Team 22
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## Introduction

Many people in the Madison area use the public transportation system every day, and rely on it to travel between home, school, work, and more. The student population is a large part of this demographic, made evident by ASM distributing free bus passes to students. Many students don't have access to other forms of transportation, whether it be their own car or moped, or even a cab/Uber, so they spend their college years relying on the bus.

While students make up a large portion of bus-riders, the entire Madison community takes advantage of the extensive bus lines. People of all ages can be seen riding the bus at any given time, extending the need for a reliable bussing system. Currently bus-riders have two options for mobile resources with information about bus routes, schedules, and price. The first is Google maps' bus line feature, and the other is the UW-Wisconsin app bus feature.

We presumed that the UW-Madison mobile app would offer features catered specifically to students, would be quick and easy to use, and would provide a surplus of information and help options considering 25% of their target audience (or more) would be freshman navigating bus routes for the first time. We presumed the app would provide information about delays, campus specific routes, and the ability to search a specific destination, but it offers none of these features. Currently, the app allows you to see bus stops near you, search specific bus stops by number, and view the entire bus line grid to select a route. There is also a "real time" feature that provides timely updates about arrivals.

## Target Population

Our target population are students of UW-Madison who use the bus on a daily basis and have a smartphone. They may use the bus to get to class, work, grocery stores, or shopping/going to movies on the weekends. In order to study the functionality of the bus app, we selected 5 students who live on different areas of campus and have very different schedules to ensure that we have sufficient data to represent as many experiences as possible. All 5 participants were aware of the UW-Madison bus app and have used it, but most of them prefer the Google maps application and use that daily.

Our 5 participants include: a freshman who is an undecided major who uses to the bus to get from her dorm to classes and to grocery stores occasionally; a senior in computer science who uses the bus when it is convenient to him; a senior in computer science who uses the bus every day to get to class; a senior in psychology who lives on the East side and relies on the bus to get to campus every day; and a junior whose major is unknown to us who uses the bus to get to class.

Preparing the Probe and Executing the Study

In order to understand more about our participants, we conducted an initial survey to gather a better understanding of their regular bus usage. We asked about how often they take the bus, why they take the bus, where they get information about the bus, how they pay for the bus, and a few other behavioral questions to understand them better. After the initial survey, we sent an informational email to all 5 participants telling them what to expect over the next 7 days, providing them with details about the surveys they would be receiving as well as our contact information if they had concerns.

Our 7-day study comprised of two daily surveys - one every morning and one every evening. To make this process as painless and simple as possible, we built an automated survey with Python and Twilio to send text messages and collect responses from participants every morning, asking how many times they expected to use the bus that day.

Then, every night we followed up with a more comprehensive email survey to help us better understand how the app suited their needs throughout the day. We asked how often they actually took the bus, how efficient the app was based on schedule and location, as well as more particular questions about how they used the app, such as where you were when you used the app and what time of day was it. We also gave them an option to leave any comments about their experience with the bus or the app. We intended to use the data we gathered from the nightly survey to understand how the app succeeded or failed in every bus trip they took, to determine how it could be improved on a personal/individual level.

We also conducted a survey halfway through our study to check in with our participants, thank them for their participation, and encourage them to keep up with their surveys. This mid-week evaluation helped keep the study on track and gave us the opportunity to ask questions that arose after the first few days of data collection. This helped us obtain answers for questions that arose after observing the data we gathered in the first few days.

Lastly, we used the final interview to ask the participants specific questions about their experiences throughout the study. We received unique experiences from each person, but their overall feelings about the app were similar: it has helpful information, but it is confusing, inaccurate, and has a lot of room for improvement.

Data Analysis and Findings

In order to analyze the data we collected, we separated the data by person. We gave each participant their own excel sheet and compressed all off our data points into meaningful conclusions. We then mapped these findings into affinity diagrams, arranging data from each person into themes such as where they used the bus, why, when, how many times day use the bus per day, their overall accuracy rating of the bus schedule, and the potential improvements they recommended in the comments section. Our affinity diagram helped us conclude from near unanimity from our participants that the app is difficult to navigate, not reliable because the schedule is inaccurate, and frustrating because looking for a specific location (rather than an overall map of the bus stops offered) is impossible. In order to model our findings we built a sequential model to represent the breakdown that occurred most often with our participants, and an artifact model to start analyzing the basic visual features of the app that caused breakdowns with our participants. Building these models helped us identify more specifically how to improve the current interface. Our data largely calls for the app to be more university oriented: more information about campus buildings, campus bus routes, and optimized search for specific locations. We presume the current app can be improved through visual design, but we also believe that the themes we found from our data could improve the app enough to be the preferred choice over Google maps.

Stories

Jessica is a freshman who needs to go to Target to buy laundry detergent. She uses the bus around campus to get to class, but has never traveled as far as Target and is nervous to do it for the first time. She uses the UW-Madison bus app to find a bus line with a bus stop at her dorm and at target, but spends a few minutes clicking through all the available bus routes attempting to search for the best one. She could benefit from a search feature that used her current location and desired location to determine the best bus line for her trip.

Tina and Sam are friends who live on opposite sides of campus. One night when they are leaving the library, Tina wants to know if a bus is scheduled to arrive soon to save her the walk home. She uses the UW-Madison app to determine whether any buses are near, and she is happy to see that a bus will arrive within 2 minutes. She tells Sam goodbye and waits for the bus. She waits 2 minutes, 5 minutes, 10 minutes - and the app continues to tell her that the bus is 2 minutes away. She is frustrated that the app was inaccurate, and wishes she would have walked home in the first place.

Tommy is running errands, and is planning on taking the bus to accomplish everything. He wants to visit his grandmother in Middleton, and then stop at West Towne Mall, then Costco, and then return to his home near Camp Randall. Tommy uses the UW-Madison bus app to try and plan his trip, but gets frustrated when he realizes he can only plan one leg of the trip at a time. He wishes he knew how many different bus lines we needs to take so he can plan ahead for how much money he needs to bring, but instead he has to guess. Tommy could benefit from an optimization feature that would allow users to plan a trip with more than one stop.

Reflection

Overall, our experience using a cultural probe was great. Using automated text messages for surveys made the process easy as interviewers, and uncomplicated and straightforward for the interviewees. Sending the longer survey at night worked well because it allowed us to get longer, more detailed answers and allowed the interviewees to reflect on their experiences throughout the entire day. None of our participants dropped out, as we sent them gentle reminders when we noticed their answers were more delayed than usual. Overall, the answers they provided were

what we expected to hear, and helped us brainstorm ideas for improvement. We are satisfied with the conclusions we drew from the data, and excited about our plans for redesign.