies (both for revenue and altruism), social and environmental impact of vehicles, and transportation options for people who are income insecure.

Our review indicated a gap in current research and planning. AV integration may bring major change to our economy, employment options, and improved city layouts. [2] How will the AV revolution affect the lives of and options for people who are income insecure? With AV integration, people with middle and higher incomes could consider "public transit a last choice option and then we have [increased] social class segregation." –Tim Papandrea, SFMTA [1]. Our project goal is to find solutions to ease this transition, even for those who may not be in the customer segment of the incoming autonomous vehicles.



Tesla Visit



Car maker Tesla has already introduced some autopilot features. To get a sense of how it feels to be in an autonomous vehicle, we visited the

Seattle Tesla dealer and took a test drive. We learned the technological leaps that are being made to bring these features to market.

User Interviews

We interviewed members of the population on which we had chosen to focus based on the results of our literature review: people with low incomes. These were a mix of strangers at transit hubs, on buses, and food banks, along with acquaintances of the research team.

Major Themes

1. Pickup locations and times are often inconvenient
2. Unplanned trips are expensive and inconvenient
3. Transportation environment is important
4. Accommodations for children and related equipment is important



South Seattle bus transfer station where we approached strangers and asked them their thoughts about Seattle public transit.

Agency Interviews

Interviews with social service agencies gave us unique insights into the needs for transportation support.

Major Themes

1. Riders find it difficult to understand public transportation
2. Language and cultural differences can be a profound barrier
3. Assistance programs can be hard to get, use, and maintain
4. Cost to agency is critical
5. Higher housing costs and reduced transit funding forces people away from core service centers
6. Low cost emergency transportation is important
7. Personal contact is especially important for seniors and those living alone



Mahinda of Hopelink agency shows a client how to use an Orca kiosk.



Interview Findings

The combination of interviewees gave a balanced view of the consumers and providers in this area and how their perspectives might align and differ.

Our concluding themes illustrate that public transportation is difficult to use, including planning, timing, and location. Additionally, spontaneous or unexpected trips are expensive and inconvenient. Going forward, we used these two major themes to develop our persona and our user stories.



Persona: Maria



“The bus is always late and sometimes gets stuck in traffic. If I am late to work one more time, I may lose my job.”

Daily Schedule



10 hours at work



6.5 hours sleeping



4 hours in transit



2 hours job searching



1.5 hours with daughter

Maria is a single mother with one daughter, 11 year old Cecile. They live in a studio apartment in South Seattle. She works in North Seattle as a housekeeper earning \$15,000 per year, and her daughter attends school in the Beacon Hill neighborhood. They travel mostly by public transportation, most frequently by bus, but occasionally on the light rail. If they plan ahead they can also sometimes borrow their neighbor's car, but they don't have regular access to a vehicle. Maria and Cecile share a smartphone. Cecile usually brings it to school with her, but Maria has it on weekends.

Maria wishes she could find a better job that pays more and has a more consistent schedule so she can spend more time with her daughter and less time at work and on the bus. She has heard about Seattle programs to help single mothers with low incomes, but hasn't had time to visit the offices to find out more information and apply.

Frustrations

- Not enough time to help her daughter with homework
- Lives paycheck to paycheck and never seems to have enough money for the bills
- Store and bus schedules rarely work with her schedule

Needs

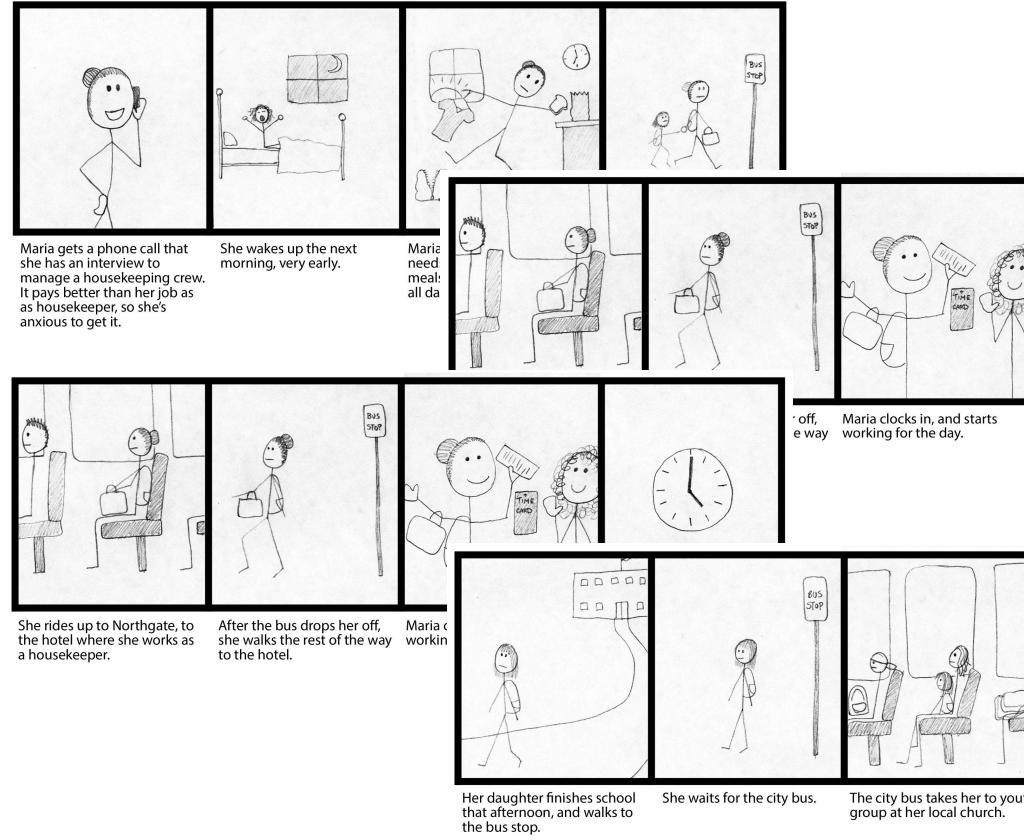
- Access to more dependable transportation
- A job that pays better and has a more consistent schedule
- A stronger support system to help with unplanned events and emergencies



User Stories

To understand Maria and her daily struggles, we created a graphic user story that walks through a day in the life of Maria. See the full story in Appendices A and B. This series of hand-drawn graphic stories made clear that she has a lot of responsibilities, not enough time in the day to do everything she can to manage her life, and that her personal and professional life are both affected.

Maria's day, and her future, would be vastly improved with a more efficient way to get around.



Present to Intel

At the end of our research phase, we visited Intel offices in Hillsboro, Oregon to present our findings and receive feedback. Industry perspective was valuable, and it was inspiring to see what they were working on as well.



The team presenting to Intel on the Intel campus



Ideation



Ideation

Sketching



The first round of ideation sketching was completed individually, and then we met as a team to go through everyone's ideas. These sketch excerpts represent different kinds of ideas, including wearables, dashboard display, vehicle connection and flow, and kiosk display concepts. Early sketches were focused on generating as many ideas as possible.

After sketching, we focused our ideas through group discussion and made three primary decisions:

1. Our device will be minimal.
2. We are designing for an AV-only future.
3. We are designing for how the device will interact with the system.



Assumptions

Through our many discussions and brainstorming activities, affinity diagramming, and consultation with Intel, we agreed on a website (viewable on any modern browser including smartphone browsers) that allows income insecure users to call a ride-share vehicle to pick them up at a moment's notice, addressing the need of improving unexpected trips. An account set up on our website would be linked to their current government and social service agency subsidized transit account, allowing riders to continue to access these rides at a discounted rate, but with more convenience for special circumstances that would otherwise be financially out of reach. Additionally, users of the AV fleet system who are not income insecure would be prompted for donations to help offset costs.

Supporting this direction, the team built a list of assumptions:

1. Mass transit still exists.
2. Normal cars are still on the road.
3. Smartphones will be cheaper and be more available than present day.
4. WIFI will be widely available in cities.
5. GPS will be faster, cheaper, and more accurate.
6. Voice recognition software will be faster and more accurate.



Design Requirements

1. The system needs a user profile system that saves user information and settings.
2. The system is accessed through a website that can be operated on any computing device that can run a modern browser, which includes smartphones, laptops, and desktops.
3. With the website, users can request an AV, view the current location of the AV and information identifying which AV will be picking them up, check account balance, view and change their language options.
4. Smart phones are issued (if desired), through a phone recycling/donation program.
5. The AV fleet system will be used by both users who are income insecure and those who are not income insecure.



Design Requirements (continued)

6. Riders who are income insecure will receive free or discounted rides (to be further defined in our prototyping phase).
7. Riders who are not income insecure will receive benefits by donating to users who are income insecure.
8. The ride experience will be consistent among varying income levels, and will always be safe and clean. The system will make every effort to ensure all riders are comfortable.
9. The system will fully accommodate children of all ages and their equipment.
10. Users will be able to elect to interact with personal contact options which may include video or voice phone connections and interactions (to be further defined in our prototyping phase).
11. The system needs to be globalized for easy understanding, regardless of cultural background, and include language options for non-English speakers.



New Supporting Persona: Jayden

To make this new approach work, we needed an additional supporting persona in our user story. We created Jayden:

Jayden travels from meeting to meeting throughout the Puget Sound each day. He doesn't like to deal with navigating to new places and finding parking spots, so he takes an AV. Jayden wishes he could give back to his community more, but it's tough to find time to volunteer in his hectic schedule.

- 37 year-old, married with no children
- Earns \$145,000 a year as a financial consultant
- Travels on AVs for their convenience as it is within his budget
- Wishes he could give back to his community more





Prototyping



Rideshares

Cab services are innately more expensive than buses to operate per rider, so in our design, we hoped to find a way to reduce the operating costs to put the subsidized rates within reach for our users. Both Uber and Lyft are experimenting with new rideshare services. Uber has UberPool, and Lyft has LyftLine. In both of these services, the companies are working to help users feel more comfortable sharing rides with total strangers.

This is only newly available in certain cities, and has not yet been proven. However, since both of these companies have deemed this a worthwhile experiment, it was worth exploring to see if it could work for our users.



Rideshare Survey

To answer whether rideshares would work, we surveyed 152 people online asking about sharing with strangers, building trust, and what would motivate them.

Key takeaways:

- 1 A significant portion of our respondents would be willing to share an AV ride for a discount, if their human safety concerns are addressed.
- 2 Seeing a photo of a potential rideshare mate had little effect on how much time riders would go out of their way, or the discount amount that they would require to share.
- 3 The discount expected to share an AV ride is significant, and likely could not fully fund an AV subsidy program for income insecure riders.

We were not ready to draw conclusions about the efficacy of a rideshare option. Because of this, we chose not to prototype this option. However, this information is a strong beginning for a more in-depth future project evaluating rideshare options within the space of autonomous vehicles.

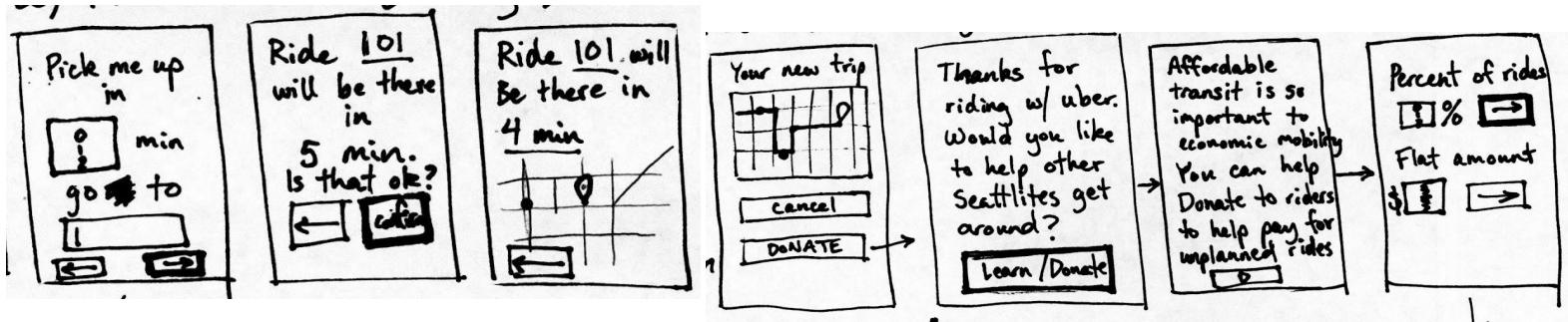


Prototyping

Sketching

Deciding to move forward with solo rides, we sketched ideas for that, and decided to test the following concepts:

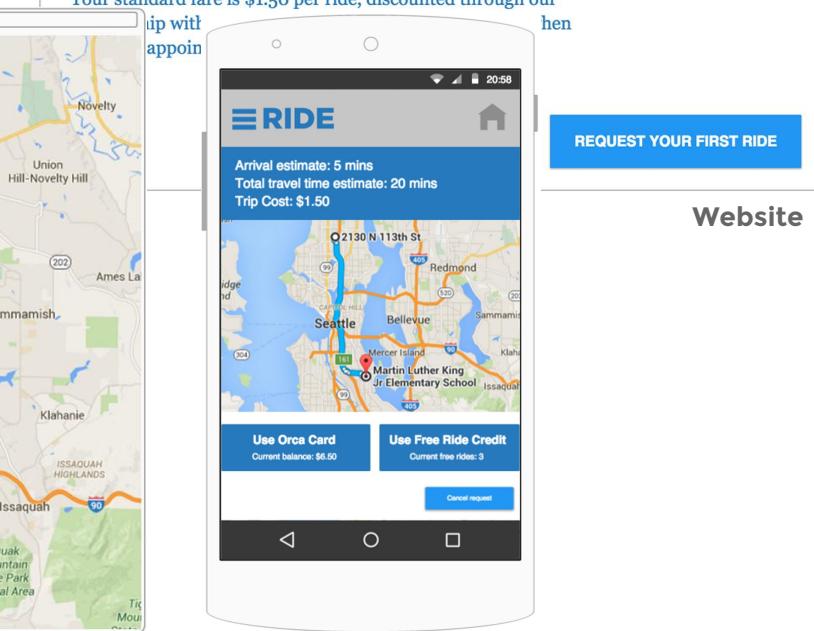
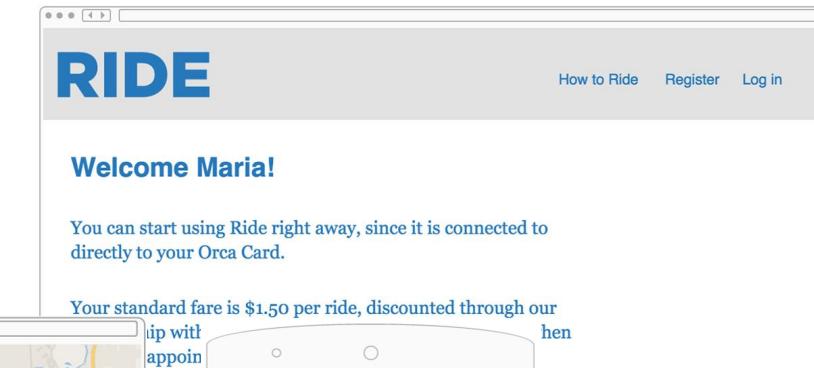
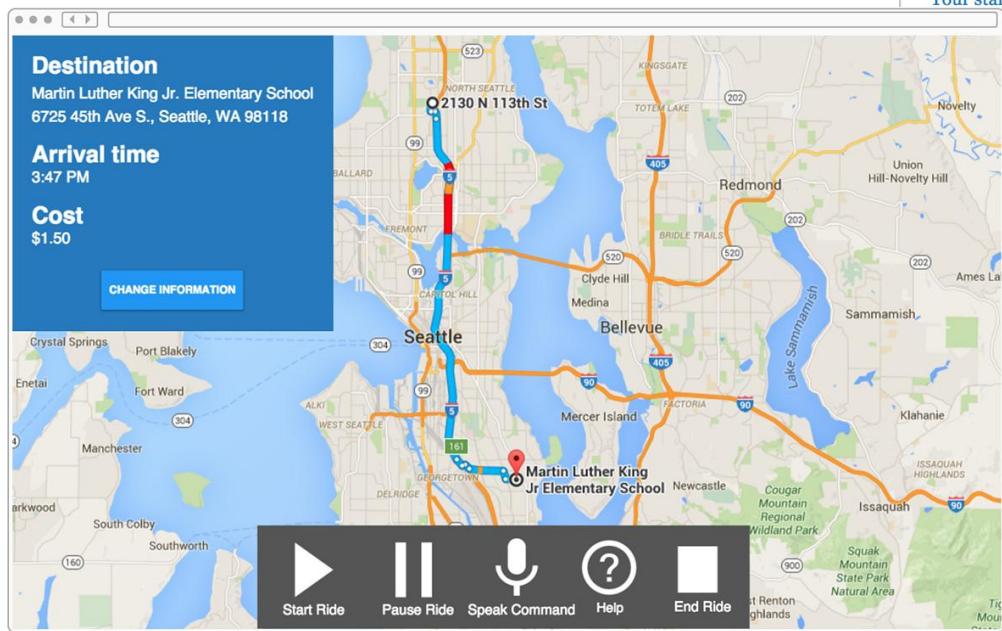
1. If users find value in the system information dissemination - would the signup system work?
2. Can people use the system end-to-end, from calling an AV to releasing it back to the system?
3. What is our success with donation solicitations?



Prototyping

Screenshots

To test the concepts and experiences we wanted to, we created prototypes of the website signup process, mobile AV calling experience, and in-AV dashboard screen experience.



AV Screen

Mobile





User Testing



User Testing

Recruiting



After developing our prototype, we recruited nine users who fit a mix of our user profiles – Maria and Jayden.

We recruited people who possessed some of the higher level attributes represented by our Maria persona: income-insecure, active users of public transportation, and those who are not native English speakers. We ended up with a mix of users who we felt were reasonably qualified to participate.

Our team deployed the prototype on a variety of devices, including laptop, tablet, and phone. We recorded users comments and our own observations, and then had them fill out a rating questionnaire about their experience. Participants were offered Starbucks coffee cards in appreciation for their assistance.



Testing Results

Our user studies resulted in a number of valuable findings which helped guide our prototype iteration process.

These include:

1. Users wanted to know more about the program before signing up
2. The registration form was difficult to use
3. People wanted more information about ride planning options such as multiple destinations and planning return trips
4. Users wished they had more system feedback for the car arrival
5. The AV Welcome screen was not expected; users wanted to see their destination
6. Understanding how the “Pause” experience works was difficult at first
7. Users were conscious and concerned about how Donation was positioned and promoted
8. Users wanted more information on donating
9. Users felt like they were being tricked into donating due to screen layout on a tablet

View links to our prototypes and videos of them in action in Appendix C.



Updated Prototype

Registration Page

1. **Language selector** on top of the homepage appears throughout the site, and allows users to view the site with culturally appropriate language and visuals.
2. Users can select their default **account language**, in case they want a different language for their experience than during registration.
3. The **Orca account link** piggybacks on an existing system and its data, and spurs income secure users to get an Orca card.
4. Entering an **Open Ride code** is all it takes to let the system know this is an Open Ride user.

The screenshot shows a web browser window for the 'RIDE' website. At the top, there's a blue header bar with the word 'RIDE' in large white letters. To the right of the header are links for 'How to Ride', 'Register', and 'Log in'. A small orange circle with the number '1' is positioned above the 'Log in' link. In the top right corner, there's a language selector showing 'English (United States)' with a dropdown arrow, and a small American flag icon. The main content area has a light gray background. It features two paragraphs of text: 'We are excited for you to join our diverse group of open riders. To register you will need to provide an email address, and Orca card account number (or a credit card number). If an agency recommended you to our program please make sure to also have your Open Ride number ready.' Below this text is a section titled 'Registration Form' in blue. This form includes four input fields: 'Full name' (with a placeholder line), 'Email address' (with a 'Learn how to create an email address' link), 'Password' (with a placeholder line), and 'Preferred language' (a dropdown menu with a '2' in an orange circle). Below these are two more fields: 'Orca Card account number' (with a 'Use credit card instead' link) and 'Open Ride code (if applicable)' (with a 'Learn how to get an Open Ride code' link). At the bottom right of the form is a blue 'SUBMIT FORM' button.



Updated Prototype (continued)

Registration Donate Page

5. If users don't enter an Open Ride code, there is a prompt to donate to Open Ride after setup is complete. It is easier and more reliable to have **regular donations** that people can "set and forget" rather than annoy users during their AV experience.

The screenshot shows a web browser window for the RIDE website. At the top, there's a blue header bar with the RIDE logo, a language dropdown set to English (United States), and navigation links for How to Ride, Register, and Log in. Below the header, a large blue "RIDE" logo is centered. To the right of the logo are the same navigation links. A prominent blue "Thank you!" message is displayed. Below it, a text block says: "Set up your donation below. If you sign up for recurring donations, we will remove all donation requests from your future Ride experiences." On the left, a yellow circle contains the number "5". Below it, the text "Recurring donation*" is followed by a note: "Donate this amount every time you ride". There are four options: "\$3" with a selected radio button, "\$2", "Round up**", and "Custom amount". On the right, the text "One time donation" is followed by a note: "Donate this amount only once, right now". There are four options: "\$20", "\$10", "\$5", and "Custom amount". At the bottom right is a blue "SUBMIT DONATION" button. Below the button, a small note says: "No thank you, I just want to ride."

5

Recurring donation*

Donate this amount every time you ride

\$3 \$2
Round up** Custom amount

One time donation

Donate this amount only once, right now

\$20 \$10
\$5 Custom amount

SUBMIT DONATION

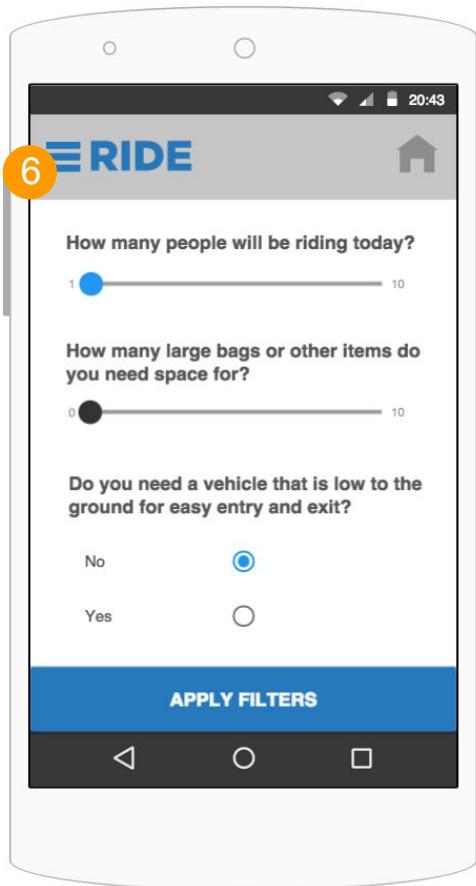
* Recurring donations can be adjusted or stopped at any time in your account settings
**Round up your payment to the nearest dollar every time you ride

No thank you, I just want to ride.



User Testing

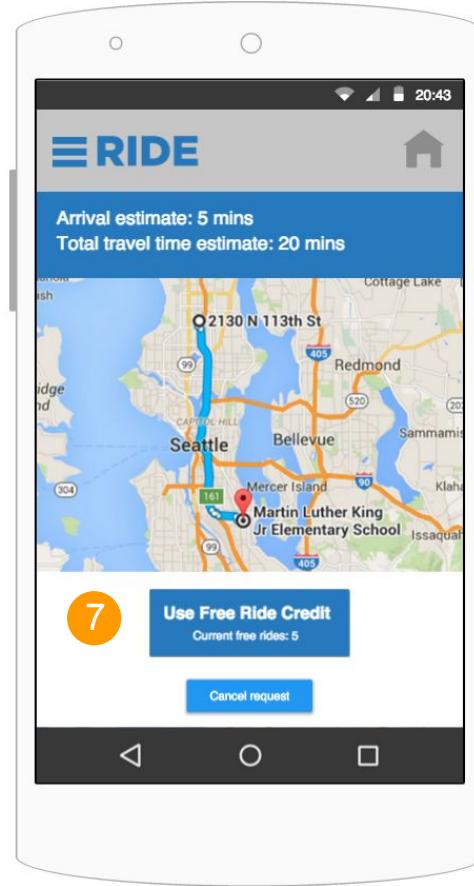
Updated Prototype (continued)



Mobile AV Call Screens

6. The **filter** screen helps users control what kind of AV arrives.

7. Riders can select to use their **free ride credits** so they know, before the AV even arrives, they will not have to pay for the trip .

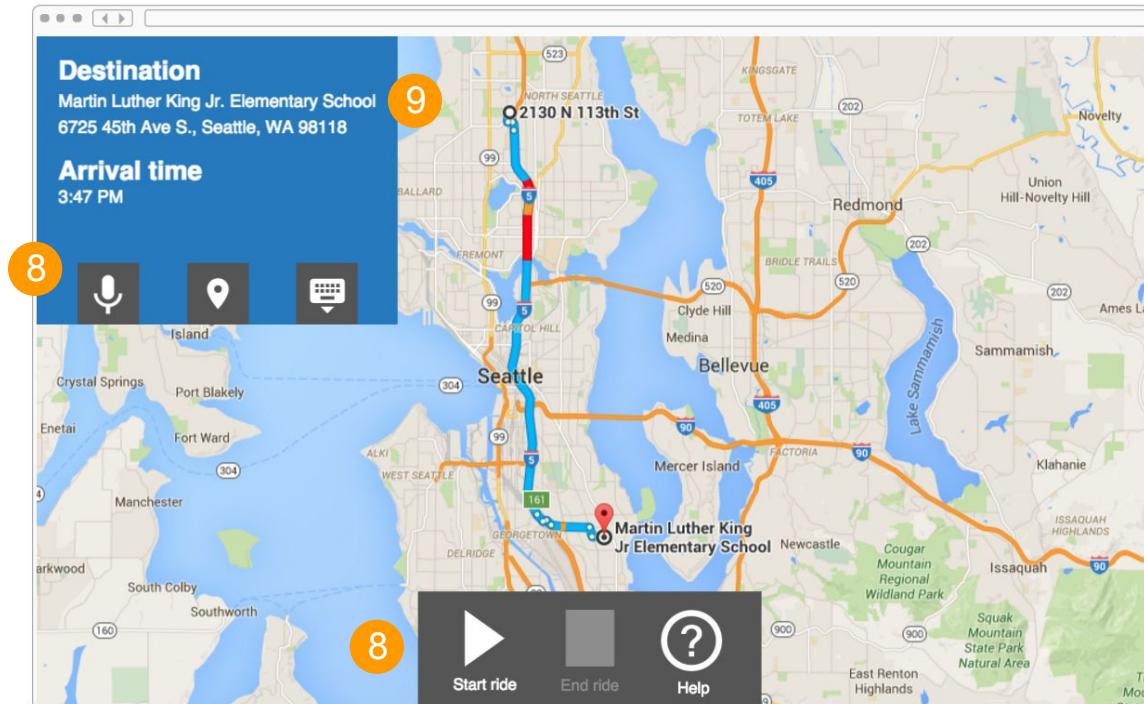


Updated Prototype (continued)

AV Dashboard Screen

8. Touch screen AV controls are split up, because showing them all in one location on the screen overwhelmed users. Focusing the user on their primary controls during the ride removed that confusion.

9. On this screen the user can also view a trip summary with the map and details.



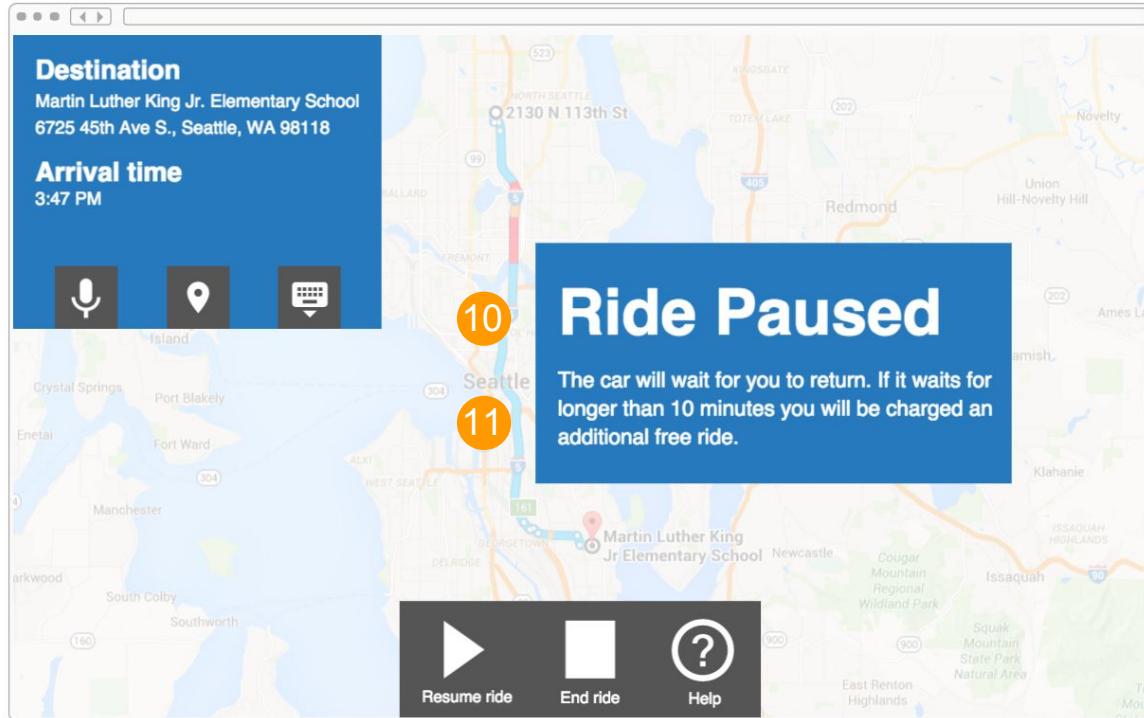
Updated Prototype (continued)

AV Pause Screen

10. Users need an option to briefly stop the AV and have it wait for them, so we designed a **Pause function** before the study.

Because users struggled with this concept, we added an explanation on screen, and changed wording on the button for resuming the trip.

11. Additionally, we added a **Pause limit**, with a charge for overusing it, to discourage abuse.



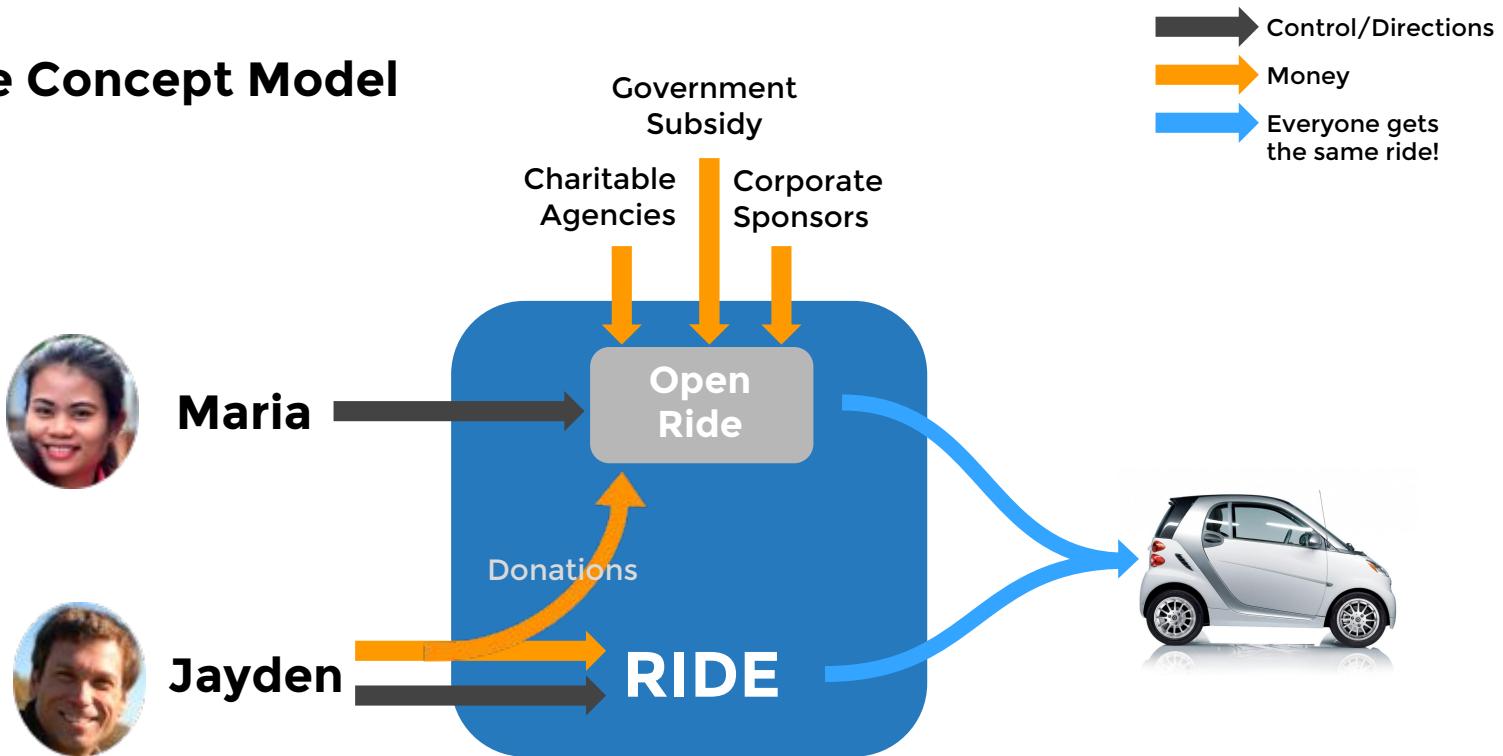


Conclusion



Conclusion

Service Concept Model



Ride is an autonomous vehicle (AV), for-profit cab company that provides individual car rides. The website allows users to hail AVs wherever they are.

OpenRide is a subsidiary of Ride that collects donations from full-fare paying riders, charitable agencies, corporate sponsors, and the government to pay for free rides for qualifying income insecure riders.



Conclusion

Service Blueprint

Step in Process		Learns about Open Ride	Signs up for Open Ride	Orders a ride	Gets into car & begins ride	Completes ride
Touchpoint	Social Worker	Ride desktop website	Ride mobile website	in-car AV screen	in-car AV screen	
User needs	Maria's Actions	Talks to social service agency	Fills out web registration	Inputs destination, elects to use free credits	Confirms destination, starts ride	Releases AV, ending ride
	On-stage Action	Agency provides code	On-screen registration confirmation, Ride welcome, & info about Open Ride	mobile website confirms vehicle ID info & estimated arrival time	AV screen displays route to destination, indicates ride in progress	AV screen shows ride summary
Line of Visibility						
Back-end system	Backstage Actions	Agency confirms qualification	Maria's Ride account created by Ride website	Dispatch identifies location, sends vehicle	AV calculates route, begins moving on command. Vehicle location tracking.	AV communicates with Ride system & Maria's account is charged one free ride.
	Support Processes	Open Ride database updated	Ride account management system database updated	GPS (US government), Ride system directory of AVs	GPS (US government), Ride system	Ride account management system contacts Open Ride for funds from: <ul style="list-style-type: none">■ Government & social service agency subsidies■ Donations from full-fare paying riders

Having designed a service, we needed to build a corresponding service blueprint diagram. This goes beyond the service concept model, and details the portions of the Ride and Open Ride system that our primary persona, Maria, will interact with and be affected by throughout her use of our system.



Updated User Story: Maria

Maria occasionally visits a social service agency for help with benefits for her and her daughter. During one visit Maria learns about the Open Ride program in which she can use her discount OrcaLift account to qualify for a limited number of free AV rides per month. She signs on to the Ride website to sign up using the special code the social service agency gave her.

A few months later, she gets a call at work from Cecile's school that her daughter isn't feeling well, and that she needs to be picked up. Taking the bus from her work to Cecile's school, then home, and back to work would take much longer than her allotted lunch break, so she uses the Ride phone app to request an AV pickup.

When the the AV arrives, Maria gets in, instructs it to take her to Cecile's school, asks the AV to standby while she goes in and gets her daughter, instructs it to then take them home, and then releases the vehicle. During the ride she is able to focus on taking care of Cecile.

Previously, Maria would have been concerned about the cost of these extra trips, but because she signed up for Open Ride using a code from a social service agency, her ride is free.



Updated User Story: Jayden

Jayden creates an account with his contact information and payment settings, and he is prompted with multiple options to donate to Open Ride, a subsidiary of Ride. He wishes he could give back to his community more, but it's tough to find time to volunteer in his hectic schedule, so he decides to donate a little by choosing the setting to round up each of his Ride transactions to the nearest dollar.



User Impacts

Without reliable, affordable transportation, income insecure people are at risk for missing important appointments, job opportunities, or incurring unmanageable expenses to meet their needs.

With Ride and Open Ride, the income insecure transit user of the future will be better connected to their city. This system can have great positive impact by meeting the need for efficient transportation in unexpected situations. Because it will be free, these users will be able to travel as needed to the places they most need to go. They will gain freedom, and ultimately, more control over their lives.

<https://vimeo.com/158706966>



Future Work

There is so much work remaining to be done and refined on this solution. With more time, we would love to continue working on...

Calling the AV:

Users requested the ability to create a trip with multiple destinations, showing the cost of each leg, and the option to filter for a more customized AV.

Open Ride Donation System:

Some ideas to study further include: providing donors information about how many people need help, and indicating how far each donation option can go. Thank you information after a donation (one-time) or each ride (recurring) detailing how many people the donation helped during that instance could also incentivize donors. It may also be worth studying whether donation solicitation would be better during the AV ride or during the initial sign-up process.

Inclusivity:

More research would need to be done on the needs of various accessibility challenged populations. As a result of this research, we would add more filter options during the ride ordering flow, including needs such as an voice-only and tactile based system for those who are visually impaired, and physical features of the AVs such as wheelchair accommodation. The system could also use additional ESL and cross-cultural testing.

AV Digital Interface:

We would like to design and test AV experience details such as an in-AV social interaction component, more options of the complete AV dashboard, and other end-of-ride flows.



Conclusion

Lessons Learned

- AVs are closer than we thought!
- AVs inspire a lot of questions from the public, but also a lot of excitement
- Scope early, scope often
- Designing for vague future circumstances is incredibly challenging
- Defining assumptions is key
- It's never too late to do more research
- Testing against a persona without accessibility challenges will not capture accessibility needs



Conclusion

Reflections

We are among the many people who are very excited for the transportation revolution that AVs will spur, and look forward to seeing these user experience problems solved in real life. In this project, we were faced with such a broad question that scoping down to a topic that was manageable was a significant undertaking for a group that was thinking about this for the first time. Additionally, there was a lot of circular debate during the ideation process, generating ideas that were good individually, but too painful for other stakeholders.

There were two primary struggles on this project:

1. Picking from among the dozens of ideas we had for each stakeholder to a final combination that addressed all the stakeholders' needs, without considerably negatively impacting another stakeholder

There were many stakeholders in our project: income insecure users, income secure users, cab companies (both with human and computer drivers), local government, social service agencies, city metro, etc. We had more than enough ideas to solve the individual problems for each of these groups, but given the number of stakeholders involved, balancing their opposing needs was a big challenge.

Due to the vast number of ideas generated during this project, it took some time to arrive at a combination that created our solution. Had the direction been more settled earlier, we may have been able to generate more system detail, and test more fringe cases. Transportation includes a dynamic, ongoing series of decisions, so an ideal AV interface would need to allow for easy changes on the fly. Defining these user flows earlier would have enabled our final deliverable to be better supported.



Reflections (continued)

2. Positioning the solution in a way that a for-profit company would see value in developing and implementing it

Our research and sponsor both indicated that in the five- to ten-year future, for-profit cab companies are the most likely entity that would launch AV fleets. This means that our income insecure user had to be included in the system in a way that would generate value for a company without sacrificing our user's needs.

If we could have talked to a cab company like Lyft or Uber, we may have been able to get a firmer idea of what would or would not work from a business perspective. We knew our user's needs from our research, but were using only our own professional experience and business understanding to drive these decisions. A cab company may have been able to nudge us towards solutions that we dismissed

prematurely, or had not thought of. While we believe that what we have created would generate a cost-neutral public relations victory for a company, the idea is still in its infancy. Much more business analysis and user research would need to occur to verify the viability of this idea.

Once the real AV future begins, it will likely happen fast. We need to start solving these problems now so that we are ready to transition in an equitable way. Focusing technology and attention on income insecure populations has the potential to make serious, broad social gains. Failing to do so will further isolate a large proportion of people, and the wealth gap made even wider as a result.



Meet the Team



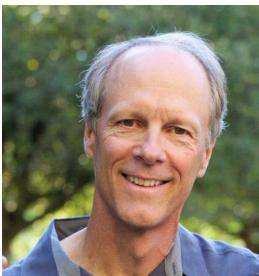
Meredith Anderson studied Aeronautical Engineering and now designs test plans for pilots and the tools to analyze the results.

She wants to expand on this background to design tools and systems that allow for safe, fun, and seamless experiences in people's everyday lives.



Susan Evans holds a Bachelor's degree in Mathematics and Computer Science. She is currently working on completing dual

design programs to further expand her knowledge and plans to move into a UX developer position after graduation.



Michael Harding has worked as a User Experience Researcher for more than 15 years, in both software and hardware from Seattle to China.

Additional experience includes marketing, web design management, and search engine optimization.



Becky Scott graduated from Washington State University with a bachelor's degree in Interior Design. After working for years in building design and construction project management, UX drew her attention for its potential to solve big, complex multidisciplinary creative problems.



Conclusion

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Appendix



A. User Story

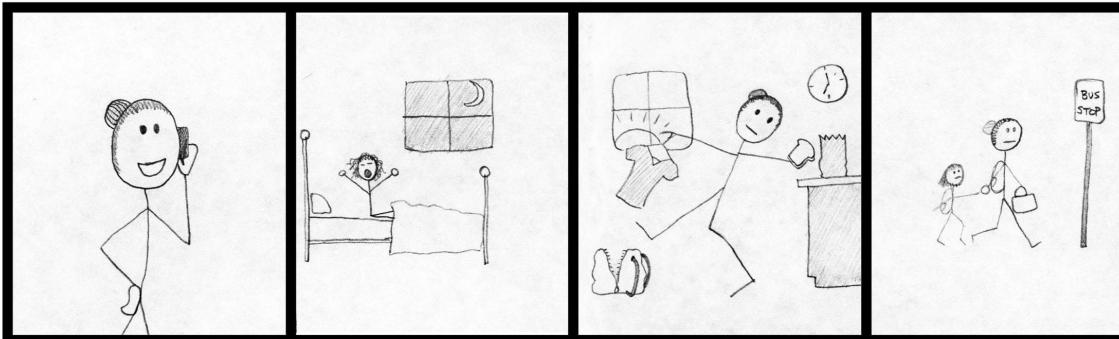
Maria is a single mother with one daughter, 11 year old Cecile. They live in a studio apartment in South Seattle. She works in North Seattle as a housekeeper and her daughter attends school in the Beacon Hill neighborhood. They travel mostly by public transportation; most frequently by bus, but occasionally on the light rail. If they plan ahead they also sometimes borrow their neighbor's car, but they do not have regular access to a vehicle. Maria and Cecile share a smart phone, most often Cecile brings it to school with her, but Maria has it on weekends.

Maria wishes she could find a better job that pays more and has a more consistent schedule so she could spend more time with her daughter and less time at work and riding the bus. She has heard about programs to help single mothers with low incomes in Seattle, but has not had any time to visit the offices to find out more information and apply.



Appendix

B. Graphic User Story

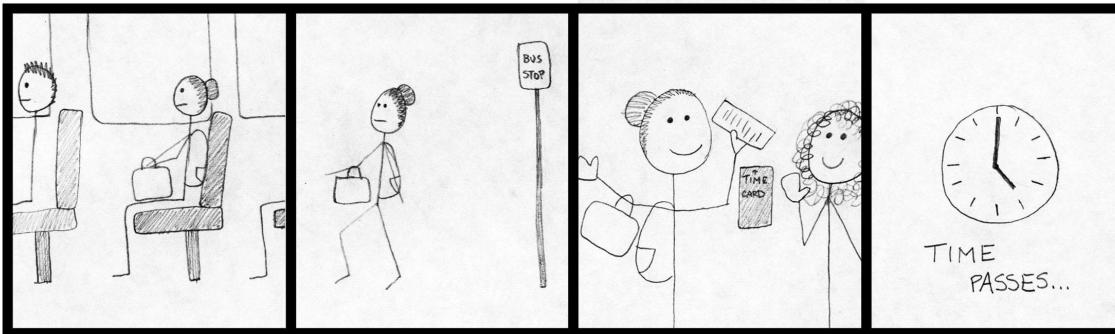


Maria gets a phone call that she has an interview to manage a housekeeping crew. It pays better than her job as housekeeper, so she's

She wakes up the next morning, very early.

Maria packs everything she needs, including clothes and meals. She carries it with her all day.

She and her daughter walk to the bus stop together.



She rides up to Northgate, to the hotel where she works as a housekeeper.

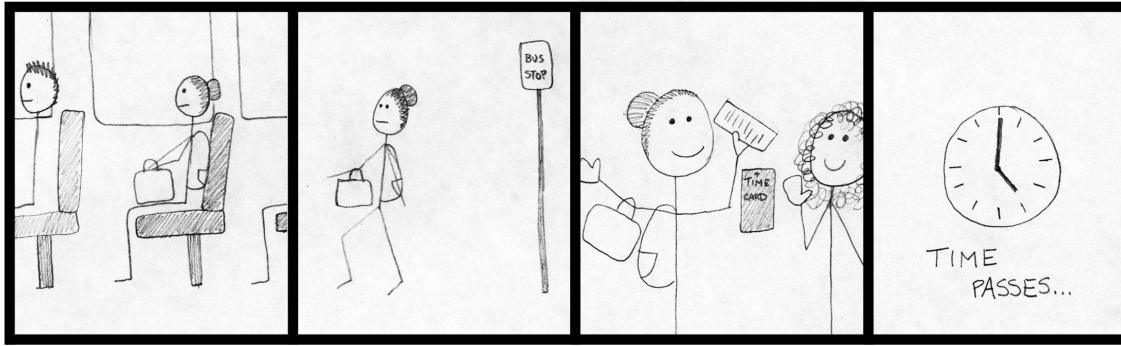
After the bus drops her off, she walks the rest of the way to the hotel.

Maria clocks in, and starts working for the day.



Appendix

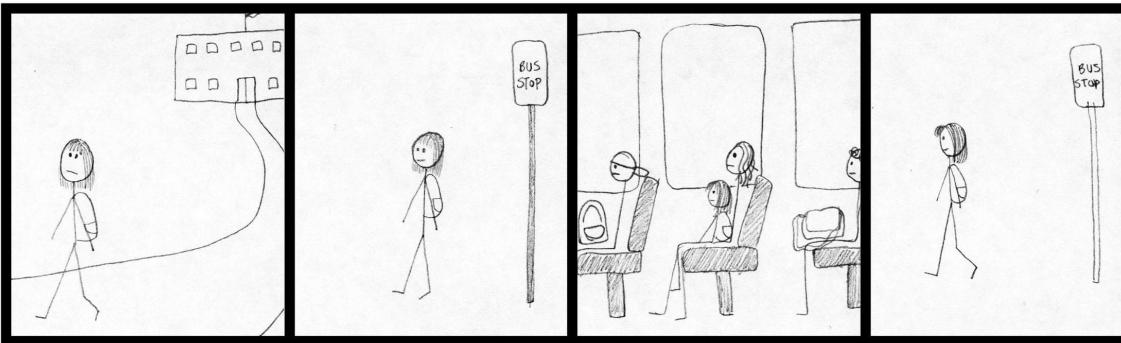
B. Graphic User Story



She rides up to Northgate, to the hotel where she works as a housekeeper.

After the bus drops her off, she walks the rest of the way to the hotel.

Maria clocks in, and starts working for the day.



Her daughter finishes school that afternoon, and walks to the bus stop.

She waits for the city bus.

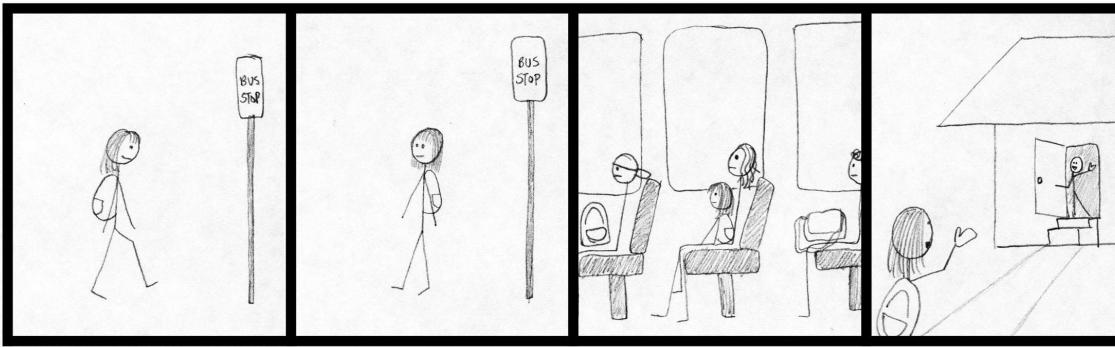
The city bus takes her to youth group at her local church.

She gets off the bus at her stop, and walks the rest of the way to her church.



Appendix

B. Graphic User Story

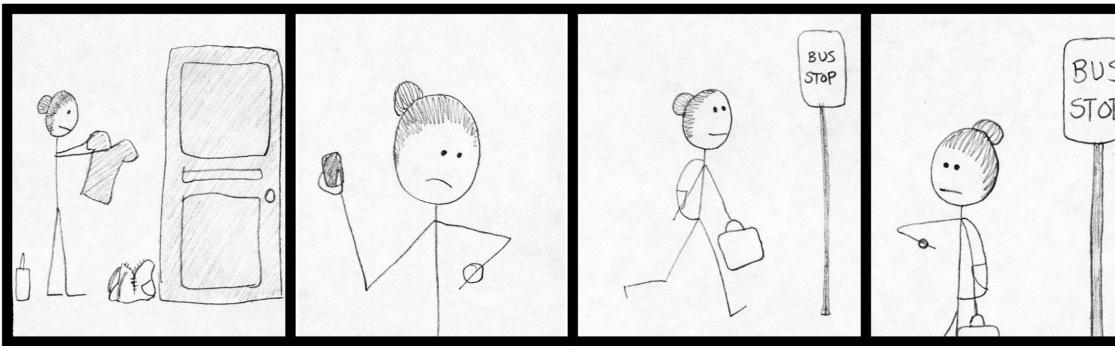


After youth group, her daughter walks a few blocks back to the bus stop.

Again, she waits for the city bus.

She takes the bus by herself back to her own neighborhood.

Her daughter goes to a neighbor's house to do her homework until Maria gets home.



After her shift, Maria changes her clothes for her interview.

Maria wants to go re-up her subsidized Orca card at the office downtown while it's still open, but doesn't have time to get there and up to Ballard for her interview.

She walks a few blocks to a different bus stop to go to Ballard.

She waits for the bus.



Appendix

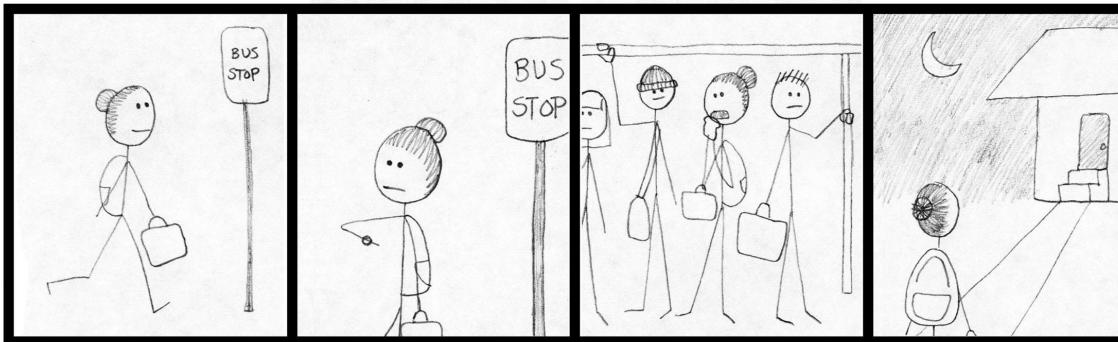
B. Graphic User Story



There is traffic during the ride, Maria thinks about what she will say if she is late.

Once the bus drops her off, she hurries to her interview.

Out of breath and a little sweaty, she is only a few minutes late to the interview.



Maria doesn't hang around for pleasantries after the interview. She hurries back to the bus stop to get home.

She waits for the bus.

There is traffic again, and Maria eats the dinner she packed while riding on the bus. It's late, and she knows to go to the neighbor's house, where her daughter waits for her after school.



Appendix

B. Graphic User Story



Her neighbor greets her.
Maria's daughter is asleep on
the couch.

Maria carries her home.

Her daughter never wakes up
as she tucks her into bed.

At the end of her long day,
Maria collapses into bed.



C. Full Updated Prototype

View our full updated prototypes.

Maria's account setup (website prototype):

<https://susane.proto.io/share/?id=3e2f857f-e802-44a1-afa1-54d42e806cd7&v=18>

Video of these interactions:

<https://vimeo.com/157934735>

Maria's ride request interactions (mobile prototype):

<https://susane.proto.io/share/?id=e4b0ff1a-90f3-40ca-85ec-c4b2affd623f&v=16>

Video of the interactions:

<https://vimeo.com/157935980>

Jayden's donation setup (website prototype):

<https://susane.proto.io/share/?id=3e2f857f-e802-44a1-afa1-54d42e806cd7&v=18>

Video of these interactions:

<https://vimeo.com/157934978>

Maria's AV interactions (built-in touchscreen prototype):

<https://susane.proto.io/share/?id=7f9557fb-7d29-4da1-9a48-f9e04c9d9bc6&v=21>

Video of the interactions:

<https://vimeo.com/157936033>

