Design Thinking Project

Smart Commuting App

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Executive Summary

This design thinking project contains a design that supports public transit users who encounter day-to-day struggles and challenges. In the beginning of our process, we discovered the common problems of public transportation such as late arrivals, seating availability, and change of routes without real-time updates. Next, we utilized methods such as secondary research, diary studies, empathy mapping, and AEIOU to enhance our knowledge on the challenges of public transportation. Then, we defined our problem statement to identify our design focal point. As a group we decided to focus on improving the commuting experience for university students and reduce the negative factors of public transportation.

Through our problem statement, we started to brainstorm and ideate solutions. Our group has developed an application called "Smart Commuting" that is aimed to improve the commuting experience for university students through the use of digital technology and real-time updates. Our prototype consists of features that notify users of real-time updates, provides information about transit routes and environment details, a carpooling system, and many more. Next, we tested our prototype by providing users with a set of tasks to complete on our application. We observed the steps users made and asked for feedback to improve the quality of our application. We received positive feedback on the reliability and layout of our application, however, users recommended improving titles and signifiers of features. Finally, we established major implementations with the use of our user feedback to enhance our application.

Brand Guidelines

Throughout the project we choose to make an App. For creating this app we wanted to keep it very simple and aesthetically pleasing. Our aim was to choose a basic colour palette so that our app does not look very crowded. We chose cool undertones for our colour palette and we also chose white and navy blue colour schene through the app. For typography we only used one font throughout the app. The font is called Poppins. We used only one font to keep simplicity once again. However, we made sure to change the style of it in terms of heading, subheading. light, or dark. This helped us maintain some similarity on all the pages. The only logos we used were related to presto, since the app was based on that. We also used icons and photos of credit cards, apple pay and other payment options. This was because we were catering the option of purchasing tickets on our app. These icons helped understand the option better. Overall,for our app we wanted to maintain some colour scheme and make it look extremely neat which I believe was only possible by using limited colours and fonts.

Logo:

Color Palette:

Hex: #07122A

RGB: (7, 18, 42)

Hex: #45E9A4

RGB: (69, 233, 164)

Hex: #DADADA

RGB: (218, 218, 218)

Typpgraphy:

Poppins

Heading

Sub-Heading

Body

Body Italic

Didot

Heading

Sub-Heading

Body

Body Italic

Chapter 1:

Discovery Stage

Where did we start? / Broad area we focused on our empathy stage?:

How can we improve unwanted, stressful experiences commuting?,
Help with time management for students

What product/service/target audience:

Improving commuting, University Students who lives in on and off campus

Chapter 2:

Empathy Stage

Methods Used:

Secondary Research, Diary Studies, Empathy Mapping, Fly on the wall AEIOU

Secondary Research

Nelson, D., Misra, K., Sype, G. E., & Mackie, W. (2016). An Analysis Of The Relationship Between Distance From Campus And Gpa Of Commuter Students. Journal of International Education Research, 12(1), 37–46. https://doi.org/10.19030/jier.v12i1.9565

This article unfolds the important aspects of the differences between the skills and qualities of Residential and Commuter Students, the collected data towards this information and results such as the student's GPAs. This research article allows us to take a further look at the realistic comparison of commuters and residential students through the studies.

Coutts, S., Aird, B., Mitra, R., Siemiatycki, M., 2018. Does commute influence post-secondary Students' social capital? A study of campus participation at four universities in Toronto, Canada. J. Transp. Geogr. 70, 172–181.

This study aimed to find if there is a correlation between a student's commute and sociability when at school. Despite the growing availability of clubs, groups and teams on campus, students reportedly felt discouraged from joining these activities due to their commute. The commute time of an individual was heavily linked with their participation in extracurriculars. This relationship was seen the most among transit riders.

Secondary Research

Chatterjee, K., Chng, S., Clark, B., Davis, A., De Vos, J., Ettema, D., Handy, S., Martin, A., & Reardon, L. (2020). Commuting and wellbeing: A critical overview of the literature with implications for policy and future research. Transport Reviews, 40(1), 5–34. https://doi.org/10.1080/01441647.2019.1649317

This study aims to examine the relationship between commuting and well-being. During the journey, immediately after the journey, and over the long term. Their study found that a person's mood is negatively affected when on a commute and that their mood affects them when they reach school, work, or home. The study points to congestion, unpredictability, and crowding as factors that worsen the mood of a commuter.

Aird, B., Coutts, S., Mitra, R., & Siemiatycki, M. (2018). Does Commute Influence Postsecondary Students' Social Capital? A Case Study of Four Universities in Toronto, Canada. Trid.trb.org. https://trid.trb.org/view/1496271#:~:text=The%20majority%20of%20these%20postsecondary

This study shows that lots of students agreed that commutes really affect their spirit of coming to school, also in-school activities, clubs, etc.

Zhou, L., Wang, M., Chang, C., Liu, S., Zhan, Y., & Shi, J. (2017). Commuting stress process and self regulation at work: Moderating roles of daily task significance, family interference with work, and commuting means efficacy. Personnel Psychology, 70(4), 891–922. https://doi.org/10.1111/peps.12219

This scholarly article looks towards how commuting may be connected to the well-being of humans. Multiple factors such as overcrowding, buses arriving late, and people stalling the bus by asking the driver questions are all factors that have been shown by people who induce stress by commuting. The study has also researched and shown a relation that if an individual is stressed from their morning commute, that stress will likely carry on for the rest of that user's day.

Bailey, J., & Cohen, A. (2021, May 20). That "Dreaded" Commute Is Actually Good for Your Health. Harvard Business Review. https://hbr.org/2021/05/that-dreaded-commute-is-actually-good-for-your-health

The article discusses the benefits of commuting, particularly in terms of physical and mental health. Commuting can be beneficial in terms of physical activity, as it can increase the amount of time spent walking or cycling. In terms of mental health, commuting can provide a period of transition between work and home life, which can allow for a greater sense of work-life balance. The article also notes that commuting can be a social activity, as it can provide opportunities for conversation and connection with others.

Diary Studies

"Commuting to school is really hard especially if you have to use public transportation. It is very time consuming."

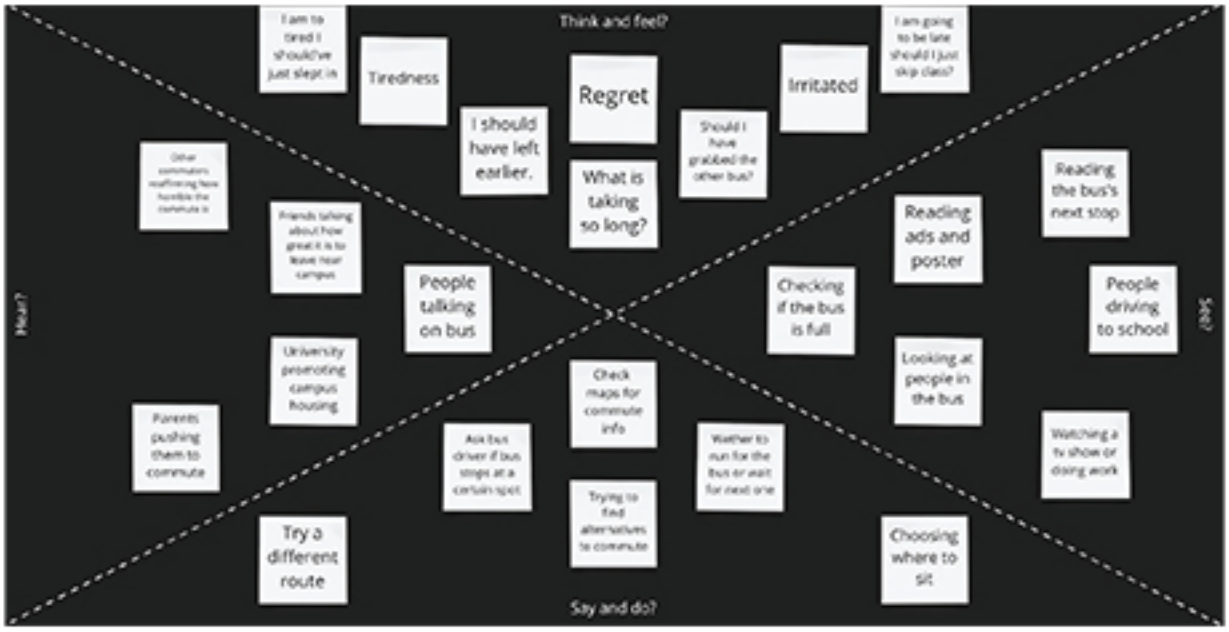
"Traffic cannot be controlled by the bus driver. It also frustrates us when there's awful traffic."

"I am always late to classes because of my bus that either won't come or gets delayed. It never informs me through my transit app."

"Waking up and making sure you catch your bus is stressful. If you're even one or two minutes late, the bus will already be gone and if you didn't plan to get to your destination early, you're going to be late to wherever you were heading."

"I commute to school by myself. Having no one to talk to for the whole trip can leave me like I'm isolated from everyone else. It also leaves me bored for most of the trip. I have to worry about where I look as well. If I look for another person for even a second and they are looking at me, I just find it really awkward so there really is no place to look except down towards the floor, at your phone, or closing your eyes"

Empathy Mapping



Fly on the wall : AEIOU

Actions:

- Showing UPass
- Tapping Presto
- Inserting bus ticket
- Inserting money to purchase a ticket
- Using mobile/technological (laptop) device
- Reading a book
- Listening to music

Environment:

- Front entrance
- Back entrance
- Bus driver area
- Side seats
- Rows of seats in two

Interactions:

To Bus Driver

- "Good morning/afternoon/evening"
- "Thank you"
- "Does this bus go to __?"
- "How much is the fare?"
- "How can I get to __?"
- "Where is __?"
- "How many stops until __?"

To Friends...

- "When are we getting off?"
- "How was school?"
- What classes do you have today"
- Did you finish the assignment/test?"
- "Did you study for the assignment/test?"

Objects:

- Seats
- Advertisements
- Handicap Sign
- Stop Button
- Stop String
- Windows
- Bus Handles
- Presto Machine
- Bus Ticket Machine

Users:

- Bus Driver
- Local University Students (or live far)
- Local High School Students (or live far)
- Local Elementary/Middle School Students (or live far)
- Children
- Parents
- Elders
- Workers
- Adults without Vehicles
- Families
- Bus Driver Trainer/Instructor

Chapter 3: Define Stage

Methods Used: Affinity Diagramming (Miro), How might we statement

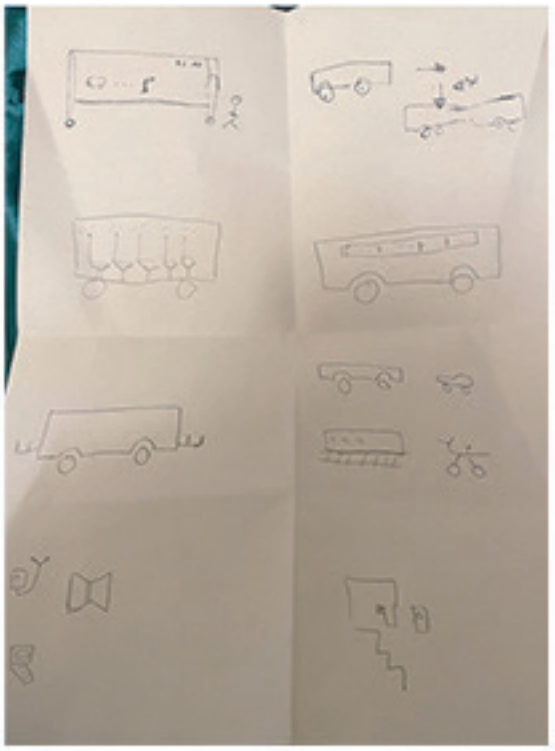
How Might We Statement:

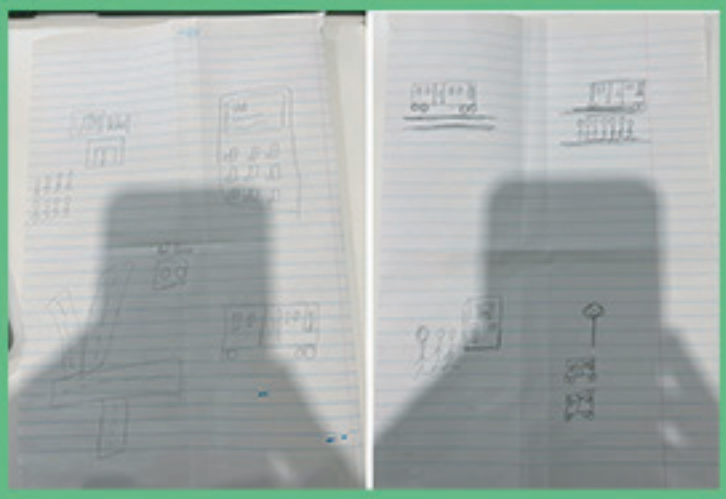
How might we...

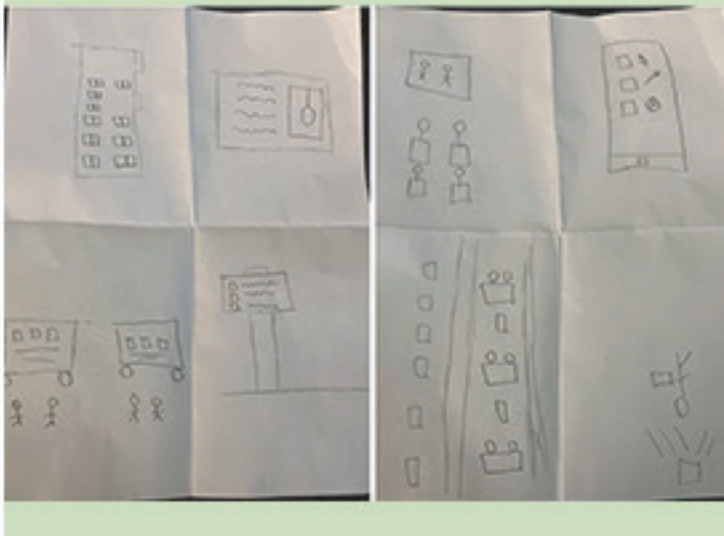
- Improve the commuting experience for university students?
- Improve overcrowding situations?
- Reduce stress caused by commuting for university students?
- Improve networking to help with the commuting experience?

Chapter 4: Ideate Stage

Methods Used: Crazy 8's, Brainstorming







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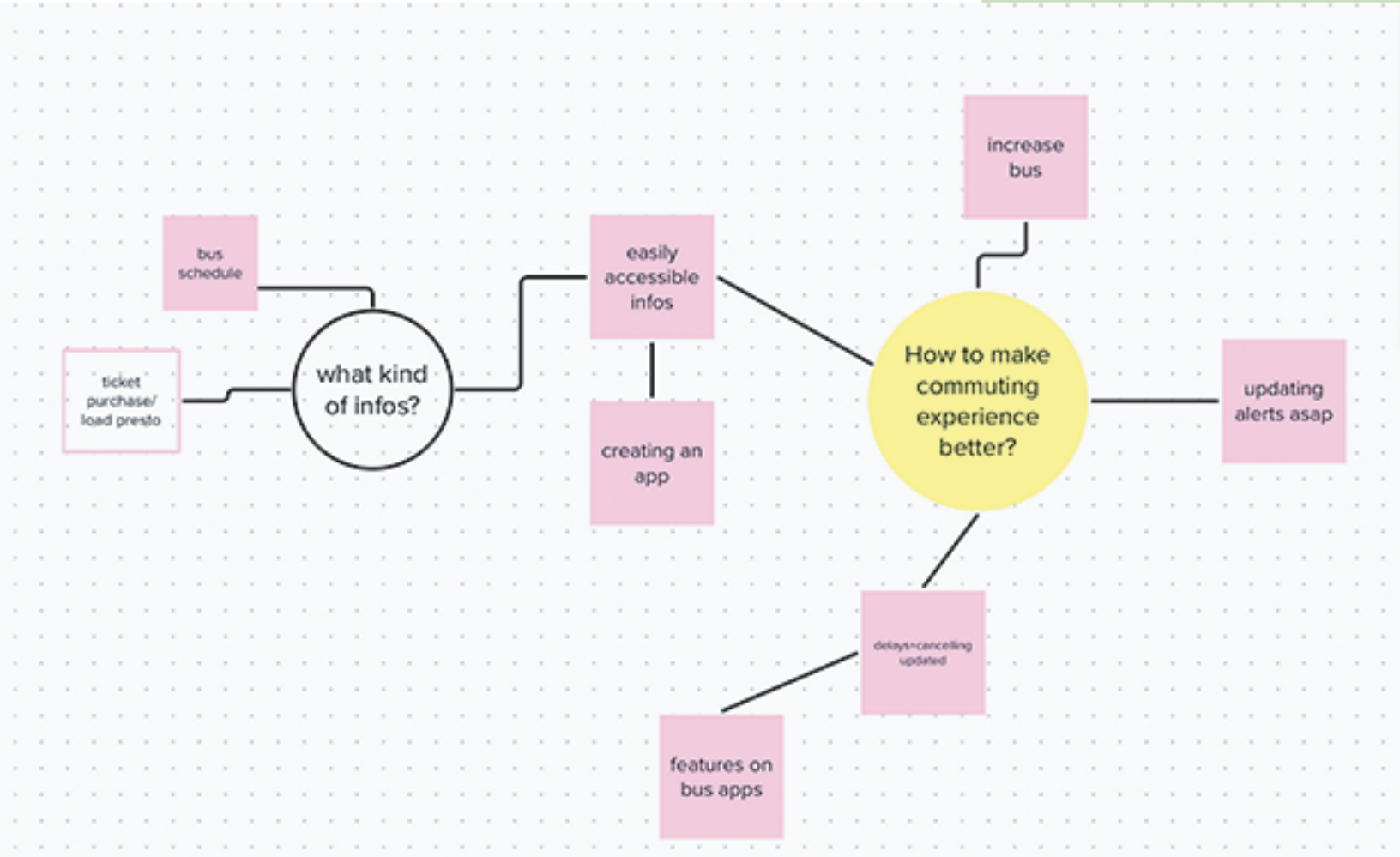


Our team used Mural to start with big topics then moved on to solving the major issue. This is the mind map we created in the beginning together.

Then, we further discussed about the actual features about the prototype

Chapter 5:

Prototype Stage

Throughout the ideation stage we used different methods to develop and come up with ideas that would solve our "how might we?" statement.

Methods we used were brainstorming and sketching specifically the Crazy 8's Exercise.
As shown through our methods in chapter 4 we came up with many ideas whether they be technological advancements like apps and tracking systems or structural changes to already existing infrastructure such as to bus stops and busses themselves. Out of all the ideas we the most feasible and impactful ones were creating an app or improving the options that buse soffer. Our wants and goals surrounding these two ideas were the following:

App:

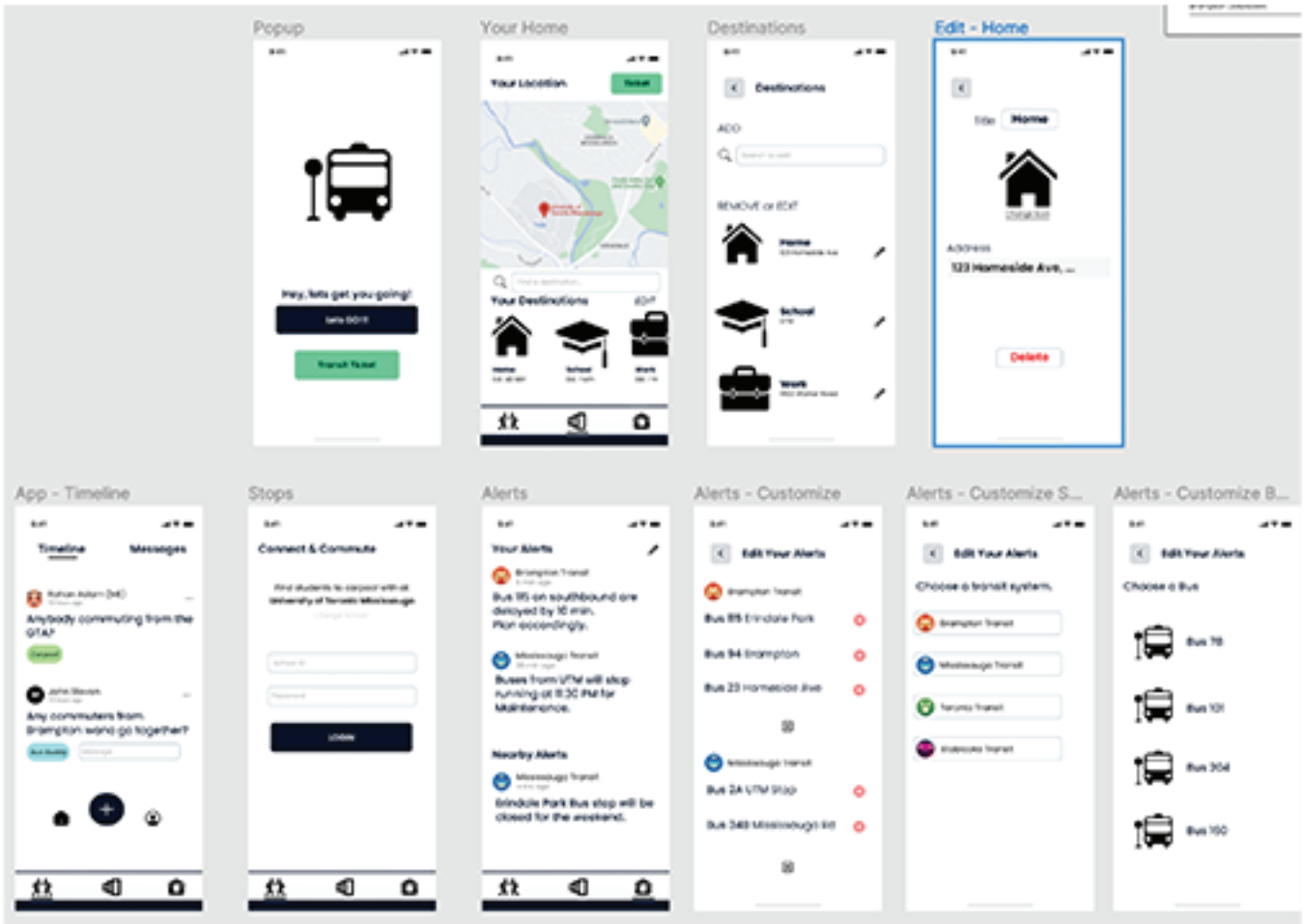
- Would have most up to date arrival times.
- Notify riders if any updates.
- Provide info or route and facts about bus such as seat and wifi availability.
- Have a carpooling system to connect riders.
- Make it much easier to pay for transit by having bus card on the app and allow users to add money directly from there.

Buses:

- Create double decker or longer buses that allow much more people to ride at once.
- Have free wifi on board to allow riders to use transit time in productive manner.
- Creating privacy cabins where riders can be undisturbed.
- Having express buses running only to and from high volume stops such as a university.

Both these ideas were chosen on the merit of desirability and feasibility but most importantly their impactfulness made them stand out from the other ideas. From a desirability standpoint these two ideas had the potential to fix many of the problems that we saw communters face within the empathy stage of our project. These problems include but are not limited to wiat time, loss of time during travel, not able to sit, and busses being full or breaking down. Therefore, we chose to expand upon the app and busses to come up changes we can make to actually tackle the issues we identified. Furthermore, the aspect of feasibility lead us to choosing these two ideas. Firstly, creating an app would be much more financial affordable and less time consuming especially compared to a lot of the infrastructure ideas that we had. However, we did realize the desirability and impactfulness of infrastructure change and chose to also consider changes to buses. We found that some of these changes such as free wifi and longer buses were already being implemented around the globe and even in parts of Canada and therefore would certainly be feasible.

As far as choosing the ideas to prototype, feasibility played was an outmost factor in our decision. Therefore creating an app seemed like the best option as we could create something interactable and desirable. We then focused on methods to prototype our ideas. Storyboarding was a design method we used to visualize scenarios for our app. Within this process we alos identified many ideas that we could en corporate within the app. To bring our app to life we used rapid prototyping software called Figma to create an interactable wireframe. The wire frame would show different features of our app and the functionality of it.



Rough 1st Storyboard

Title: | Page:

Scene No. | Shot No.

* Student waiting for bus on

Scene No. | Shot No.

* Student frustrated as he late today

Scene No. | Shot No.

* Student checking for bus's location but doesn't receive any update

Scene No. | Shot No.

* Bus arrives after 20 minutes

Scene No. | Shot No.

* Student is late to class

Scene No. | Shot No.

* Student misses the attendance (percentage mark) and gets very stressed with the workload

Rough 2nd Storyboard

Title: StoryBoard | Page:

Scene No. | Shot No.

* Student waiting for bus to arrive

Scene No. | Shot No.

* Before bus arrives, Students uses our app to check if the bus is delayed or on time

Scene No. | Shot No.

* App contains features such as...
  - Alerts
  - Updates on bus location/status
  - Feature that provide information about the bus

Scene No. | Shot No.

* Student was able to avoid going on the bus that is delayed

Scene No. | Shot No.

* Arrives to school on time and attends the lecture on time

Scene No. | Shot No.

* Student getting good mark because she/he attended all the lectures on time

Chapter 6: User

Testing Stage

We got users to test our prototype using Think Aloud Protocol.
Initially we had users inform us of their current status by asking them i ntroduction questions. Asking questions such as "Do they live on Campus?" or "Do they actively take public transit?" to gain an understanding of the users daily life and if they transport via commuting or not. Whether the user responded with yes or no to commuting, we asked if they had any knowledge of issues that come with commuting by bus. This would aid us by allowing us to possibly gain some ideas of issues with commuting that we previously may not have thought of before.

We had users choose five tasks from a list of tasks (provided below) and had them speak out their thoughts as they proceeded to figure out how to their their chosen task in our prototype. As they spoke their thoughts out, their thoughts were recorded via notetakers to let us analyse how easy or hard they found it to traverse through the prototype with no prior knowledge of functionality.

Tasks

- How do you search for a destination?
- How do you edit your permanent destination(s)?
- How do you add a permanent destination?
- How do you remove your permanent destination(s)?
- How do you access your presto card?
- How do you add money to your presto card balance?
- How do you purchase a ticket?
- How do you access your transit alerts?
- How do you add transit alerts?
- How do you edit your transit alerts?
- How do you access the timeline?
- How do you access the messages?
- How do you find out the time distance of your designated location?
- How do you edit your designated home location?
- How do you access the route information of your designated location?
- How do you find the wifi availability, noise level, and seating availability of your bus?

After the user completed the five tasks they choose, we asked a few follow up questions to gain an understanding of how the user interpreted the features of our prototype. How did they enjoy the experience of using the app? Was there anything that made the app simple or difficult to navigate through? Through this we were able to gain an understanding of multiple factors that each user tester enjoyed or disliked.

Chapter 7: Access/Implement Stage

User Testing Stage Evaluation

Firstly, our user introduction questions were focused on learning about our testers and past experiences with public transit.

For Example:

"Do you live on or off campus?

"Do you take public transit?"

"Have you encountered any problems with the transit?"

Based on our results, the majority of testers (four out of five) use public transit to commute to school and other locations (such as grocery stores, restaurants, etc.) regardless if they live on or off campus. The outlier tester who refuses to utilize public transportation, uses Uber due to his dislike of checking bus schedules and waiting times. There were a variety of problems that users encountered on public transit. For instance, the late arrival of buses and the change of routes without prior notification were common problems voiced by users. Additionally, lack of seat spaces, early departures, Wi-fi availability, and safety issues were among the other highlighted problems users reported.

Next, we observed the steps of users when completing the tasks on the application. Through our observations, we noticed that users were able to easily complete the simpler tasks and navigate the designated sections. For example, testers were able to access the home, edit, alerts, and Presto features without error or unnecessary steps. However, users struggled to locate our complex and creative features (Example: How do you find the wifi availability, noise level, and seating availability of your bus?). Users tend to take a longer amount of time to navigate these features. Moreover, testers tend to have troubles with locating the timeline section as users would navigate the bus alerts section (when given the search for the timeline task).

Thirdly, after the testing stage, we asked users for feedback to improve the reliability, accessibility, and layout of our application.

For Example:

"What features were the easiest and difficult to access?"

"What features stood out the most? Why?"

We received excellent feedback on the design of the layout and users positively commented on the usefulness of the features. For instance, one of the testers stressed the importance of the bus alerts feature as transit organizations do not distribute real-time notifications of schedule changes and arrivals. Moreover, users reported the application itself is user-friendly. However, the majority of users pointed out the confusion between the timeline and bus alerts sections as the titles can be misinterpreted. Testers recommended to change the title of the timeline just to "carpool section" to make it easier to access and differentiate with the bus alerts section. Additionally, testers recommended changing the signifiers to icons that better represent the function of the feature. Testers suggested to allow users to develop a mapping tool that allows the user to navigate through a digital real-world map. Lastly, one of our users recommended restructuring our add balance to Presto function and separating it from the Apple Pay feature.

As a group, our first major implementation is to change the timeline's section title to "carpool" to reduce misinterpretations of the timeline and bus alerts features. Next, we plan to develop a mapping tool which allows users to navigate through locations on a real-world map. For the profile icon, we plan to add a circle with a person or any choice of background by the user to improve the representation of that feature. Furthermore, we will change the signifier of the home button to a home icon as it simply and properly represents its function. We plan to create a signifier for the ticket feature and implement a ticket icon on the bottom of the home page. Finally, we will add a "arrive by" and depart by" feature to allow users to schedule their trips ahead of time.

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