

# BART Fare Gate Redesign

Team Pathfinders:

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## Week 2

Persona's POV exploration

HMW exploration

Ideation sketches



## Problem Framing

## Week 3

Group discussion and vote on ideation

2nd round of interview

A.E.I.O.U mind map

2nd round of iteration with iterated HMW

## Week 4

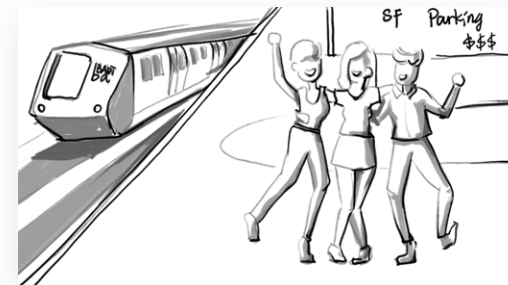
Final HMW

3rd round of iteration

Storyboard

1st cardboard mockup

## Problem Framing



## Iteration

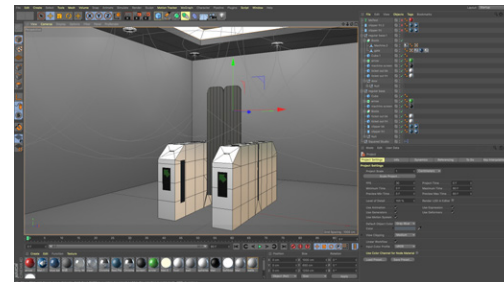


## Week 5

- 2nd cardboard mockup with iteration
- Survey regarding the split feedback
- Analyze feedback and iterate again

## Week 6

- 3D model building
- A/B testing on design detail
- Develop the final product
- Write the script for the concept video



## Concept Video & Presentation

## Week 7

- Shoot live footage
- Create concept video
- Final product presentation

## Introduction

Problem definition, design challenge, and the potential of benefits with solving the problem

The Bay Area Rapid Transit is one of the biggest public transportation systems serving Northern California. However, BART has a lot of well known issues including safety, schedule, personal space, hygiene...etc.

With several rounds of research, we found that one of the **root cause** is that there are many **fare evaders** due to the **lack of the security of the BART entrance**.

**BART loses \$15,000,000 to \$25,000,000 each year** due to the fare evasion. If we can reduce BART fare evasion, we can help with the **packed trains during rush hour** and also save money for BART to **improve their services and facilities**.



## ▄ About Our Team

### THE TEAM

On the day we started this project, we decided to use "[Pathfinders](#)" as our team name. The reason behind this is that we focus on human centered design, and [problem framing](#) plays a huge role in this design process. We are the pathfinders; we try everything; we talk to everyone in order to [find the right path](#).

### MY ROLE

Design Lead | Researcher | Survey Generator | Visual Designer | 3D Model Builder | Photographer

### WHAT I DID

I oversee the progress of the project to make sure our team stays on schedule. I participated in all stages of our project development. Including interview target audience, generate user survey, create mockups for user testing, create storyboard, ideation, and usability testing. As the visual designer in the team, I also created our proof of concept slides and presentation slides. I shot the video footage for the concept video and did the post-editing as well.

### PATHFINDERS



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## Private Interview: 1st Round

Primary research: one on one private interviews with BART riders to hear their stories with BART

### INTERVIEW 1:

Name: Yanan | Age: 22

Status: In a relationship

Occupation: Student

Location: East Bay

I ride BART **every once in a week**, the time varies, usually **either morning or afternoon**.

I ride BART to go to SF.

*Why would you choose to take BART to SF?*

Cause **parking is too expensive** and **I don't like the traffic**.

It's hard to find the parking space too and they are small.

I used to walk to the BART station cause I lived really close to it. Now **I would drive there and park my car at the station** or take an Uber there.

I will probably prefer to park there just because if I come back late, I will **have my own transportation** and don't have to wait, it feels safer.

*How's your experience with parking at the BART station?*

It's not bad, it's 3 dollars for a whole day.

A typical trip for me riding BART will be: I probably will have a **backpack** with me, I will probably be **wearing my headphones** and depending on what stations I get on to I will probably **watch my surroundings** too, because there is always some shady people.

*Some shady people... How do you feel about it?*

Obviously **not safe**, during the day when there is a lot of people I can just ignore them, on the BART though, there will be like, performers, which is fine. Other times though, there will be people asking you for money or...just again, **shady people**. You kinda wanna like to see where you wanna sit and hope no weird people will sit next to you. Cause **I've had friends got rob** on BART before, so... it happens, just need to be careful. I **don't look at my phone the whole time**, I try not to do that.

## Private Interview: 1st Round

*Why? What's the reason behind that?*

You just have to **pay attention to your surroundings**, if you get too stuck to your phone...oh and another reason is that I also get motion sickness.

*How do you feel about the people that you mentioned who will be asking for money?*

Ummm that's ok, I guess they're really smart for doing that because you **feel awkward** for not giving money. It's fine but I would rather not have them there.

*You also mentioned that you want to have your own transportation when you come back late, what's your experience with that?*

It depends on the station, so downtown Berkely around 9 or 10 is fine, but if somewhere like El Cerrito, where there is no a lot of traffic, I will feel a little bit not safe.

*So less traffic makes you feel more unsafe?*

Yes because there will be fewer people around. But...also Berkely, there's been shootings, stabbings...so...you just gotta be careful.

My experience with taking BART is **just average**, I never run into like...crazy people, but you know, sometimes it's **dirty**, it **smells**, and there are **weird people**, they don't do anything bad to you but they're...I don't know they make me feel a little **uncomfortable**. It could be better, it could be **safer**. Also, the BART driver could be a little bit more clear when **announcing which station** we are on. Cause sometimes they don't say it at all, other times they say it quietly...Especially for people who transfer, it's like **confusing** on where to get off like they don't say it. Those **new trains are a lot better**, they are cleaner, they look a lot better. I think they have more seats on it too?

*I believe they actually have fewer setas but more space for people.*

Yea I really like that, it makes it less packed.

## Private Interview: 1st Round

*Have you experienced a packed BART before?*

Yea, especially coming back from SF during **rush hours** maybe around 5, 6 or 7, it's really really bad.

*What's the worst part about that?*

Well sometimes **you don't have the thing to hold on to**, so if you are by yourself, what do you do? And if you have a backpack, it's hard to...you know, I feel bad for taking away other people's space or if other people have their **bike that's taking a huge space...**

### INTERVIEW 2:

Name: Xu | Age: 25

Status: In a relationship

Occupation: Teacher

Location: Richmond

I ride BART **once in a month or two month.**

The first time for me to ride the BART was 2 years ago, I went to DTSF with my best friend. We decided to take the BART instead of driving.

*Why did you guys choose to take the BART instead of driving?*

Because there is no parking space and expensive to park the car over there. It's really inconvenient if we want to go to another mall, we need to park the car again.

We first went to the ticket machine to buy the ticket, at that time I didn't buy the Clipper card, I just bought the regular ticket. It was like a paper ticket that I can use for multiple times, now I got my Clipper card. So it's convenient to put money in. Then we went inside the BART station, but it was **really confusing...**There is **no LED screen for information.** I need to Google everything.

## Private Interview: 1st Round

*I see, you Googled, did you see a map anywhere?*

Well, I saw a map but **it's really confusing** because **there is no color** when the actual train comes, so I need to Google every time to see if it's the right train. Then I sat on the train and need to look at the name of the station every time it stops because I'm afraid I will go to the wrong place.

*The only way you could determine which station you're at is by looking at the station name?*

You can also **listen to the radio**, but sometimes it's really **noisy** so I just couldn't hear it clearly. Also, sometimes the **smell is really bad** because of the **homeless people**, and also some people will take **their bikes** on the train, that'll occupy a lot of space, also sometimes the seat is not **clean** or broken. So I feel like that's really uncomfortable for me, but I think overall it was ok. It's also **slow**, sometimes the train comes every 20 mins, that's really inconvenient. I went to SF once and it took an hour and a half to get there. I feel like I stayed on the train forever.

*What did you do during these long hours?*

I just **play my phone**, sometimes I lost the signal and I can just sit there and staring at somewhere.

*Besides all these facility issues you mentioned, anything else that bothered you?*

I think usually the price is ok, but that time I went to the airport, I think it was like what...12 dollars? When I went to Powell street it's only like 4 or 5 dollars, so I was shocked.

*You didn't know this price in advance?*

When I Googled it then I knew it.

*Do you know any other ways to find out the price?*

Oh yea the price on the ticket machine, but it wastes time to go there and check so I just Googled it.

*What makes you think that it's a waste of time? What makes Google easier for you?*

It's **too much information on one page**.

## Private Interview: 1st Round

*When do you usually ride BART?*

I usually ride BART in the afternoon or evening, and I've been only riding BART for about 5 times.

*Ok, how familiar do you think you're with BART now?*

I think I'm still not used to it.

*What are the confusing parts for you then?*

The **direction** and the **color of the train**. Because it has colored lines, so I don't know how to distinguish those lines. The **destination display on the screen is very confusing**.

*Anything else?*

Maybe **safety**.

*What's wrong with safety?*

The latest time I got into the BART was like 9 or 8:30 pm, I wonder how it worked after 10 pm because I think public transportation is not that safe in the U.S. after 9 pm.

*What makes you think so?*

Because the subway in New York is messy and not safe, especially after evening.

*How did you feel about that late-night trip that you mentioned?*

It was ok, I just feel like there are **homeless people**.

*Did you saw some homeless people?*

Well because some people are **smelly**, I don't know if they are homeless or not, I just think they are homeless.

*What do you do in those situations?*

I **stay far** from them.

*What if there is no other sits?*

I will stand far away.

*Why?*

It's because of the **smell** and I want to **keep myself safe**.

## Private Interview: 1st Round

*What makes you think it's unsafe?*

Because some homeless people are psycho, so I don't know if they're normal or not. When they hurt people, you can fight back but I don't think I have enough strength to fight back. Also if they hurt you, they will be OK because they're not normal anyway.

*Stay far away makes you feel safer?*

Yes because then I can run if anything happens.

*Runaway is your choice when a bad thing happens?*

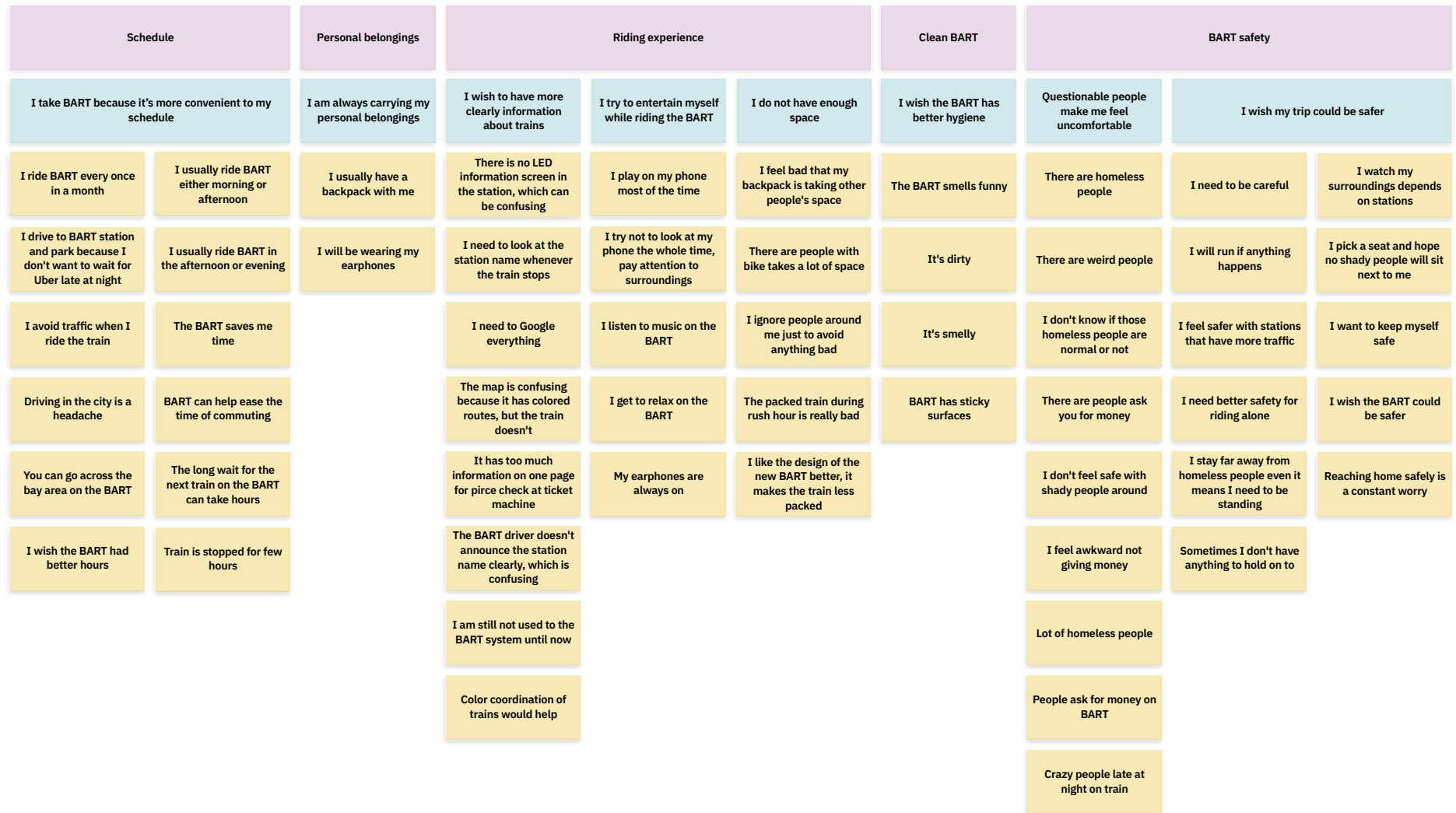
Yes, of course, I will fight back if it's necessary, but I will choose to run first.

*What's your main concern about the safety issues that you mention?*

Yea it's **people**, the people.

# Affinity Diagram

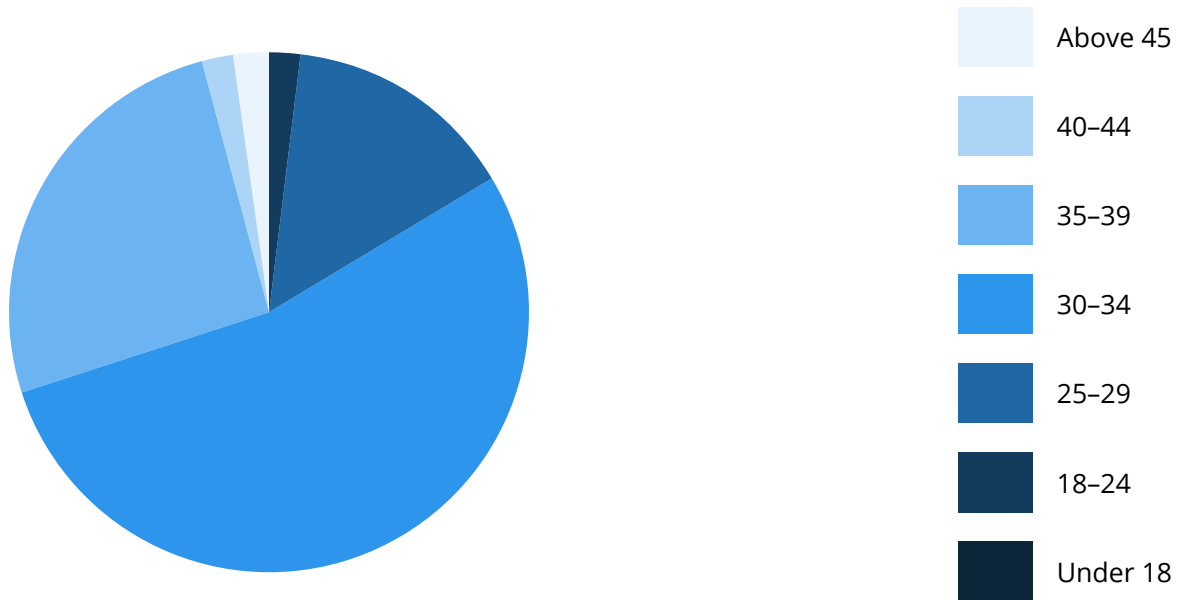
Based on the nine interviews, used an affinity diagram to organize and analyze the information



## Survey Result

This survey is generated with general questions to find our target audience and their main concerns. There was a total of 31 participants.

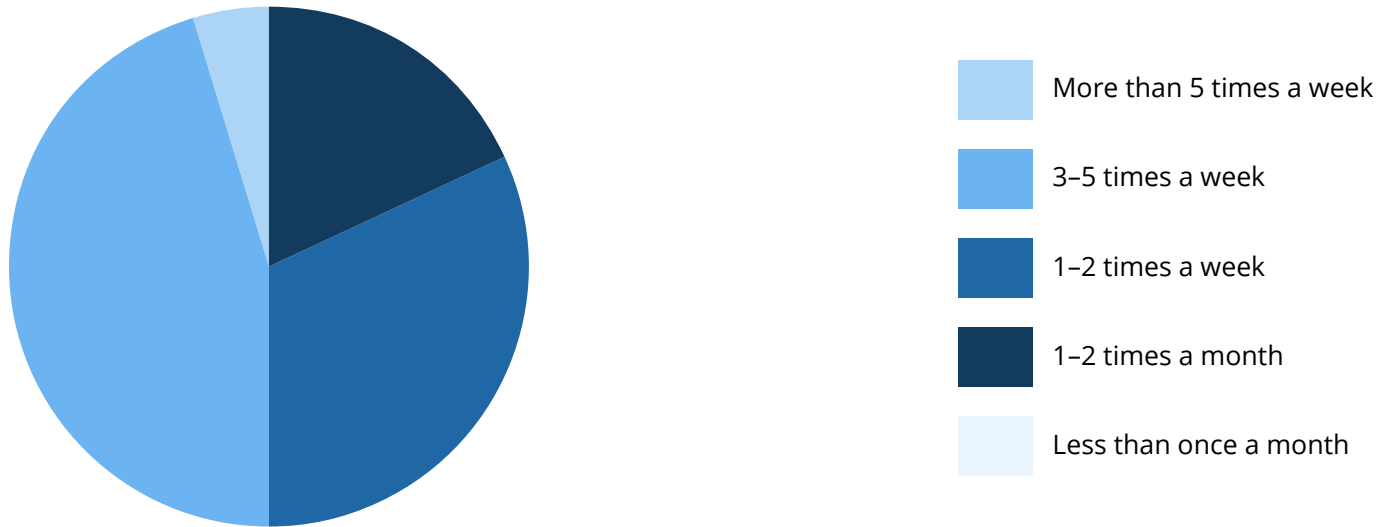
### WHAT IS YOUR AGE?





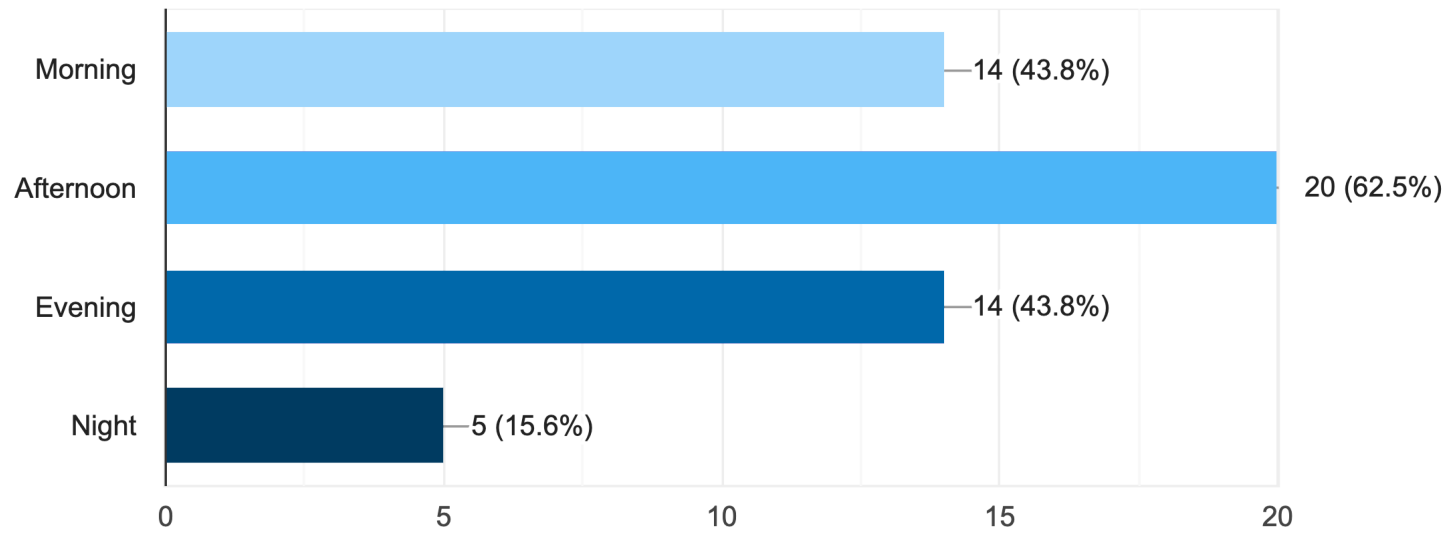
## Survey Result

### HOW OFTEN DO YOU RIDE BART?



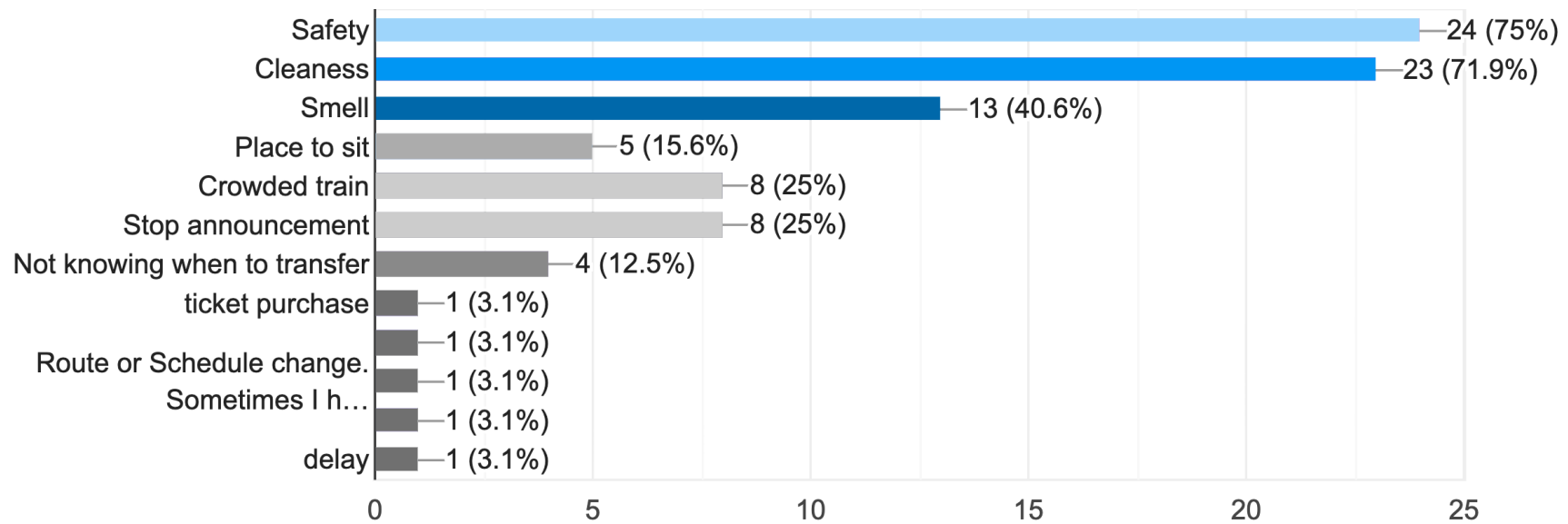
## Survey Result

### WHAT TIME DO YOU USUALLY RIDE BART?



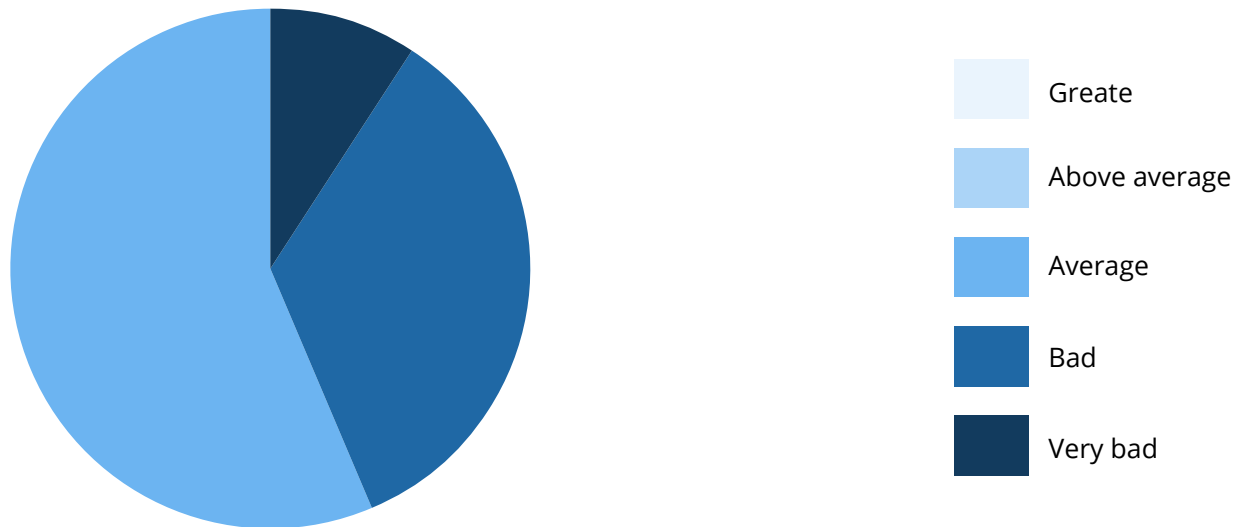
## Survey Result

### WHAT ARE THE TOP 3 CONCERNS/FRUSTRATING THINGS FOR YOU WHEN RIDING THE BART?



## Survey Result

### HOW'S YOUR OVERALL EXPERIENCE WITH BART?



#### KEY FINDINGS FROM THE SURVEY:

The BART rider's **age range is very wide**.

**Most** riders ride the BART **during the day time**.

**Most** of the riders found that the experience with riding the BART is **just average**, others feel it's a **bad experience** when riding the BART.

Top 3 concerns for BART riders: **Safety**, **Cleanness**, and **Smell**.

## 2018 BART Customer Satisfaction Survey

As a secondary source, the BART's official customer satisfaction survey provides a better understanding of the target user's behavior and pain points.

How did you travel between home and BART today?	Weighted Frequency	Percent
Walked all the way to BART	1,649	31%
Drove alone	1,535	29%
Bus / transit	694	13%
Dropped off	463	9%
Carpooled	292	6%
Bicycled	281	5%
Uber, Lyft, etc.	218	4%
Scooter / electric scooter / skateboard	15	0%
Airplane	15	0%
Taxi	13	0%
Car unspecified / car share / rental car	6	0%
Other	28	1%
Multiple response / blank	85	2%
Total	5,294	100%

How often do you currently ride BART? (Check one.)	Weighted Frequency	Percent
6-7 days a week	665	13%
5 days a week	2,450	46%
3 - 4 days a week	901	17%
1 - 2 days a week	427	8%
1 - 3 days a month	407	8%
Less than once a month	387	7%
Multiple response / blank	57	1%
Total	5,294	100%

About what time did you get on this train?	Weighted Frequency	Percent
Before 6 AM	103	2%
6 - 9 AM	1,276	24%
9:01 AM - 12 Noon	616	12%
12:01 PM - 4 PM	870	16%
4:01 PM - 7 PM	1,817	34%
After 7 PM	506	10%
Don't know / blank	107	2%
Total	5,294	100%

Did you use a Clipper card to pay for this BART trip?	Weighted Frequency	Percent
Yes	4,436	84%
No	814	15%
Multiple response / blank	45	1%
Total	5,294	100%

Do you have a smart phone (can access Internet, use apps)?	Weighted Frequency	Percent
Yes	5,039	95%
No	186	4%
Multiple response / blank	69	1%
Total	5,294	100%

## 2018 BART Customer Satisfaction Survey

Presence of BART Police on trains		
7	232	4%
6	268	5%
5	502	9%
4	809	15%
3	778	15%
2	780	15%
1	1,203	23%
Blank / NA	723	14%
Total	5,294	100%

Personal security in the BART system		
7	296	6%
6	429	8%
5	781	15%
4	960	18%
3	794	15%
2	594	11%
1	840	16%
Blank / NA	600	11%
Total	5,294	100%

Addressing homelessness on the BART system		
7	261	5%
6	292	6%
5	445	8%
4	647	12%
3	623	12%
2	699	13%
1	1,726	33%
Blank / NA	600	11%
Total	5,294	100%

## Secondary Source

Other supporting sources found online including reports, data and articles.

### **THE SATISFACTION OF RIDERS**

The BART approval and satisfaction of riders have **dropped** over the last few years. BART riders feel like BART has become a haven for **homeless people** and **drug addicts**. It has also lost its touch on sanitary and cleanliness overall. Personal safety has also been a recent issue with riders and the distrust of police officers.

### **SAFETY IS THE #1 PRIORITY**

According to BART, **safety** is their number one priority.

BART currently has 4,000 working cameras around their stations and trains. BART has a safety app that users can report incidents. A tip, if you are traveling alone, is to go to the first train where an attendee is at. BART is currently trying to solve the **homeless issues** on the train. **Phone theft** is the biggest crime on the BART.

### **FACTS ABOUT BART**

There are 669 revenue vehicles or cars. There are about 121 miles of BART track. The trains travel at 70 mph maximum, 35 mph average and make 20-second station stops.

## Secondary Source

### **VIOLENT CRIME IS INCREASING**

Violent crime **increased by 57 percent** between 2013 and 2017. 420,000 riders ride the BART a day on average. In San Francisco crime went down from 7,064 reports in 2013 to 6,334 in 2017. The researcher finds BART needs roughly 19-20 additional officers each fiscal year over the next 5 years. **When the relationship between cops and citizens breaks apart, crime goes up.**

### **TRAIN SEATS ARE TAKING BY BACTERIA**

A supervisor at San Francisco State University's biology lab tested the seats at the BART trains and found fecal and bacteria. Mold and nine different types of bacteria were found on the trains. **Harmful bacteria** have been found in the **seat fabric of the BART**. BART spends \$595,000 a year on dry cleaning the seat cushions of the train.

### **HYGIENE IS A PROBLEM**

San Francisco BART is the **second most germ-infested transit system in the US**. SF BART tested high for gram-positive cocci which are common to cause skin infections. Suggestions from the article say to **always wash your hands after riding a train**.



## Secondary Source Citation

*Bay Area Rapid Transit. "Reports." Bay Area Rapid Transit, 2018, [www.bart.gov/about/reports](http://www.bart.gov/about/reports).*

*Swan, Rachel. "BART's Approval Rating Plummets as Riders Complain about Filth and Crime." SFChronicle.com, San Francisco Chronicle, 22 Jan. 2019, [www.sfchronicle.com/bayarea/article/BART-s-approval-rating-plummets-as-riders-13550578.php](http://www.sfchronicle.com/bayarea/article/BART-s-approval-rating-plummets-as-riders-13550578.php)*

*"Bay Area Rapid Transit Fast Facts." CNN, Cable News Network, 12 July 2019, [www.cnn.com/2013/07/04/us/san-francisco-bay-area-rapid-transit-fast-facts/index.html](http://www.cnn.com/2013/07/04/us/san-francisco-bay-area-rapid-transit-fast-facts/index.html).*

*Ktvu. "Why Is Violent Crime on BART on the Rise? 2 Investigates Looks beyond Stats." KTVU FOX 2, KTVU FOX 2, 20 Nov. 2018, [www.ktvu.com/news/why-is-violent-crime-on-bart-on-the-rise-2-investigates-looks-beyond-stats](http://www.ktvu.com/news/why-is-violent-crime-on-bart-on-the-rise-2-investigates-looks-beyond-stats).*

*Elinson, Zusha. "On BART Trains, the Seats Are Taken (by Bacteria)." The New York Times, The New York Times, 5 Mar. 2011, [www.nytimes.com/2011/03/06/us/06bcseats.html](http://www.nytimes.com/2011/03/06/us/06bcseats.html).*

*"Public Transportation Hygiene Exposed." Travelmath, [www.travelmath.com/feature/public-transportation-hygiene-exposed/](http://www.travelmath.com/feature/public-transportation-hygiene-exposed/).*

*"Safety & Security." Bay Area Rapid Transit, [www.bart.gov/guide/safety](http://www.bart.gov/guide/safety).*

# BART A.E.I.O.U. Mind Map

Generate the mind map of BART related Activities, Environment, Interaction, Objects, and Users.



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## Target Audience

Based on the research, personas are built to group the target audience.

Target Audience Grouping.

【DATA:】  
 Age Range → Very Wide. : 18 to >49. ▽ 21. ★ 34. ○ 44. △ 54.  
 Frequency For Riding BART: ★ 3-5/week. ★ 1-2/week. ★ < 1/month. ★ 1-2/month.  
▽ ★ ○ △  
 Time: Mostly During Day Time.  
 Experience with BART: Average, Bad & Very Bad.  
 Pain Points: Safety ★ Cleaness ○ Smell ○  
 Place to Sit ○ △ Crowded Train ○ Stop Annouement △  
 Transfer △ Ticket Purchase △ Delay ✗

Persona 1: ▽	Persona 2: ★	Persona 3: ○	Persona 4: △
Age: 21. Student.	Age: 34.	Age: 44.	Age: 54.
Pain Point:	Pain Point:	Pain Point:	Pain Point:
- Safety. ✓	- Safety. ✓	- Cleaness. ✓	- Place to Sit. ✓
- Cost.	- Personal Belongs Safety	- Smell. ✓	- Stop Annouement. ✓
- Delay. ✓		- Place to Sit. ✓	- Transfer. ✓
1-2/week.	3-5/week.	- Crowded Train. ✓	- Ticket Purchase. ✓
		> 5/week.	3-5/week.

## Persona 1

### Aiden Brown

👤 Age: 21

📍 Location: Berkely, CA

🎓 Occupation: Student

♀️ Status: Single

Extroverted: 

Cautious: 

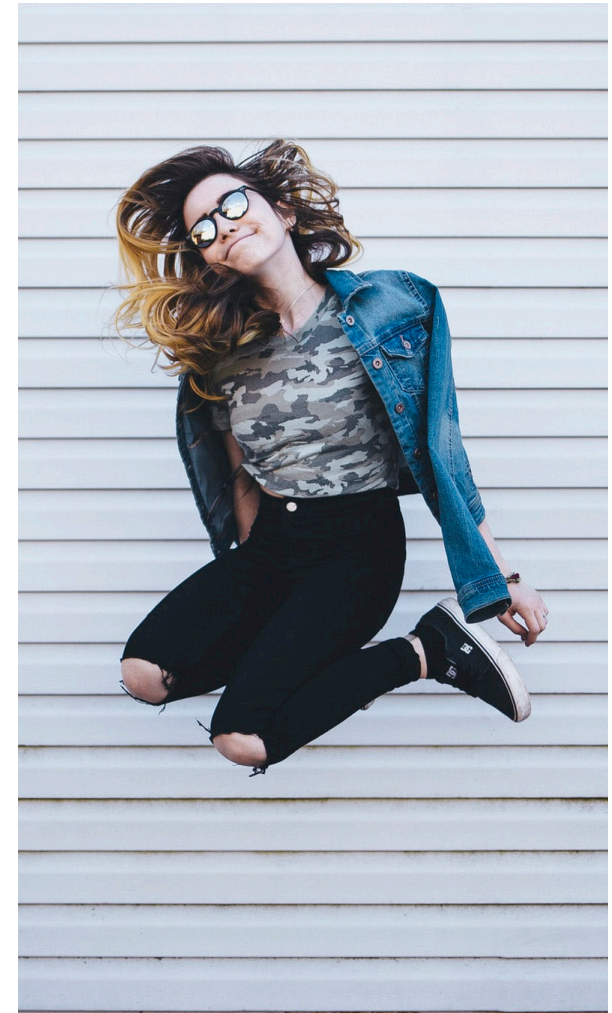
Energetic: 

Tech Savvy: 

### Bio:

Aiden Brown is a bachelor student majoring in Biology at UC Berkeley. She lives close to the campus, so she usually walks to school to attend classes. In her free time, she works a part-time job tutoring middle school math. Aiden is very outgoing and has a lot of friends. They often hang out in Berkeley or downtown San Francisco. They usually take BART to San Francisco due to the pricey parking in the city. Sometimes they stay until late at night. In that case, she will take an Uber back home because she feels it's unsafe for her to ride BART during the night time.

*"I wish I didn't need to take Uber as often. It can be costly."*



## Persona 2

### Eden Mack

👤 Age: 34

📍 Location: San Francisco, CA

👔 Occupation: Web Designer

👫 Status: Married

Extroverted: 

Cautious: 

Energetic: 

Tech Savvy: 

### Bio:

Eden is a web designer based in San Francisco. He lives with his wife in a small apartment, and they don't have a car. They think that it's a pain to drive and find a parking space in San Francisco. The church that Eden goes to is in Fremont. He often goes there on Friday night and comes back on Sunday. Eden likes to play on his phone and listen to music while riding the BART. His wife always tells him not to be too attached to his phone, because she worries about his safety, especially during the night time.

*"I wish the BART will have a safer environment so that people don't have to worry about this all the time."*



## Persona 3

### Brianna Perry

👤 Age: 44

📍 Location: Alameda, CA

👔 Occupation: Store Manager

👫 Status: Married

Extroverted: 

Cautious: 

Energetic: 

Tech Savvy: 

### Bio:

Brianna works in the GAP retail store in San Francisco as the store manager. She lives in Alameda with her husband and their younger daughter. Brianna rides BART to work, five days a week. Since she always rides the BART during the rush hour, she usually experiences a very packed train. Brianna loves reading books and often reads a book while riding the BART. However, due to the limited space, she isn't always able to do that. She also hates the smell of the train, especially when there are a lot of people in it.

*"I wish BART could be cleaner. It's such a pain to deal with the smell and the dirty train everyday."*



## Persona 4

### Charles Mcgrath

👤 Age: 54

📍 Location: Alameda, CA

👔 Occupation: College Professor

👫 Status: Married

Extroverted: 

Cautious: 

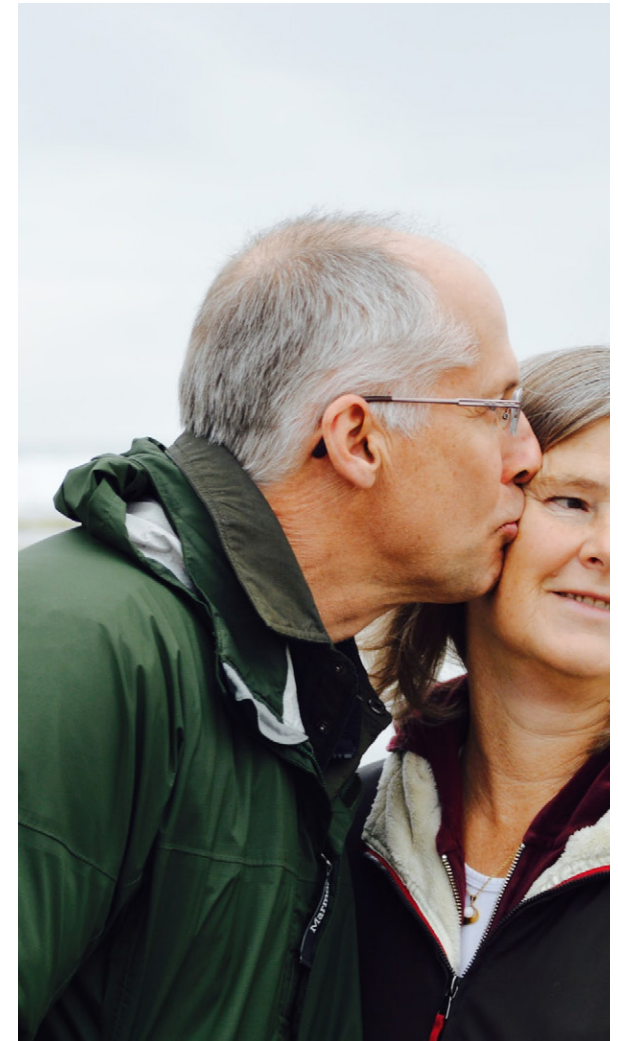
Energetic: 

Tech Savvy: 

### Bio:

Charles Mcgrath is a professor who teaches college math at Diablo Valley College in Pleasant Hill. He moved to Emeryville with his family from Boston one month ago. Due to the heavy traffic during the rush hour, Charles decided to start taking the BART to work. However, he finds himself is not used to the BART system. He has problems when he purchases tickets and is confused about the train direction. Transfers are sometimes an issue too. Charles can't always hear the BART driver's voice clearly, so he has missed the transfer station a couple of times. He is hoping that he will get used to it soon.

*"I hope I don't get lost taking the BART today."*





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## POV Exploration

Use the point of view method to determine the problem and try to find the root cause of that problem

Format: [User] needs a way to [Verb] because [Surprising Insight]

### Persona 1: Aiden Brown

[Aiden] needs a way to feel safe while riding BART at night because private transportation is expensive

[Aiden] needs a way to commute across the Bay Area because she likes to go out with her friends

[Aiden] needs a way to arrive at her destination safely because BART has a bad safety reputation

[Aiden] needs a way to control her motion sickness because the BART halts unexpectedly

[Aiden] needs a way to get to her destination on time because BART has unexpected delays

[Aiden] needs a way to arrive at her destination on time because BART does not want to lose customers

[Aiden] needs a way to call for help quickly because she's concerned about her safety when riding alone

[Aiden] needs a way to meet her friends on time because she takes the BART to get across the bay area

## POV Exploration

### Persona 2: Eden Mack

[Eden] needs a way to [safely guard his possessions] because [he wants to entertain himself while riding the BART]

[Eden] needs a way to [stay vigilant while riding the BART] because [his wife is worried about his belongings being stolen]

[Eden] needs a way to [feel safe with his belongings] because [BART's report system is not trustworthy]

[Eden] needs a way to [report a lost item] because [BART's reporting system is unclear]

[Eden] needs a way to [keep his belongings secured] because [the BART has robberies in crowded trains]

[Eden] needs a way to [feel comfortable without being bothered while riding the BART] because [it makes him uncomfortable and awkward when strangers talk to him]

[Eden] needs a way to [feel safe while listening to music] because [he can be distracted being entertained if something happens on the BART]

[Eden] needs a way to [feel secured for his safety] because [BART has violent crime reputation]

[Eden] needs a way to [store his bike easily on the BART] because [it's challenging to take a bike on board during rush hours]

[Eden] needs a way to [keep his bike safe from damage] because [the BART has no secure way of securing the bike]

[Eden] needs a way to [trust the BART's security] because [the city's resources of law enforcement can be used for better purposes at somewhere else]

## POV Exploration

### Persona 3: Brianna Perry

[Brianna] needs a way to find a place to sit on the BART because she likes to read while riding the BART

[Brianna] needs a way to feel comfortable using the BART services because the BART has bad hygiene

[Brianna] needs a way to safely contain herself because the BART gets overcrowded

[Brianna] needs a way to feel convenient while taking the BART because she has concerns about her health

[Brianna] needs a way to deal with the odor with the BART because it makes her riding experience uncomfortable

[Brianna] needs a way to have a more pleasurable experience riding the BART during rush hour because the overcrowding of BART doesn't allow her to do anything

[Brianna] needs a way to protect her hearing because the BART gets really loud and noisy

[Brianna] needs a way to safely store her belongings on the BART during rush hours because it is good etiquette to take off your backpack for more space for riders

[Brianna] needs a way to sanitize her hands because the BART environment is very dirty

[Brianna] needs a way to feel clean on the BART because the BART has not updated its old facilities and equipment

## POV Exploration

### Persona 4: Charles Mcgrath

[Charles] needs a way to [find out ticket prices easily] because [the ticket price information on the graph is unclear]

[Charles] needs a way to [transfer trains successfully without getting lost] because [he is a new rider to the BART]

[Charles] needs a way to [navigate through the BART station] because [the stations are confusing when navigating through]

[Charles] needs a way to [know what train to get on to] because [the trains all look the same and are not color-coded]

[Charles] needs a way to [understand how to buy a ticket] because [the ticket machine is confusing]

[Charles] needs a way to [find out what station he stops at] because [the signs and loudspeakers are unclear on what stop the rider is at]

[Charles] needs a way to [know how long the BART ride will be] because [the BART does not display this information]

[Charles] needs a way to [secure his BART ticket] because [the rider does not want to pay twice for riding the BART]

[Charles] needs a way to [know how many stops on his ride in order to transfer] because [he can miss his stop and fail to get on to next train]

## HMW Exploration

"How Might We" explorations based on every person's point of view. Going through different angles to define the problem and get inspired.



### Aiden Brown

- 👤 Age: 21
- 📍 Location: Berkely, CA
- 🎓 Occupation: Student
- ♀️ Status: Single

#### **AMP UP THE GOOD:**

- HMW make private transportation more affordable?
- HMW help solo commuters on BART find reliable commute buddies?
- HMW help solo commuters on BART have better self-defense ability?

#### **REMOVE THE BAD:**

- HMW separate the questionable people from other passengers?

#### **EXPLORE THE OPPOSITE:**

- HMW help to ease commuter's tension when they are running late on schedule due to BART's delay?

#### **QUESTION AN ASSUMPTION:**

- HMW always keep BART on schedule?
- HMW provide backup transportation options for BART rider in case BART delay has occurred?

## HMW Exploration



### Aiden Brown

👤 Age: 21

📍 Location: Berkely, CA

🎓 Occupation: Student

👤 Status: Single

#### **GO AFTER ADJECTIVES:**

HMW makes the solo passenger feel confident when riding on BART?

#### **ID UNEXPECTED RESOURCES:**

HMW encourage riders to help look after each other?

#### **CREATE AN ANALOGY FROM NEED OR CONTEXT:**

HMW make the BART has smooth movement?

#### **PLAY POV AGAINST THE CHALLENGE:**

HMW makes the BART be the top transportation that people want to choose?

#### **CHANGE A STATUS QUO:**

HMW make questionable people behave on the BART?

#### **BREAK POV INTO PIECES:**

HMW remind BART riders to get on to BART earlier than their planned schedule to leave room for any potential delays?

## HMW Exploration



### Eden Mack

👤 Age: 34

📍 Location: San Francisco, CA

👔 Occupation: Web Designer

👫 Status: Married

#### **AMP UP THE GOOD:**

HMW enhance BART rider's watchfulness for their personal belongings?

HMW encourage BART riders to bring other people's lost item to the BART lost and found center?

#### **REMOVE THE BAD:**

HMW prohibit the behavior of asking for money from BART riders?

HMW forbid people to ride the BART who has a criminal record of stealing?

#### **EXPLORE THE OPPOSITE:**

HMW make BART riders feel pleased when there are strangers talk to them?

#### **QUESTION AN ASSUMPTION:**

HMW eliminate the violent crime on BART?

HMW dismiss the BART rider's concern about safety?

HMW eliminate the robberies on BART?

HMW make bikes available at all stations so riders don't need to carry the bike on the BART?

#### **GO AFTER ADJECTIVES:**

HMW make riding BART be an exciting adventure instead of being dull?

HMW make BART riders more willing to communicate with other passengers?



## HMW Exploration



### Eden Mack

👤 Age: 34

📍 Location: San Francisco, CA

👔 Occupation: Web Designer

👫 Status: Married

#### **ID UNEXPECTED RESOURCES:**

HMW encourage BART riders to step forward when they see stealing happens?

HMW utilize the crowd to make the BART safer?

#### **CREATE AN ANALOGY FROM NEED OR CONTEXT:**

HMW make the BART like a leisure facility? Like a movie theater?

#### **PLAY POV AGAINST THE CHALLENGE:**

HMW make BART riders not to worry about their personal belongings?

HMW make BART riders feel protected by the city's law enforcement?

#### **CHANGE A STATUS QUO:**

HMW make guarding personal belongings to be an easy task that doesn't require BART rider's attention?

HMW make storing a bike to be an easy task for BART riders?

HMW use bike storage space on BART more efficiently?

#### **BREAK POV INTO PIECES:**

HMW entertain BART riders?

HMW help protect the rider's personal belongings?

## HMW Exploration



### Brianna Perry

👤 Age: 44

📍 Location: Alameda, CA

👔 Occupation: Store Manager

👰 Status: Married

#### **AMP UP THE GOOD:**

HMW encourage BART riders to help maintain/improve the hygiene of the BART?

#### **REMOVE THE BAD:**

HMW limit the max number of riders per train to have more space for riders?

HMW remove bacterias from the BART facilities?

#### **EXPLORE THE OPPOSITE:**

HMW make BART riders enjoy to ride with a crowded train?

HMW make riders feel fresh while riding the BART?

HMW make BART riders to willing ride in a different time so that the rush hour could be less crowded?

HMW make BART riders have a peace of mind that there is always support?

#### **QUESTION AN ASSUMPTION:**

HMW create a super clean environment for BART?

#### **GO AFTER ADJECTIVES:**

HMW help BART riders to easily contain themselves when the BART gets crowded?

HMW make BART riders enjoy the air while riding the BART?

## HMW Exploration



### Brianna Perry

👤 Age: 44

📍 Location: Alameda, CA

👔 Occupation: Store Manager

👫 Status: Married

#### **ID UNEXPECTED RESOURCES:**

HMW utilize the source of BART riders to provide emergency help to other riders?

#### **CREATE AN ANALOGY FROM NEED OR CONTEXT:**

HMW make the BART station like a cruise?

HMW help BART riders always safely contain themselves?

#### **PLAY POV AGAINST THE CHALLENGE:**

HMW make BART be the place that people want to stay and enjoy?

#### **CHANGE A STATUS QUO:**

HMW make BART riders ride safely without interact with the BART facilities?

#### **BREAK POV INTO PIECES:**

HMW protect BART riders hearing?

HMW help people to sanitize whenever they feel it's needed?

## HMW Exploration



### Charles Mcgrath

👤 Age: 54

📍 Location: Alameda, CA

👔 Occupation: College Professor

👫 Status: Married

#### **AMP UP THE GOOD:**

HMW make BART's ticket information appealing to its riders and more competitive to other transportations?

HMW bring the color-coded map concept into more places for BART?

HMW make buying ticket a simpler task?

#### **REMOVE THE BAD:**

HMW make the BART ticket not easy to lose?

#### **EXPLORE THE OPPOSITE:**

HMW make new BART riders find riding BART is exciting and easy?

HMW help BART riders to easily know how to ride BART without learning a lot of new information?

#### **QUESTION AN ASSUMPTION:**

HMW remove the ticket system in the BART station and use something else?

#### **GO AFTER ADJECTIVES:**

HMW make BART riders feel confident about riding the BART?

HMW make BART riders clearly knows how far are they from their destination?

HMW make BART riders who are lost in the BART station feel entertained?

## HMW Exploration



### Charles Mcgrath

👤 Age: 54

📍 Location: Alameda, CA

👔 Occupation: College Professor

👫 Status: Married

#### **ID UNEXPECTED RESOURCES:**

HMW use those buskers at BART stations to help riders navigate in BART stations and get information easily?

#### **CREATE AN ANALOGY FROM NEED OR CONTEXT:**

HMW make the BART station like an art gallery?

#### **PLAY POV AGAINST THE CHALLENGE:**

HMW make people trust BART's price system that they know they are riding in the cheapest way?

#### **CHANGE A STATUS QUO:**

HMW make the BART's train information less confusing?

HMW make the BART riders always knowing where are they at and how far are they from the destination?

#### **BREAK POV INTO PIECES:**

HMW make train stop information on the BART more clear?

## Private Interview: 2nd Round

Another round of private interviews are conducted in order to dig deeper with more specific questions.

### INTERVIEW 1:

Name: Chris

Occupation: Student

Location: East Bay

*Do you ever worry about your personal belongings when you ride the BART?*

Yes I do, usually when it's crowded.

*Ok, where do you usually feel insecure about your belongings?*

Usually when I am riding, when it's **crowded** or if I **fall asleep** or something like that.

*I see, so is it like that you will feel insecure in certain situations?*

Yes.

*Why would you feel insecure in those situations?*

Yea I had an experience before when I was riding, I fall asleep once and **a guy was trying to take my cell phone**. I've been seeing people that when they fall asleep that they are not cautious about their stuff. Also when it's crowded...

*I see, is there a certain time that you are more worried about your items?*

Usually when it's crowded, and as far as time, maybe **night time** I will cautious more.

*What items do you usually carry when riding the BART?*

Usually my **phone**, my **wallet**, and if I am going to school, going to class, or go to work I'll probably take my **laptop** along with my **backpack**.

## Private Interview: 2nd Round

*Ok, are there any items that you worry more about?*

I will say probably my **wallet**, my **phone**, and my **laptop**.

*I see, where do you usually keep them when riding the BART?*

I usually carry my wallet and my keys in my pocket. Usually my laptop I will have it in my backpack.

*Ok, where do you put your backpack?*

Usually, when I am standing, I will have it **in front of me**. If it's crowded I will keep it in front of me on the ground. If I am sitting down I will usually have it on my lap so people can sit, or I will put it below on my shoes.

*Do you feel secure with your items this way?*

Yea as long as **I can be with it, or physically see it**, or you know, even have it close by. I've been seeing people taking a nap and they will sit on their backpack, or even wrap it around on themselves or keep it in the front.

*So physically touching or be able to see your items make you feel better?*

Yes kind of, as long as it's been seeing.

*Alright, do you wish to have something that helps you to take care of your personal belongings easier?*

Yes, I definitely do.

## Private Interview: 2nd Round

### INTERVIEW 2:

Name: Yanan

Occupation: Student

Location: East Bay

Do you ever worry about your personal belongings when you ride the BART?

Yes, of course I will. That's why I always check my belongings every 5 to 10 minutes, or even just carry them in front of me. Well, I think it might also be related to my previous experience, I used to live in Beijing so I am being careful.

I see, is worrying about your items something that only on BART for you? Or do you just worry about them all the time? I think I worry it about them in most of the public areas, my personal belongings.

Ok, when it's related to the BART, at what areas that you worry the most?

I feel like when I am **entering the station** or **waiting for the train**, as long as there is no one really close to me, I don't really worry about it. Then, in the BART, if I am sitting down, I am less concerned about my items. However if I am standing and there is a male stranger nearby, I will worry about it.

*Why is that? A male stranger?*

I think the feeling, the vibe is less safe. It really depends on how they look.

*Do you feel more insecure when there are fewer people or more people?*

If it's during the daytime, I won't worry too much. However, if there are too many people in the daytime I will still worry about it. If it's **during the night time then I will worry about it all the time.**

*It sounds like most of your fear comes from surrounding people?*

Yes!



## Private Interview: 2nd Round

*In this case, what are the items that you usually carry with you on the BART?*

Sometimes I take BART to the airport, in that case, I will carry a lot of stuff, but actually, I won't worry too much in that case because there are too many and I don't think someone could easily steal it. I **worry more about my small items**. One thing is that I don't really carry cash around, so my cell phone is something that I worry the most.

*Ok, what do you usually do when you riding the BART?*

I usually play with my cell phone.

*Do you still worry about your cell phone while you're using it?*

Sometimes I will put it in my pocket, especially when I am leaving the station, so yea I still worry about it.

*What do you do to help yourself feel more secure about it?*

I **hold on to my phone**, touch it.

*Anything else that you also worried about?*

I've also brought my iPad to BART before, and it was in my backpack that I was carrying it behind me, so I was really worried. Sometimes I will carry the backpack **in front of me**.

*Why would you put it in front of yourself?*

I feel more secure that way.

*If there is something that will help you to take care of your belongings better, would you like to try it?*

Yes of course!

## Private Interview: 2nd Round

### INTERVIEW 3:

Name: Xu

Occupation: Teacher

Location: East Bay

*Do you ever feel insecure about your personal belongings while traveling with BART?*

Yes, **all the time**.

*Usually, where would you feel insecure about it?*

Usually on the BART.

*Why is that?*

When there is not a lot of people, but there are a couple of people that look like they are suspicious, or **if they sit really close to me**.

*Is there a specific time that you feel unsafe?*

It's the **worst in the night**, but you know it could happen anytime... You never know.

*Have you had a bad experience before?*

Not myself, but my friend got robbed before, he got his phone stolen and he told me about it.

*Hearing this story makes you feel unsafe?*

Yes, I was like...oh man.

*Could you please tell me a little more about what happened to your friend?*

Yea so he wasn't alone actually, he was with another friend, and the person was sitting behind them and he basically had a gun or a knife I don't remember. He was not sure if that person pulled it out, but that person said you just need to hand it (cell phone) to me and you will be OK. So they didn't want to look back and take the chance, so they just handed it over and that person ran away. Because he **timed it** so that it was almost at a stop, **so as soon as the door opened he just ran**.

## Private Interview: 2nd Round

*It sounds like whoever did that wanted it to be a quick action?*

Yes, they just want to **take it and run**.

*What items do you usually carry while riding the BART?*

**Backpack** or **purse**, sometimes maybe a **laptop**, **iPad**, mostly digital devices.

*What do you worry about the most?*

iPad or computer cause all my notes is on it. Other than that will be my wallet because it has my license...blablabla, if it gets lost it's very inconvenient.

*Ok, is it the value of the item or the inconvenience you care more about?*

Inconvenient, because I won't remember what cards I have in there and it will be more money to have them replaced...

*Is there something that you will do to make yourself feel more secure and comfortable?*

You know for the purse, you could carry it on one shoulder or crossbody, I will go more **crossbody**. Then I will **keep a hand on it**.

*How about backpacks?*

For backpacks, I will **hug it**. Just try to **cover more**. Even when I am walking, I will have it **in front of me** and hug it cause my wallet is usually in the smallest pocket and if I hug it, it's better.

*Do you still worry about your items if you're already hugging it?*

I will watch the area but I will try to look not very obvious that like "I am looking at you". It just like... you know, **constantly be aware of the surroundings**.

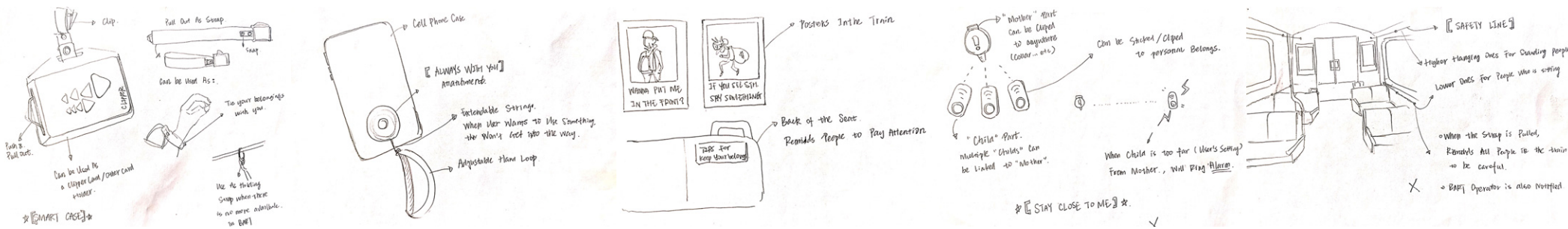
*If there is something that helps you with taking care of your belongings while riding the BART would you like to try it?*

Of course, yes.

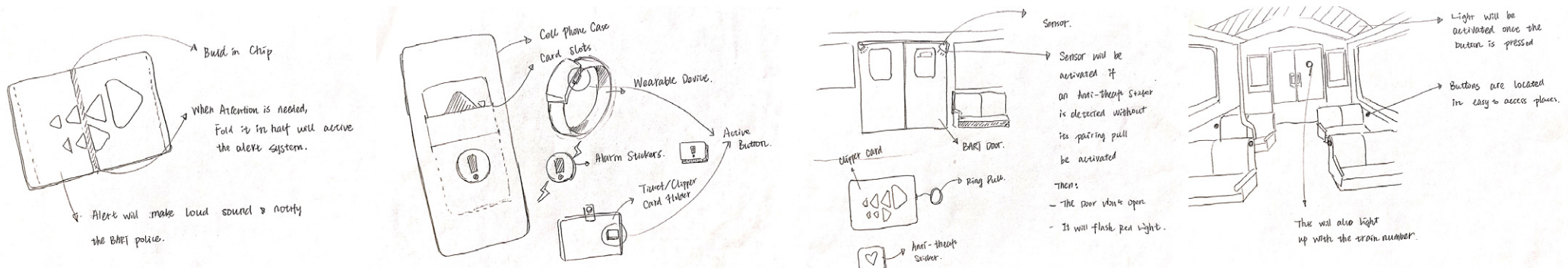
# Find the Root Cause

Finalized a couple HMW statement and brainstorm of ideation for possible solutions.

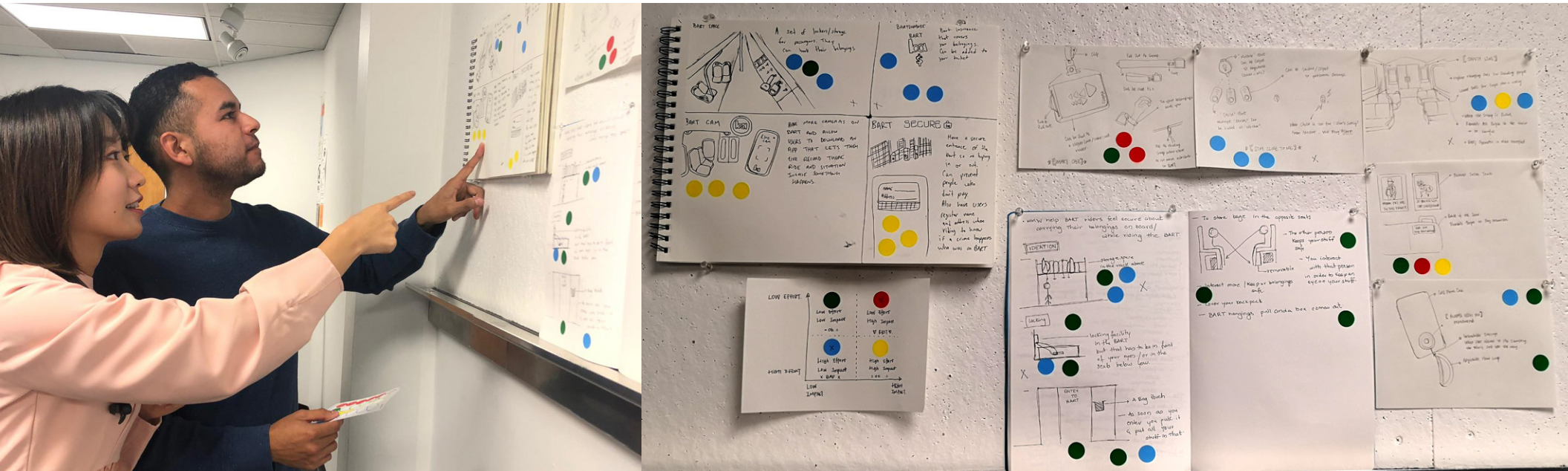
### HMW help BART riders feel secure about carrying their belongings on board?



### HMW help BART riders get attention quickly in case of theft of their belongings?



## ➤ Determine the Root Cause



The root cause of a lot of problems is from **unwanted/suspicious people**. Usually, those people don't pay for BART.

An **estimated 22,000 people ride the BART every day without paying**. Fare evasion costs BART between an estimated **\$15 million to \$25 million each year**. If we could reduce BART fare evasion. We could help with:

Reduce the unwanted people on the BART, **helps with the packed train during rush hour**.

Save money for BART so they can use it to **improve the BART service/facility**.

Final HMW Statement

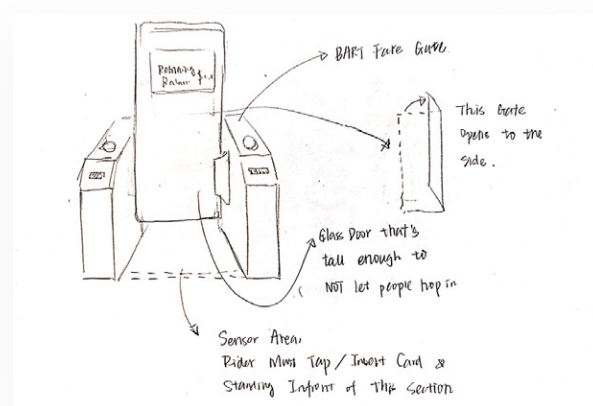
## Problem Statement

How might we prevent fare evasion from non paying BART riders by improving the entrance gate security?

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## Ideation

Brainstorm on possible solutions to prevent non paying riders for BART

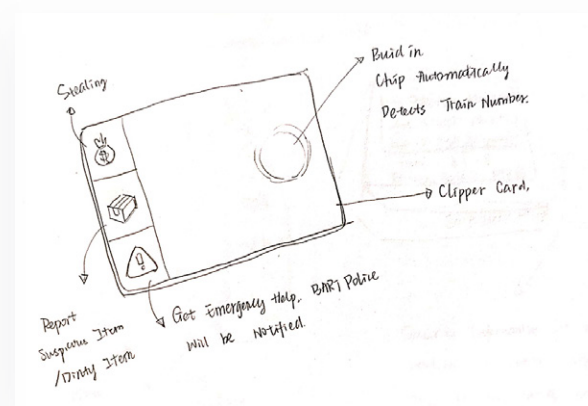


### BARGATE

Use see-through gate that's tall enough to block anyone who tries to cheat on the fare ticket

The sensor is located on the entrance of the gate, the user must be standing behind it in order to insert the ticket

The door opens to the side allow one person get through

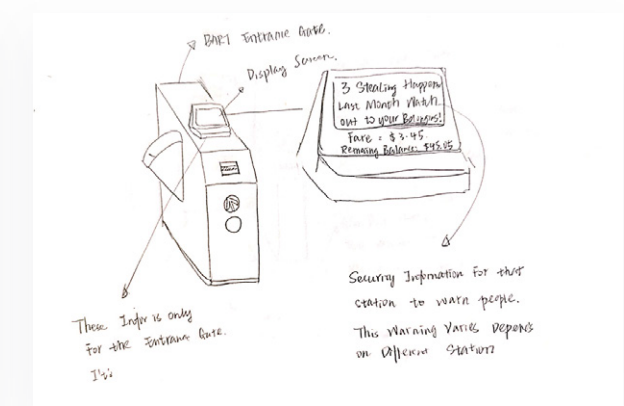


### CLIPPERGENCY

Three buttons on the clipper card

Report stealing button, suspicious item button, and emergency help button

The card has a built-in chip. When used, the train number and location will be automatically sent to the police



### BE CAREFUL

On the fare display screen of the fare gate, make it bigger and display the information to help riders be aware of safety issues

Each station might have different information depends on the station safety report statistics

Gate for entrance and gate for exit will have different information



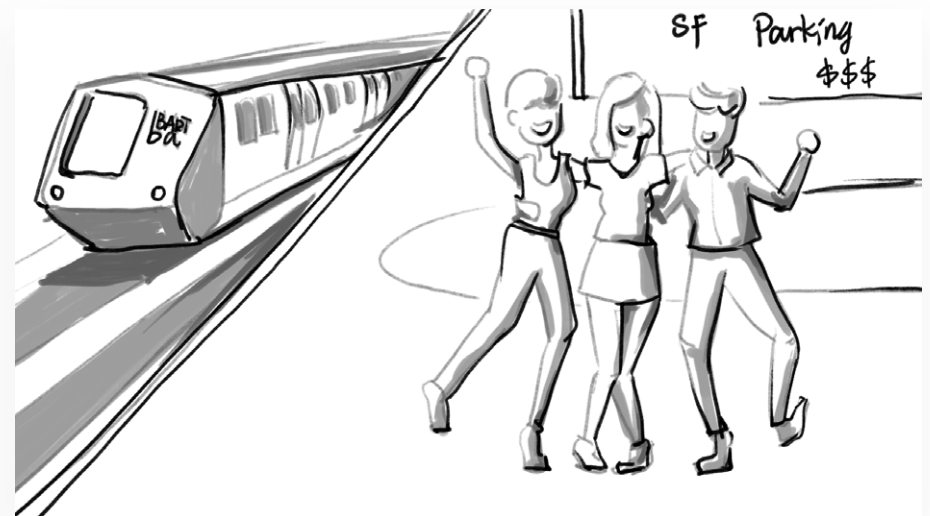
## Storyboard

Sketch a storyboard to see if users are willing to use this newly designed gate



Description:

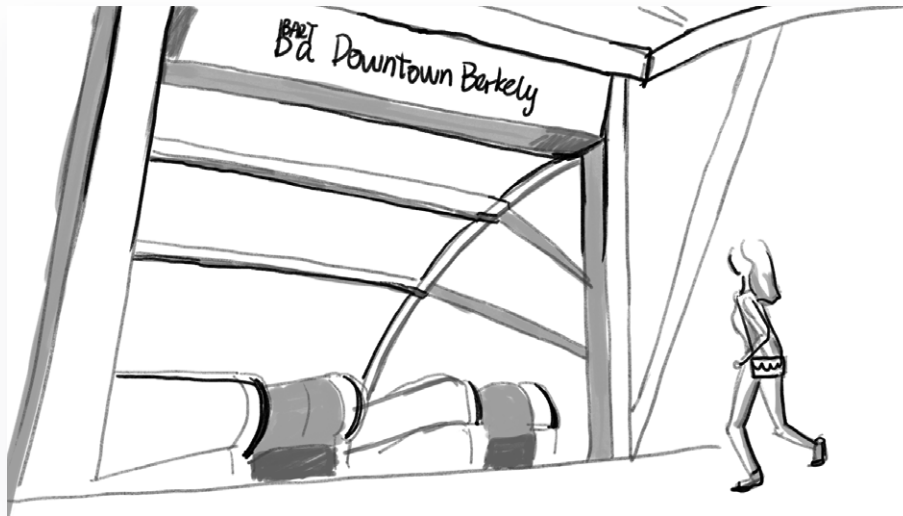
Aiden is an undergraduate student majoring in Biology at UC Berkely. She is very outgoing and loves to hang out with her friends on Friday night and weekends.



Description:

They like to hang out in downtown San Francisco and usually take BART there due to the pricey parking in the city.

## Storyboard



### Description:

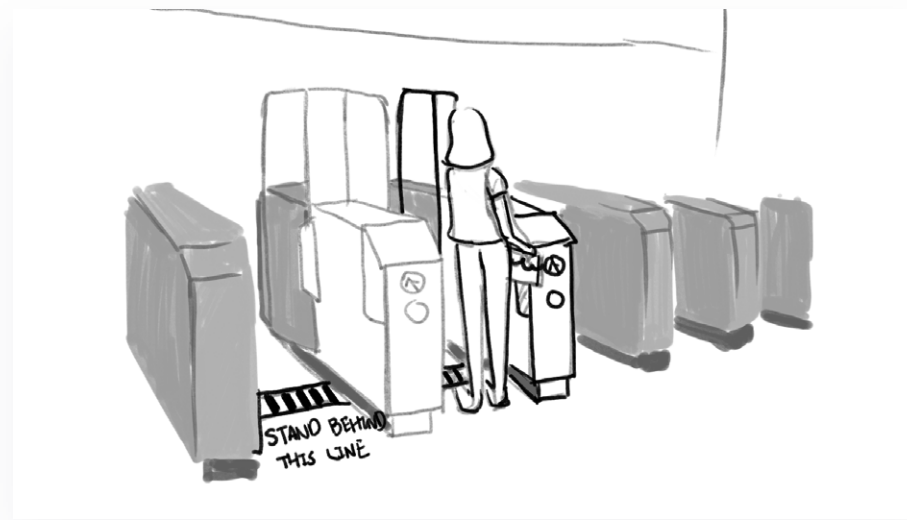
It's a Friday night, she has a plan with her friends in one of the bars in downtown San Francisco. Aiden took her purse and walked to the Downtown Berkeley BART station which is very close to her apartment.



### Description:

When she arrives at the station, she found that the new fare gate now is ready to use. It's a tempered glass gate that's a lot taller than the old gate.

## Storyboard



### Description:

Aiden walked towards one of the gates and saw there is a sign on the floor stating that the rider needs to scan their card behind this line. She then hands her purse closer to the sensor located on the gate base (She has her clipper card in her purse and there is no need to take it out).



### Description:

The glass gate displays her clipper card balance information when the sensor detects her card.

## Storyboard



### Description:

The glass door displays her fare balance and then opened while she walks close to it (This is to prevent people from following others to get through the gate without paying for the fare ticket).



### Description:

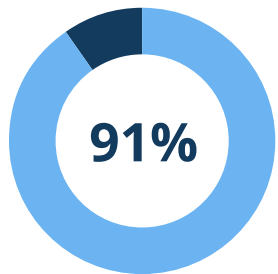
The glass gate closes right after she passed it. She felt it was convenient that she didn't need to take her clipper card out during the process.

## Survey Data

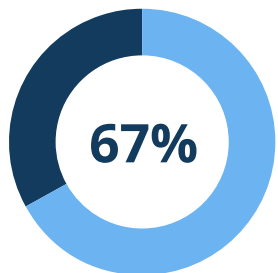
Survey result about the 1st prototype: the storyboard



**ALL** of the participants believe that this gate is **easy to use**.



The **majority** of the participants **prefer the new gate** over the old gate.



**Most** of the participants **feel safer** with this new fare gate.

### ADDITIONAL COMMENTS:

"Show estimate time of the BART."

"Install something like a mirror so I can see if anybody is trying to follow me."

"I don't want to see my balance is shown on the gate."

"Maybe another gate before you scan so only one person can go at a time."

"Maybe add the time table of next BART, so I can decide to run or not."

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## Prototype 2: Cardboard Mockup

Based on the feedback from the storyboard survey. A low-fidelity cardboard mockup is made and tested with 20 participants on the street.

### OVERVIEW

All of the participants **prefer this gate** over the current gate.

They think that the **higher gate is good**.

One lady said that she's seen many people just jumping over the current gate. She is upset about it that she has to pay for the ticket, but there are people will ride it for free.

People think that this gate **will prevent ticket evasion**.

### FEEDBACK ABOUT THE MATERIAL

People like the glass gate because it will look nice. However, there is concern about it:

Two people mentioned that **if it's a glass door, people might try to break the glass**.

**Acrylic** material could be another option. The con side of it will be that after a while it will get **dirty** and **ugly**.



## Prototype 2: Cardboard Mockup

### FEEDBACK ABOUT THE DOUBLE GATE DESIGN

Based on some people's concern that people will squeeze in by following other riders. We tested it with two different methods. [Single gate and double gate](#), to see what people think of it.

[More](#) people prefer to have [two gates](#) to prevent this situation. However, there are some concerns regarding the two gates:

"I am worried that the [traffic will build up](#)"

"[People will be mad](#) about it, at least I will be"

"I am concerned if there someone still follows me, then I [got stuck](#) with that person in a small area"

"If it's two gates like this, they will need to re-build everything and it will [cost a lot](#), I don't think that will happen."





## Prototype 2: Cardboard Mockup

### CONCLUSION

People **like to have a taller gate** and think this will reduce the number of people who cheats on BART fare.

Maybe we could **keep the current gate to be the 1st gate**, and make it automatically opens when people approach it. It will close once the people passed it. The 2nd gate won't open until the 1st gate is closed and the rider tapped/insert the clipper card/ticket.

Consider if **only use this function for the entrance**, not when people exit the station.

**Keep it simple**, the goal is to make it harder or impossible for people to cheats on the BART fare.



## Iteration and Test

Based on the feedback from the 2nd prototype. Another mockup is built and did another round of the test. There was a total of 12 participants.

### OVERVIEW

**ALL** of the participants would **prefer the redesigned gate** over the current one.

Some participants **feel safer** with this gate.

There are **split thoughts** regarding the gate **material**.

Based on the feedback, users had **different thoughts** about the **double gates**. Some people understand it, some people still would like to **stick with a single gate** even though they understand double gates add another level of security.



## Feedbacks on the 3rd Prototype

### COLOR CODE

**RED** text indicates the confusion from the user or what they don't like

**BLUE** is what user liked about

**GREEN** is the feature that the user wants to add

**ORANGE** is the suggestions to the current design

### QUOTE FROM PARTICIPANTS

Add a sign to the gate, because it can be confused to people who already have the impression of the old gate. Instead of having a tall gate, can you just make the scan area higher so it's hard for people to hop over. I want to see the fare, the current screen is too small to see my balance. I like this better than the old gate.

— Michelle

It's good. I can't think of any suggestions. I like it better than the current gate.

— DH

At first, I was confused because I thought I need to pay first and then the door will open. I didn't expect the door will automatically open. I am worried this will slow the process.

— Man



## Feedbacks on the 3rd Prototype

### QUOTE FROM PARTICIPANTS

I like it, it's a good idea. Maybe **show the fare bigger**.

— Jude

Instead of two doors, maybe **a laser to indicate for one person only**. If it's a solid material, maybe put holes on the gate.

— Kris

I like the idea, it's good. I like how it has **holes on the solid material**.

— Michael

I **don't think the fare is needed** on the door because if someone sees I have a lot of balance, they might want to steal it. It was really easy to use because I've seen a similar concept (double gate) in Taiwan. For the BART though, **two gates might be too much**. If someone is rushing to the station. I for sure **prefer this gate** than the current one. I wish I could **see the real-time train schedule on the door**.

— Nicole

It's not difficult, **easy to use**. I like it better than the current gate.

— Jia



## Feedbacks on the 3rd Prototype

### QUOTE FROM PARTICIPANTS

I hope it's a **glass door** so I can see through it, it will be good if it's **tempered glass**. There is always station staff, I think glass will be fine. I am worried if it's a **solid material**, it makes the **environment dark**. The only thing I am worried about is that if someone is in a rush, will **two doors be annoying**. If this double gate is only for the entrance(not the exit), it's fine. I **prefer this gate** than the current gate  
— Summer

I was confused at first in front of the first gate. **Two doors seem inconvenient**, will two-door build traffic? I **like this new gate** better than the current one, it makes me **feel safer!**  
— Xiaoyu

**What if it (two gates) creates traffic?** Other than that, I like it. I was confused at first for the two gates, but after you explained that the traffic builds up on the exit, it makes sense. I am not sure about the holes, I think it could just be transparent. Some people have **tryphobia**. I **like it better** than the current door.  
— Fan



## Double Gates VS Single Gate

Based on the feedback, I decided to do one more survey to see if people prefer to have double gates or a single gate with an explanation of the pros and cons of them.

### DOUBLE GATES

Tall gates prevent people from hopping over the BART gate and minimize fare evasion.

Double gates **prevent** people who **sneak behind other** paid rider to do fare evasion.

This double gate is only used when people enter the BART station, where usually doesn't have traffic even at rush hour.

According to the test, the average speed for participants to complete the process is **1 to 1.5 seconds**.

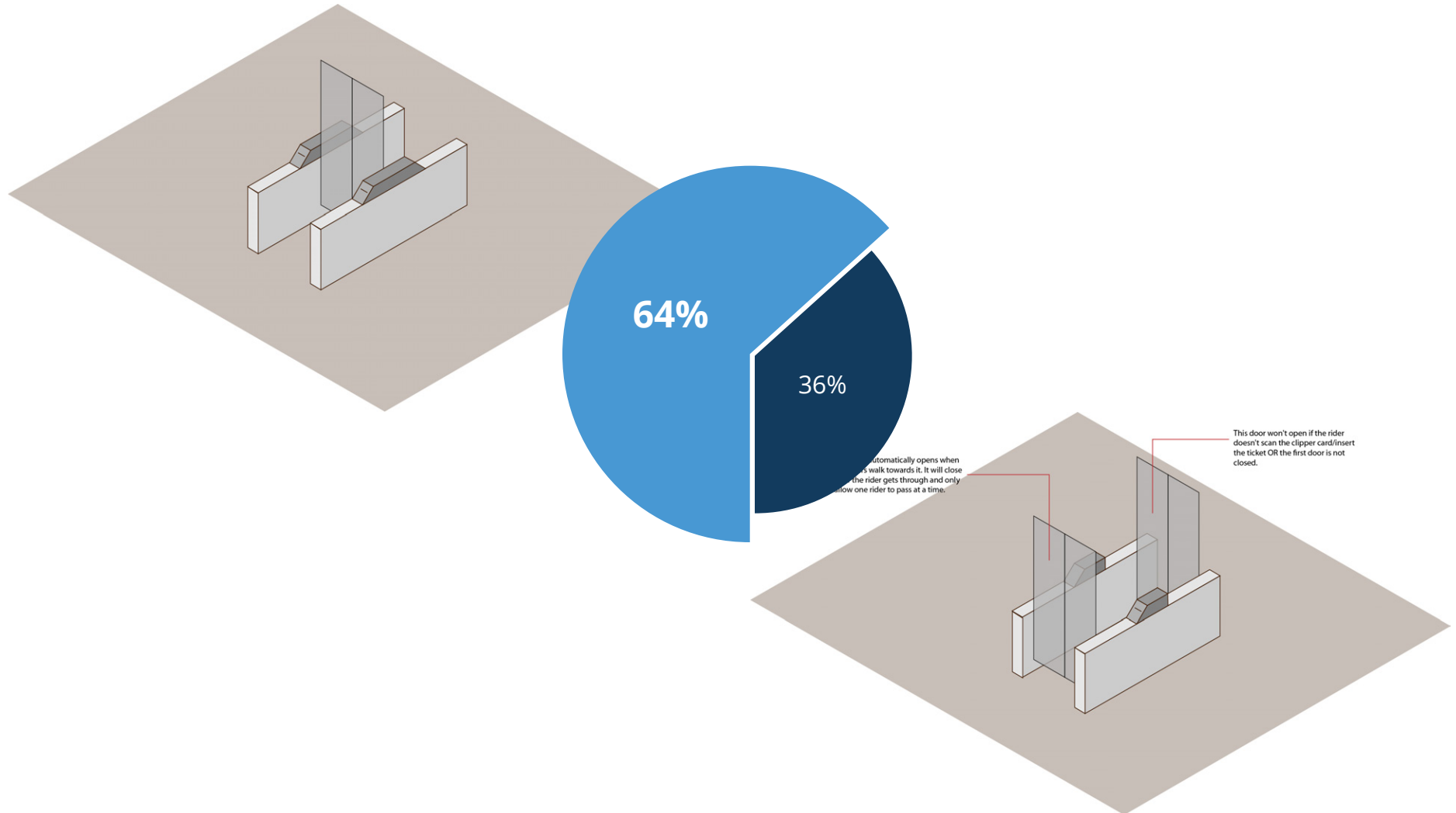
### SINGLE GATE

Tall gates prevent people from hopping over the BART gate and minimize fare evasion.

However, it will not do well on preventing people sneaking behind other paid riders.

## Survey Result

With 22 participants, the majority of people prefer to have a **single gate**.



## Comments from Participants

### DOUBLE GATES VOTER

- I like how it **prevents** people **follow other riders**.
- Seems **safer**.
- For avoiding fare evasion, double gates seem better. Single gates just aimed at who hop over the gate.
- **More security** and looks a lot more **safe** and **cool**.
- Double protection.
- More secure so **less number of weird people** in BART.
- Will be effective in reducing the amount of fare evasion.
- Seems more secure.

### SINGE GATE VOTER

- It can **process quickly** instead of waiting for the door close and open.
- **Easier** to use.
- Hard choice, you know if anyone they want to save money thought this way to fare evasion they always can find a way, it's **unnecessarily designed**.
- The **double gate seems excessive**. The single gate serves its purpose and is more similar to the styles of other countries.
- I prefer to pass through 1 door instead of 2.
- Two doors are **not efficient during the rush hour**.
- I am a little afraid to be **stuck in the middle**.
- Huge costs for double gates.
- I don't see the need to have a double gate as it is doing the same function as that of the single gate and creating a double gate only makes the space more claustrophobic for a person.
- People **run while catching the train** and they would not want to spend much time and one door is sufficient I feel! Also if the system shuts down or has power outages when a person is in between those two doors then it will get hard. So I would go with one door.
- I feel like the **double door is annoying** when I'm in a hurry. If someone still following me into the first gate, what should I do?
- It's **not necessary to have two doors**, it's too serious and not suit for public transportation like this.

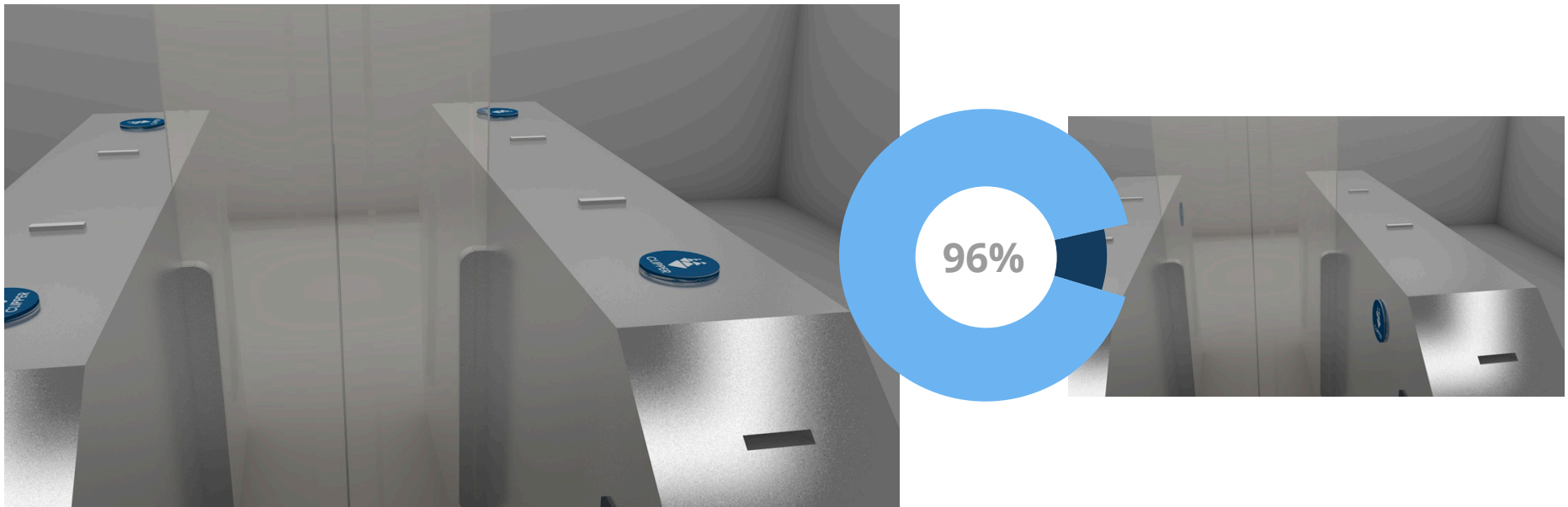


## ▄ A/B Testing for Design Detail

With all the feedback from previous user testing, another A/B testing is created to settle some design details. There were a total of 26 participants.

Location of the clipper card sensor winner:

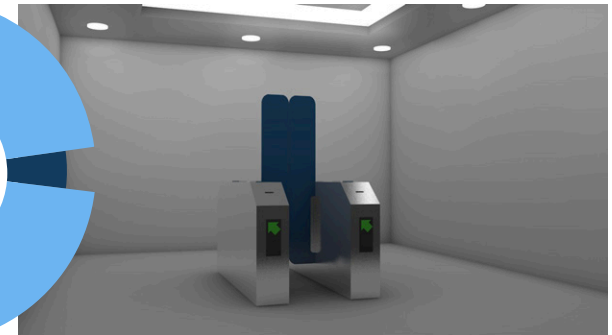
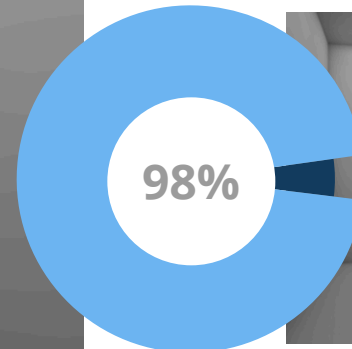
On the top



## ▄ A/B Testing for Design Detail

Gate material winner:

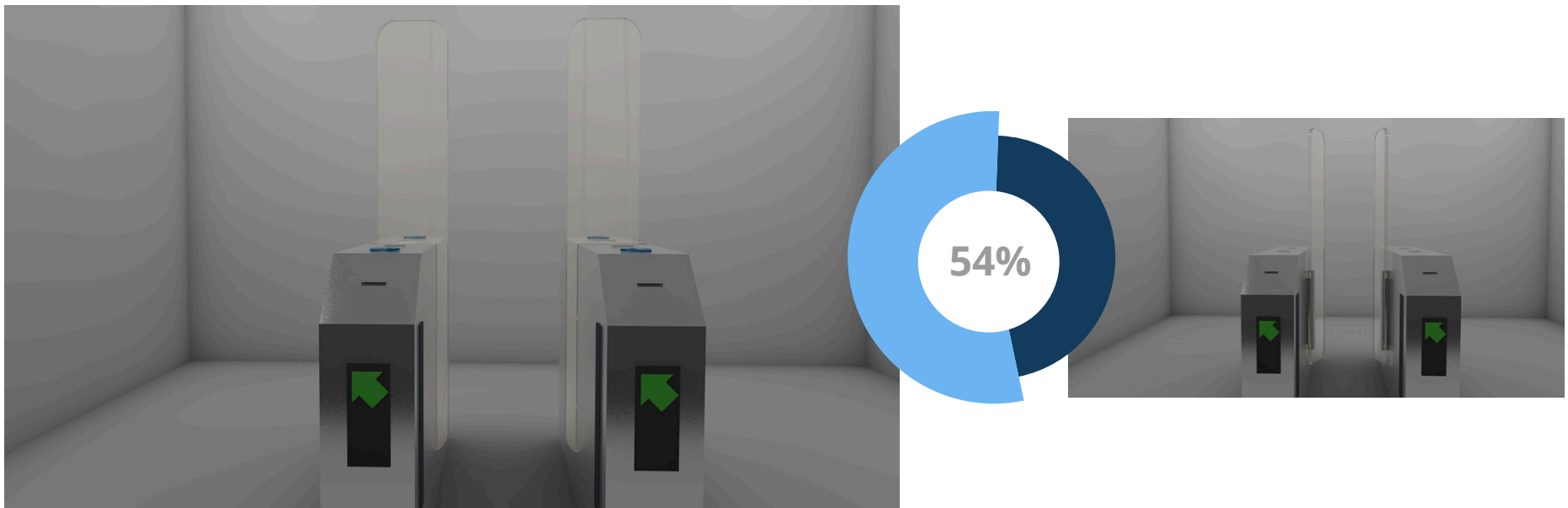
Tempered glass



## ▄ A/B Testing for Design Detail

Gate open option winner:

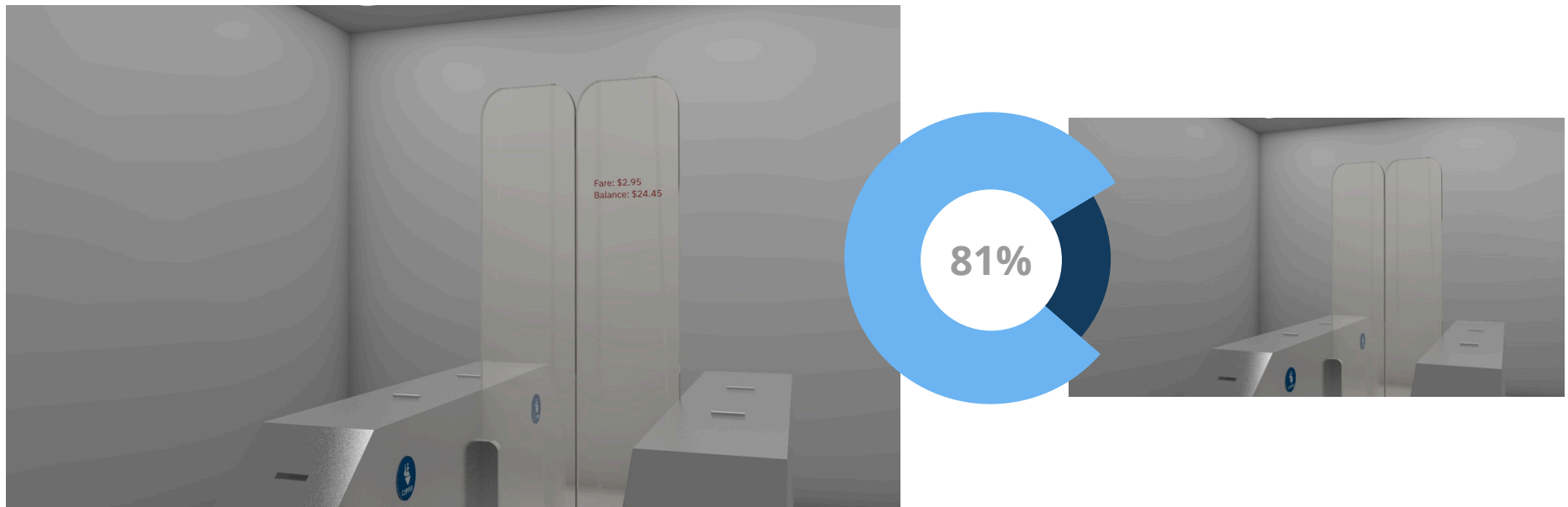
Slide open



## ▄ A/B Testing for Design Detail

Fare display option:

Show the fare on the gate



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## Bargate

A better, safer solution to current BART fare gate



### **EASY TO USE**

Bargate keeps a similar entering process as the current gate. It's easy for people to understand how to use it.



### **SAVES SPACE**

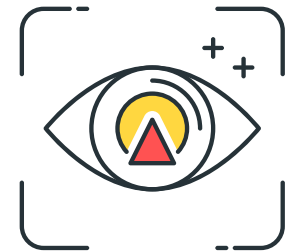
Reversible gate direction allows the gate to be either an exit or an entrance.



### **SECURITY**

The height of the gate prevents people from hopping over it.

The sensor located in the front area will ring the alarm if it detects more than one passenger trying to get through the gate.



### **CLEAR INFORMATION**

Fare balance shows on the gate makes it very easy for the rider to see their clipper card/ticket information. Fare balance will disappear while sliding open to protect the rider's privacy.

## Proof of Concept

# 01 Safety

The height prevents people from hopping over the gate, and the sensor located at the front area will trigger the alarm if it detects more than one passenger trying to get through.



EAVDER SENSOR

## Proof of Concept

02

### Convenient

Clipper card sensor located at the top of the machine for easy to reach.

A 3D rendering of a transit machine, possibly a fare collector or validator. The machine is shown from a perspective view, highlighting its top surface. A blue circular clipper card is placed on the top surface. A white callout line points from the card to a blue rounded rectangular box containing the text 'CLIPPER CARD SENSOR'. The machine has a metallic, brushed metal appearance with some dark grey and red accents.

CLIPPER CARD SENSOR



## Proof of Concept

### 03 Clear Information

Once the rider taps their clipper card or inserts the ticket, their fare balance will show on the tempered glass gate. When the passenger is close to the gate, the fare balance will disappear while the gate is sliding open.

Fare: \$2.95  
Balance: \$24.45

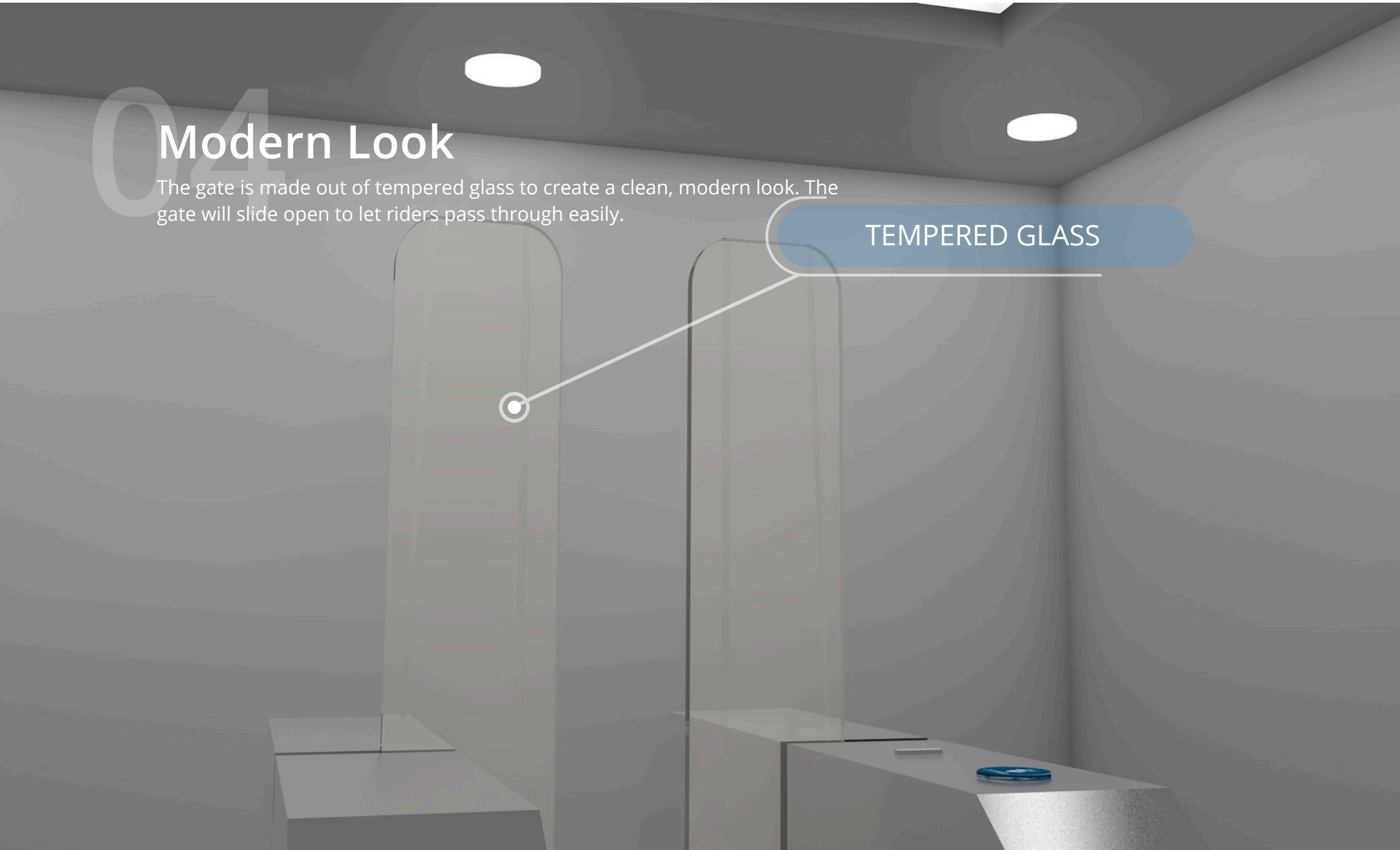
FARE BALANCE DISPLAY

## Proof of Concept

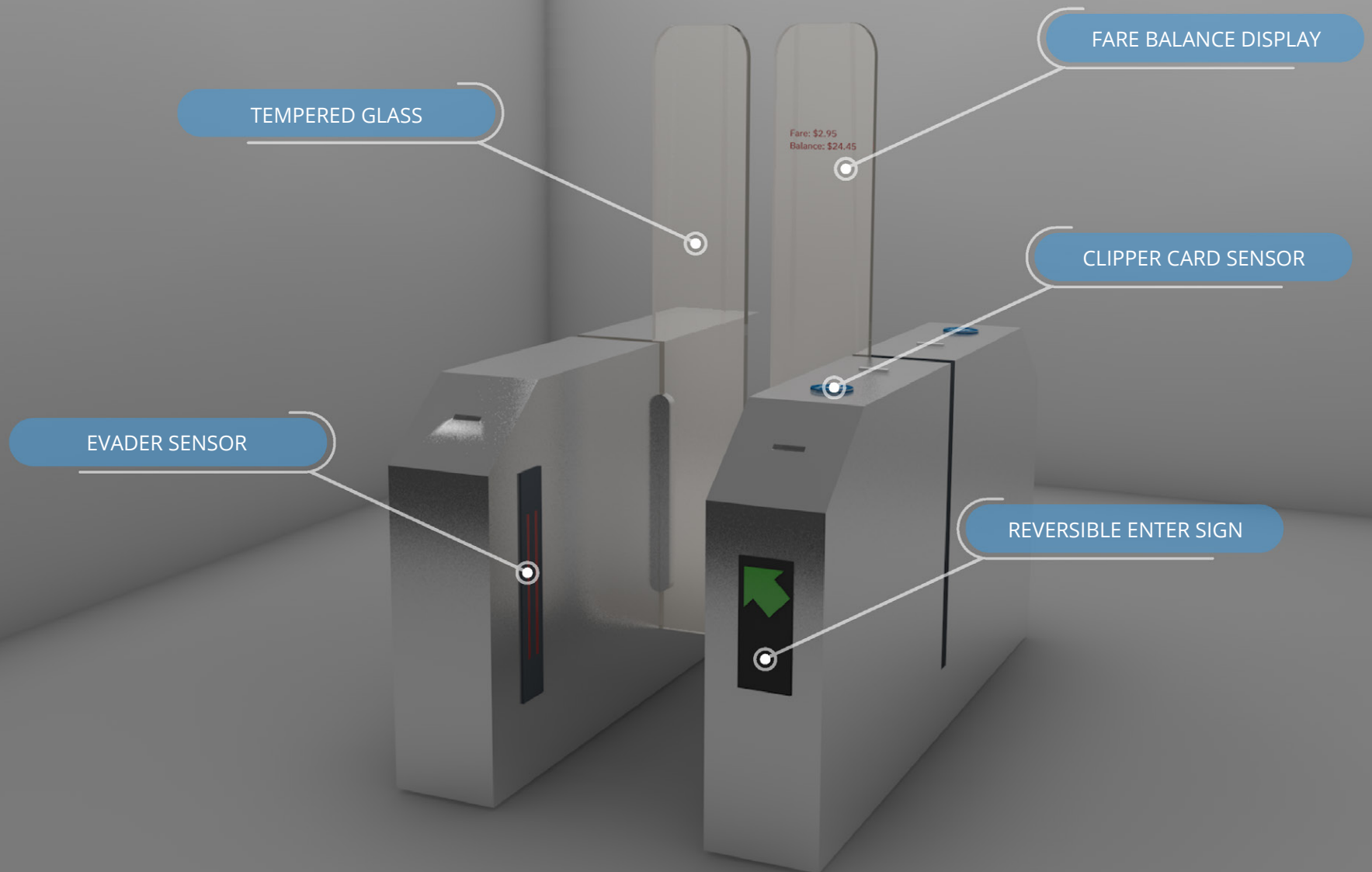
# 04 Modern Look

The gate is made out of tempered glass to create a clean, modern look. The gate will slide open to let riders pass through easily.

TEMPERED GLASS



## Final Design



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## Conclusion

### SUMMARY

Bargate is a redesigned BART gate with high doors that open and close so people cannot hop the gate or sneak up behind other people.

### WHAT WE LEARNED

We learned that research is fundamental. It is essential to start from a user's point of view and don't start with a solution. Use empathy towards the user's concerns. User testing and user research bring insights towards the pain points and needs of users. Human-centered design is useful to achieve a viable solution to a complex problem. We can't solve many problems at once. We must try to address one at a time.

I've also learned that when working in a team, it's very important to see the overall progress and make sure the team is on schedule. It's nice to work in a team because we could bounce ideas and inspire each other.

### NEXT STEPS

Try to have the live prototype on a station and see if fare evasion is affected through the process. Interview and observe how people interact with it.

[View the Concept Video](#)



Team Pathfinders



The Team  
is Assembled

Nov 4th, 2019



The Mission  
is Completed!

Dec 17th, 2019



Bargate

A Better Gate for BART

