CSE 440 AA
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3f Final Report
April 26, 2017

1. Title

Sherpa: opening your world, one tour at a time

2. Team Roles

We don't specifically have defined roles in our team since we work in a collaborative way. We meet once a week to generate main content/ideas and delegate tasks. No one person has a set defined task. There are tasks that certain team members are more likely to tend to, but they are also fair game for the rest of the team. The "tend to do" tasks are listed below:

- *Ahmed Awwad:* generating initial content, compiling information for final documents, usability testing, creating pre-mockup in Balsamiq
- *Timothy Kwan*: generating sketches, submits assignments, generating digital mockup in Origami
- *Amanda Loh:* creating a Google doc for each assignment and copy/pasting rubric, editing documents, checking for rubric requirements, usability testing, compiling final report
- *Carina Salcedo:* editing documents looking for rubric requirements and grammatical errors/syntax, usability testing, compiling/editing final report

3. Problem and Solution Overview

In the United States alone, there are 3.5 million people who never leave their homes, 1.9 million of which are wheelchair users [1]. Most of these people have mobility in their upper body with various types of paralysis/limitations from the waist down. These are the types of wheelchair users we aim to target.

After user research we uncovered how discouraged these types of people are from traveling to new places. Airlines often damage their $2,000+ wheelchairs, they have to wait around for days for wheelchair replacements, and loading a wheelchair onto and off a plane can be time consuming. Wheelchair users are pushed into an "I can't" mentality due to the limited and inconsistent accessibility infrastructure around the world. A lot of people we talked to in wheelchairs don't consider traveling as a possibility. Our solution builds on the trying to change the mindset of users one step at a time. We aim to get them comfortable exploring a little outside their comfort zone: by doing self guided tours in a local area led by a wheelchair user that's explored the area before. Also, our user research strongly indicated a desire wheelchair users to want to connect with one another. We also aim to give users the option to explore tours with other wheelchair users, because we believe defeating an "I can't" mindset can be best be done collaboratively with others.
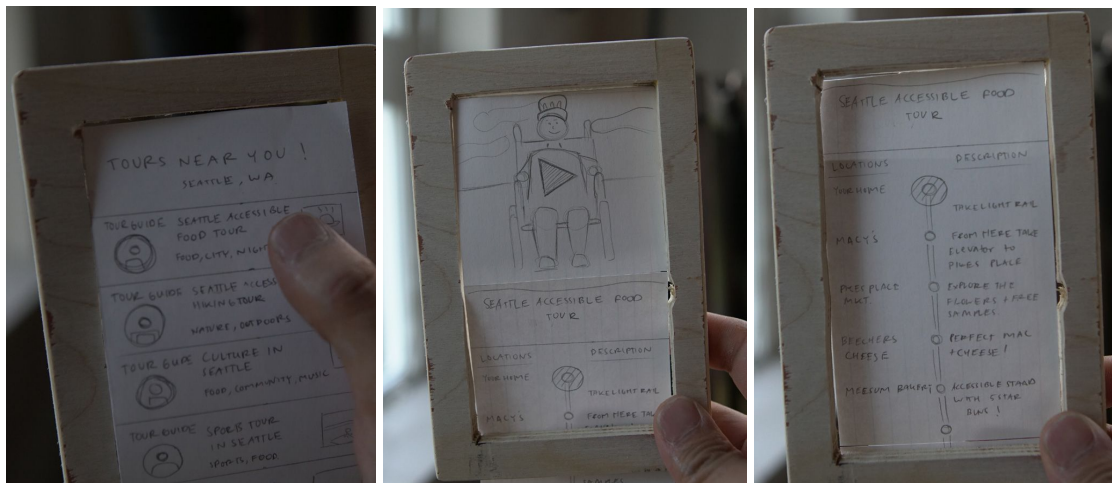
4. Initial Paper Prototype
Overview Image of Entire Paper Prototype

Overview of initial paper prototype

Detailed Images Showing each Component Walking Through Primary Tasks.

The following screens are the beginning of both task 1 and task 2.

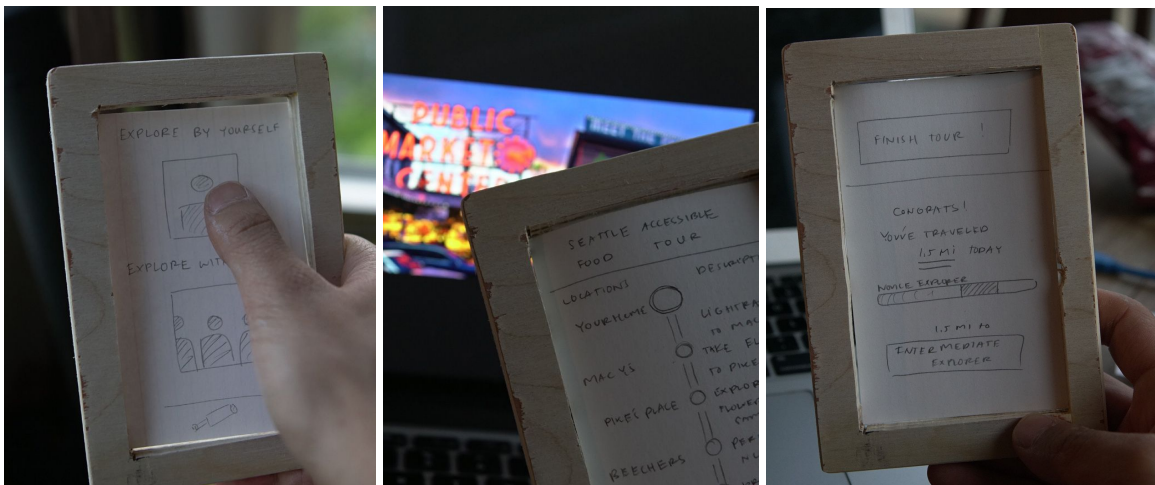**Screen 0.1**: User selects a food tour near them on the home page.
Screen 0.2: User is taken to the tour preview where they can watch a video
introduction to the tour.
Screen 0.3: User then scrolls down page to see map and stops on tour.

Screen 0.4: User decides they are ready to start the tour.

**Task One: Motivating wheelchair users to explore their local area**

Screen 1.5: User decides to go on a solo tour.
Screen 1.6: User travels to the first stop on the tour and the audio for that location starts playing. This is repeated for all stops on the tour.
Screen 1.7: At the end of the tour, the user selects "Finish Tour" and sees a summary of how far they traveled and how close they are to reaching the next rank.
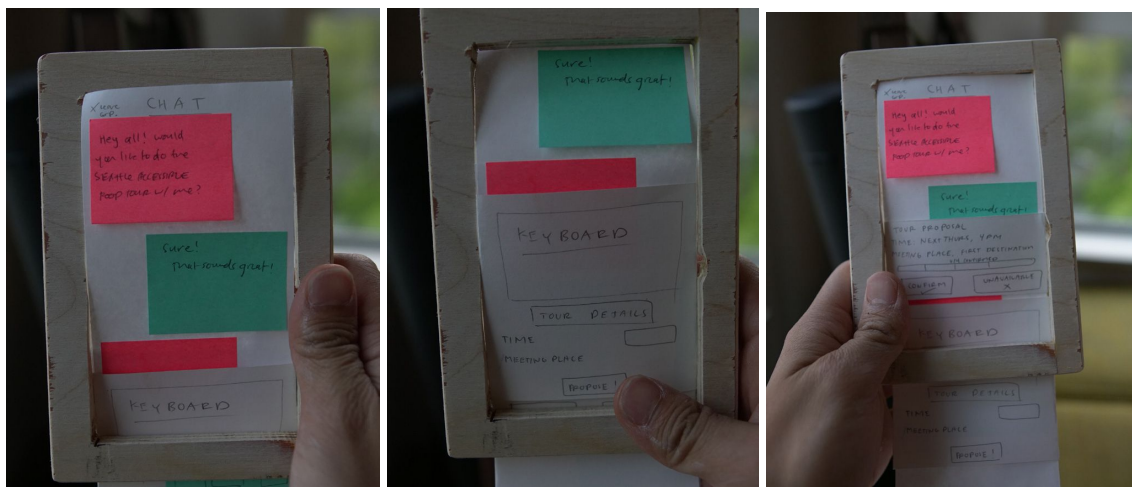
Task Two: Connecting nearby wheelchair users with similar disabilities and interests
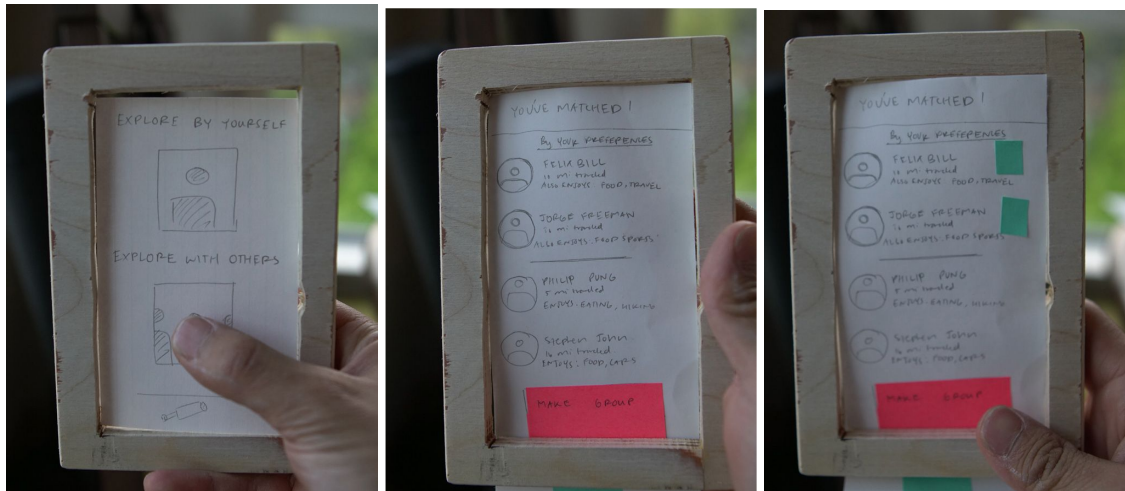
Screen 2.5: User decides to join a group tour.
Screen 2.6: User gets matched with people who have similar interest to themselves
Screen 2.7: User selects people they want to be in a group with.

Screen 2.8: A chat begins with all the users who selected each other.
Screen 2.9: After chatting with the group, the user decides to propose a time and
        date for the tour.
Screen 2.10: The proposal is posted to the chat and all the group members respond
        whether or not they are able to attend at that time.

5. Testing Process

        For each of the tests we sat the user down, placed the prototype on a table
and asked the user to perform 2 tasks. The first task was going on a self guided tour
alone. The second task was to join a group tour in order to meet other wheelchair
users. Users were not given any other hints as to how to use the app other than the

facilitator providing the user with tasks to complete. If the user became stuck or confused about an aspect, the facilitator would explain how the functionality was supposed to work and then the user was able to provide feedback about the confusion they felt. In our first test, we did not explain the app thoroughly beforehand, but we learned to do so for our second and third usability tests. This helped our testers understand the purpose of the app from the beginning so they had fewer basic questions during the tasks. When our tests did have to ask questions, it broke the their concentration on the task and their flow through trying to achieve some goal. We found explaining more beforehand provided us with more time to observe the user and less time jumping in explain things we had forgot to mention. For the second test we were able to have our tester move around while using the prototype to simulate actually taking a tour. Further details of our usability tests are shown below:

Three Usability Tests

First Usability Test: Molly[1]
Amanda Loh: Computer and Facilitator
Ahmed Awwad: Notetaker

Our first usability test was on Molly, who was also one of our design research participants. Molly works at the Disability Resources for Students (DRS) as a consultant. She spent her undergraduate years at the UW and is currently working on her master's degree in social work. She has been a wheelchair user since birth, and as such, has traveled very little. We chose Molly as our first participant for usability studies because, as a wheelchair user who is wary of travelling, she represents one of our target users. We interviewed Molly in the DRS at UW in the basement of Mary Gates in her office, which was most convenient for her.

Second Usability Test: Luna[2]
Carina Salcedo: Computer, Facilitator, Notetaker

Our second usability test was on Luna, a senior at UW majoring in law societies and justice with a focus on disability law. Her studies and her experience living with her brother, a wheelchair user, have made her highly aware of the needs of wheelchair users. We chose Luna for this usability test because she represents able bodied people with an interest in supporting wheelchair users. She performed the first half test while walking around campus to simulate the experience of using our app on the go and the second half sitting at a table in Mary Gates.

For this test, we asked her to select a solo, self guided tour, then move around and pretend to visit the locations on the tour. Then, when we were inside, we had her chose chose a tour to take with a group. The group tour test was done without moving away from the table we were at since we had no other testers at the time to simulate the group dynamics.

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[1] Name changed for privacy reasons
[2] Name changed for privacy reasons

Third Usability Test: Cho[3]
Carina Salcedo: Computer, Facilitator, Notetaker

Our third usability tester was Cho, a senior at UW majoring in informatics. She has been a TA for informatics classes that develop and critique user interfaces and is very familiar with the process of usability testing. We had hoped to use another wheelchair user instead, but none of the people we contacted have replied to us. However, Cho's experience developing and critiquing user interfaces meant she was capable of giving insightful feedback and helpful suggestions. We chose Cho for this reason and administered the test sitting at a table in Odegaard library because the weather was too wet to allow us to comfortably move around outside.

For this test we asked her to select a solo, self guided tour. When she finished that task, we asked her to select a tour to take with a group. Along the way, she was instructed to try to "break" the app in any way she could think of to expose faults in our design.

Retrospective

By slightly altering how we conducted our usability test, we received more, higher quality feedback. Having one user actually move around and another try to "break" the app highlighted some of the basic issues in our design that we needed to fix. From these studies, we were able to improve the flow of the app and make it more intuitive. The group functionality especially benefitted from user feedback, receiving the most critiques and the most substantial changes. We also found that by explaining our app in more detail before the tests began helped the testers to feel more independent, not constantly have to ask facilitator about what exactly their goal or purpose was. Also, not asking targeted questions and allowing users to find the bugs themselves through self discovery pointed out flaws we had not considered.

6. Testing Results

After each round of feedback, we made changes to our paper prototype. Our most profound changes include flow of app, navigation, joining/leading tour groups, and profile. Listed below are more detailed descriptions of how the app was modified on each iteration.

Initial Design to Heuristic Evaluation: Based on the feedback from our heuristic evaluation, we realized we did not have a good way to guide users from destination A to destination B. Also, we had no back buttons so user could not navigate back to a previous screen. We also received feedback it was unclear what our preview screen is: so we added a title to ensure users know that it is indeed a preview screen. Also, many students found the group messaging and scheduling feature to be very confusing and unintuitive so we removed it entirely and thought of a brand new idea to schedule group tours: prescheduled or you can make a new tour.

Initial prototype to First Usability Check in: From our first prototype the main change we made to the prototype was the navigation page from A to B. Molly, our

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[3] Name changed for privacy reasons

initial usability tester, mentioned she really liked Google Maps integration. She also mentioned that some wheelchair users also really like audio. Therefore, we added text and audio as options for navigation as well. Also, this test led us to working on group tours to make more simple for users, which helped make the group tab transition to two dividers: tour participating on and tours hosting. We also added some screens we were missing: the screen that appears when a user reaches a tour destination and first iteration of our home, profile, and group tours toolbar. This iteration in design contained the largest changes.

First Usability Check in to Second/Third Prototype: From the first usability test, we improved the prototype further to be more robust. We added more features for curious users. For example, we made it possible for users to see other user's profiles in a group and be able to click on them and view more details. Also, we made it possible for users to see tours they have led or will be leading from others' profiles. We also cleaned up unnecessary information not needed on the "Tours Near You" page and the "Group Tours" page. We also simplified the tours page you are leading or participating in even further.

7. Final Paper Prototype

Overview Image of Entire Paper Prototype

Overview of final paper prototype

Detailed Images Showing each Component Walking Through Primary Tasks
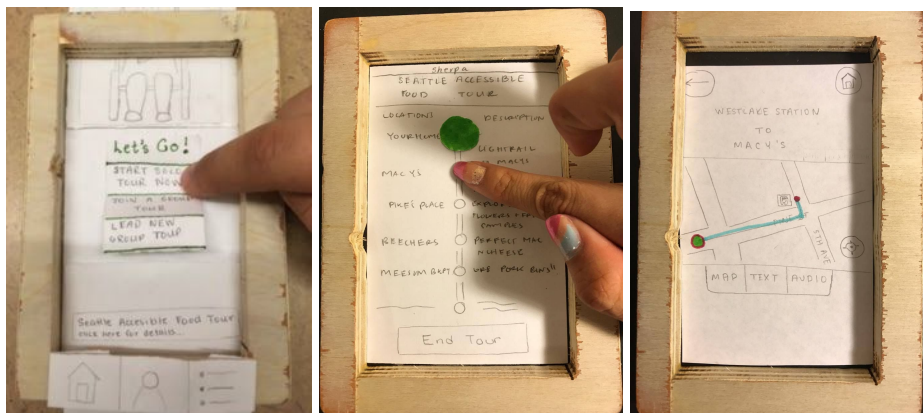
Task One: Motivating wheelchair users to explore their local area

Screen 1.1: User selects a tour near them on the home page.
**Screen 1.2**: User previews the tour by watching a video.
Screen 1.3: User then decides to start the tour by selecting "Let's Go."

Screen 1.4: User decides they want to go on a solo tour.
Screen 1.5: User is taken to the tour page where a green dot highlights their current location amongst all the stops on the tour. To get directions, the user selects the next stop.
Screen 1.6: The user is taken to a map where they have the option to get directions in text or audio.
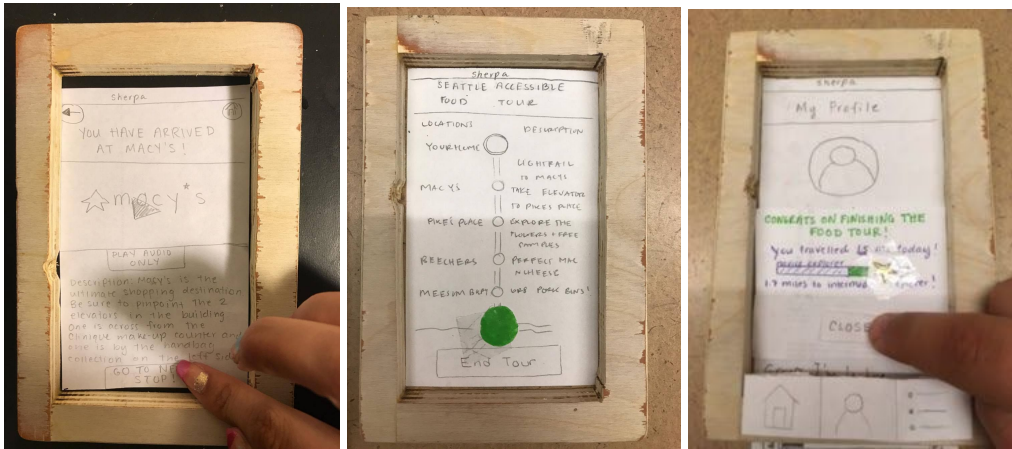
Screen 1.7: When the user arrives at their destination, a screen pops up with video, audio, and text descriptions of the location. Screens 1.5 to 1.7 repeat until all destinations on the tour have been visited.

Screen 1.8: The user has finished the tour and selects "End Tour."

Screen 1.9: The user is taken to their profile where a popup gives the user a summary of how far they traveled and how far they have to go before they reach the next rank. The user selects "Close" to dismiss the popup.
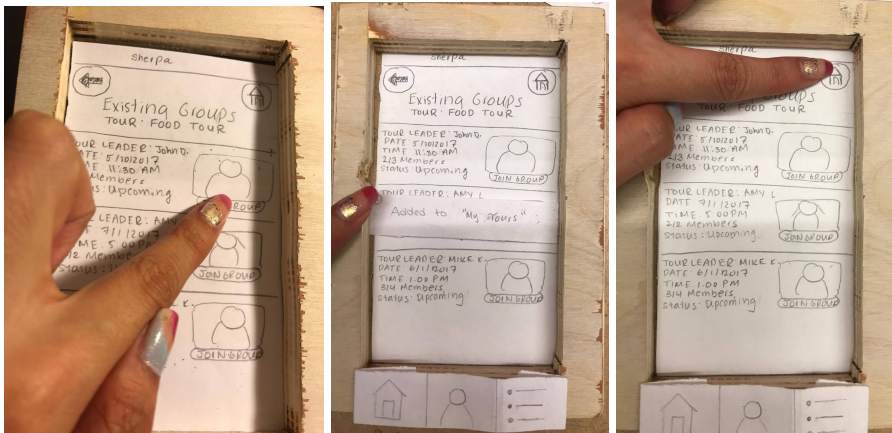
Task Two: Connecting nearby wheelchair users with similar disabilities/interests

Screen 2.1: User selects a tour near them on the home page.

Screen 2.2: User previews the tour by watching a video.

Screen 2.3: User then decides to start the tour by selecting "Let's Go" and decides to go on a group tour.

Screen 2.4: The user is taken to a list of the groups planning to go on the chosen tour and selects "Join Group" for one of them.

Screen 2.5: A notification pops up, letting the user know that they have been added to the group.
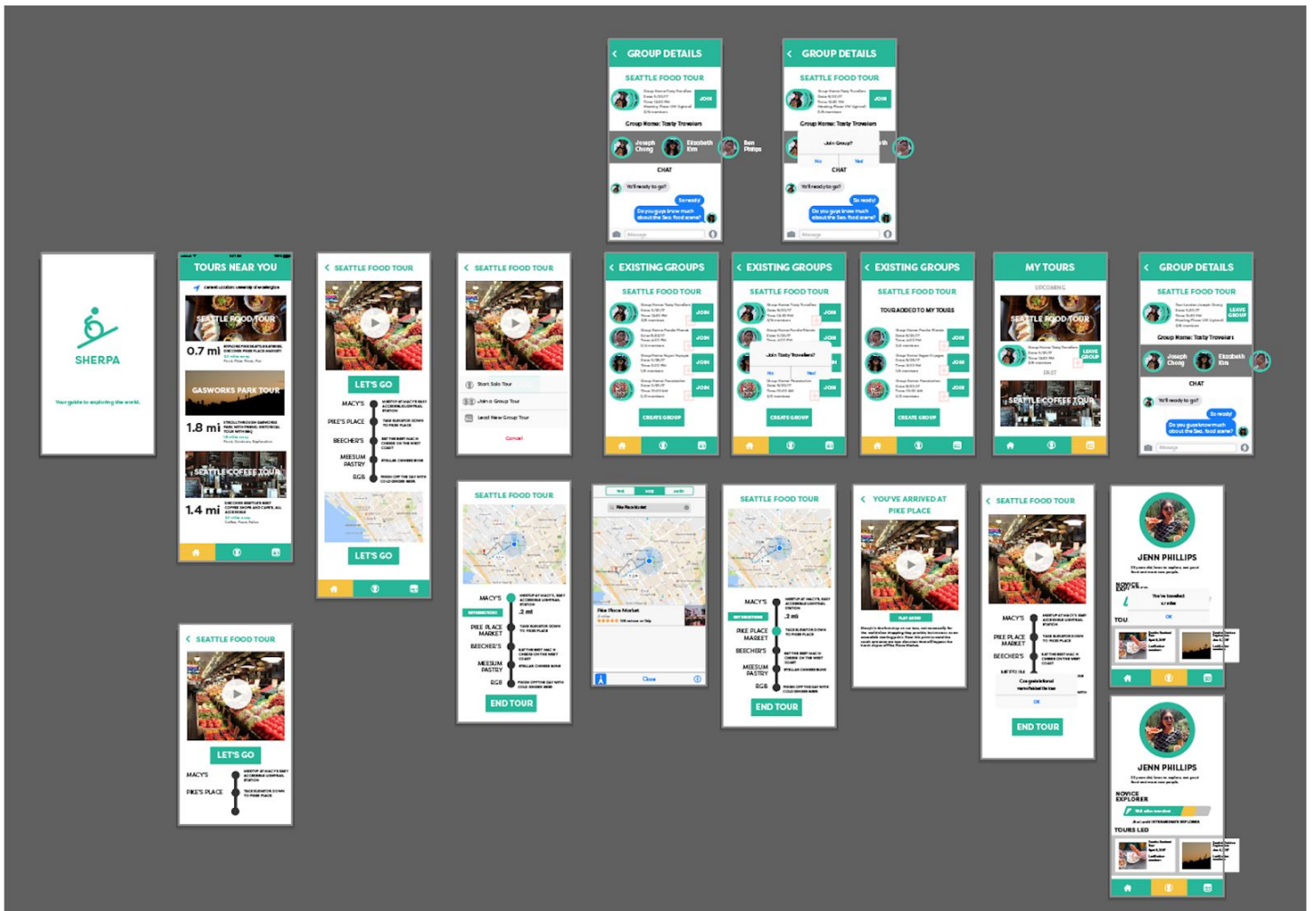
Screen 2.6: The user selects the home button.
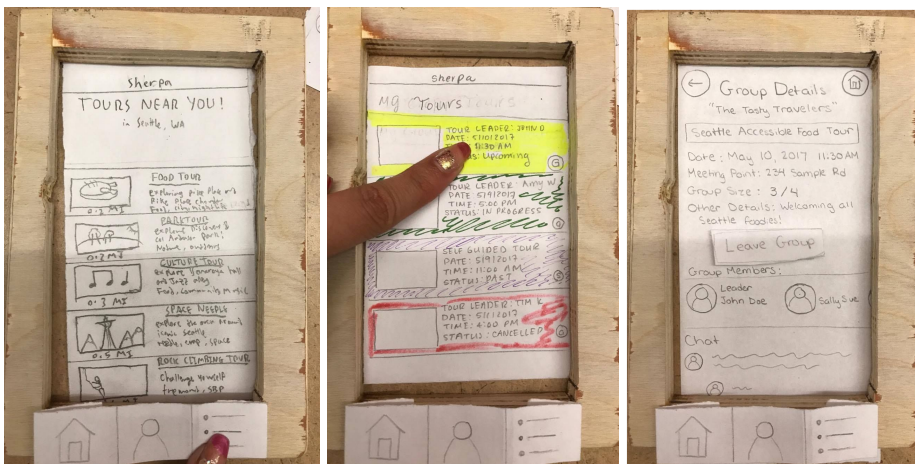
Screen 2.7: The user is taken to the home screen and selects the list of their group tours.

Screen 2.8: The recently added group is at the top of the screen. The user selects this group.

Screen 2.9: The user is shown all the details for their new group. Here they have the ability to chat with other group members and leave the group.

8. Digital Mockup
Overview images of Sherpa:


Overview of digital mockup

Task 1 (Going on a solo self-guided tour):
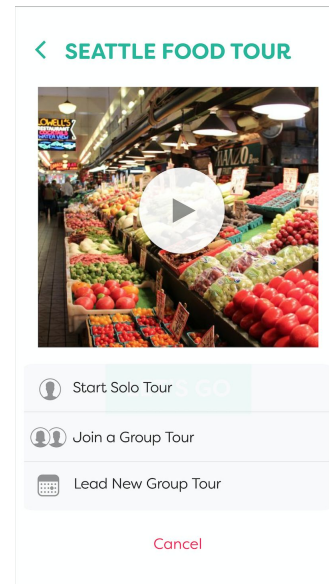
Screen 1.1: The user selects the Seattle Food Tour from the homepage

Screen 1.2: The user decides to watch the tour video which explains important tips and details about the tour, including both points of interest to look out for, but also accessibility information and advice for wheelchair-friendly routes and locations. Then the user clicks the "LET'S GO" button.

Screen 1.3: A menu pops up with options for how to go on the tour. The user decides to start a solo tour.
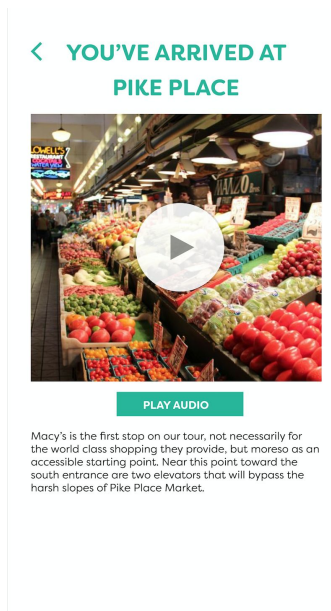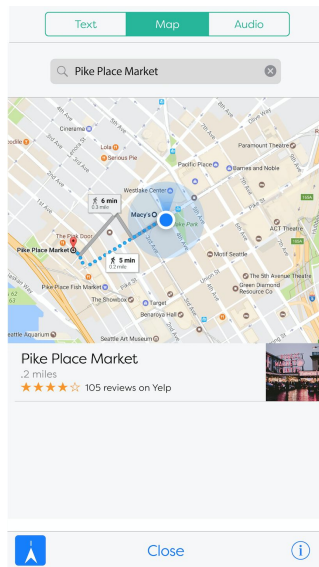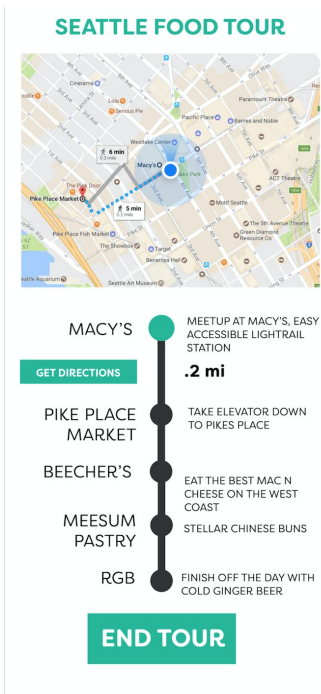
Screen 1.4: The screen changes to an overview of the tour, with a green marker over the dot representing their current location.

Screen 1.5: By clicking "GET DIRECTIONS" on the tour overview, the user is taken to a screen with more detailed directions to the next stop on the tour. The directions can be viewed in text, map, or audio form.
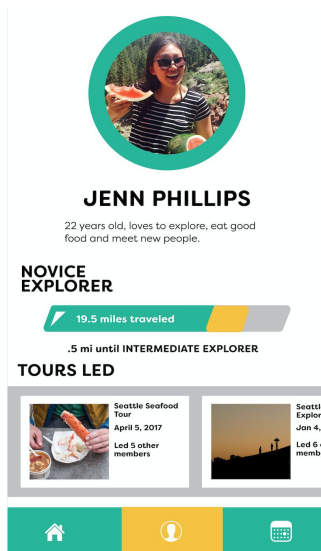
Screen 1.6: When the user arrives at their next stop, they are taken to a screen with more details about the location. The user can choose to receive this information through video, audio, or text. When the user is ready to move on, they select the back button.
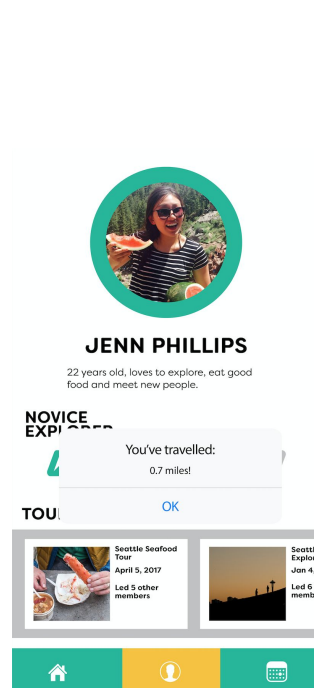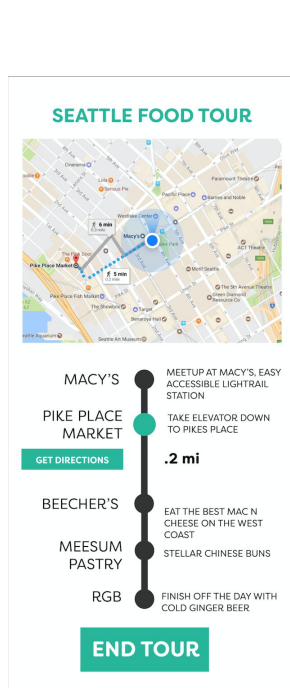
Screen 1.7: Back at the tour overview, the green marker has updated to the user's current location and they are ready for directions to the next stop.

**Screen 1.8:** Once the tour is over, the user clicks on the "END TOUR" button.

Screen 1.9: When the tour has ended, the user is taken to their profile page, where a popup notifies them of the number of miles they travelled.

JENN PHILLIPS

22 years old, loves to explore, eat good food and meet new people.

NOVICE EXPLORER

19.5 miles traveled

.5 mi until INTERMEDIATE EXPLORER

TOURS LED

Seattle Seafood Tour
April 5, 2017
Led 5 other members

Seattle Explora
Jan 4, 2
Led 6 ot
membe

Screen 1.10: Once the user closes the notification, the updated profile page comes into full view and fills the progress bar with with new miles traveled.

Task 2 (Joining a group tour):

Screens 2.1 and 2.2 are identical to screens 1.1 to 1.2 respectively and have been omitted to save space.
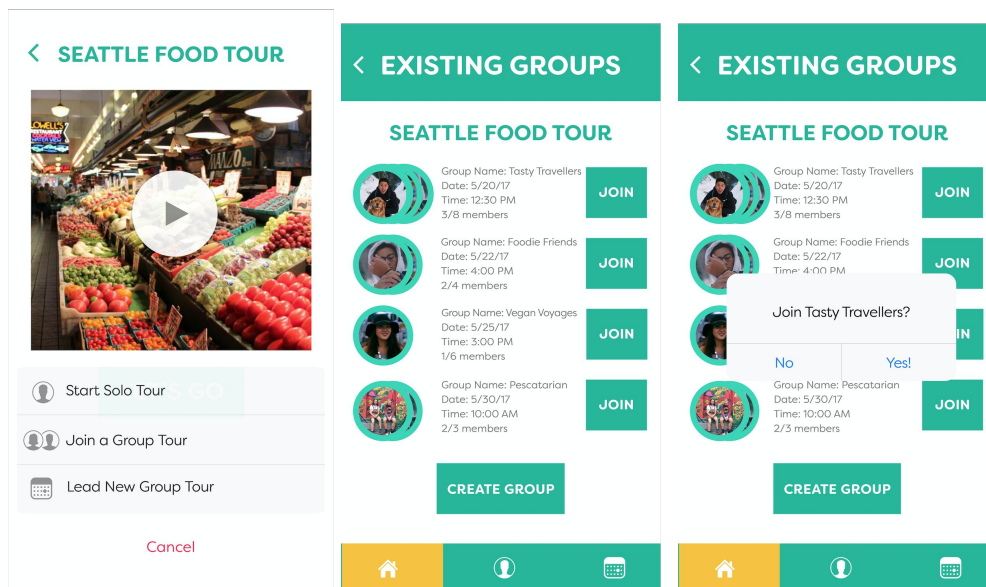
Screen 2.3: The user decides to join a group tour.

Screen 2.4: The user is taken to a list of all the existing groups for their chosen tour and selects one with a convenient time, date, and group size.

Screen 2.5: The user confirms they want to join the group by notifying the user that it was added to "My Tours".
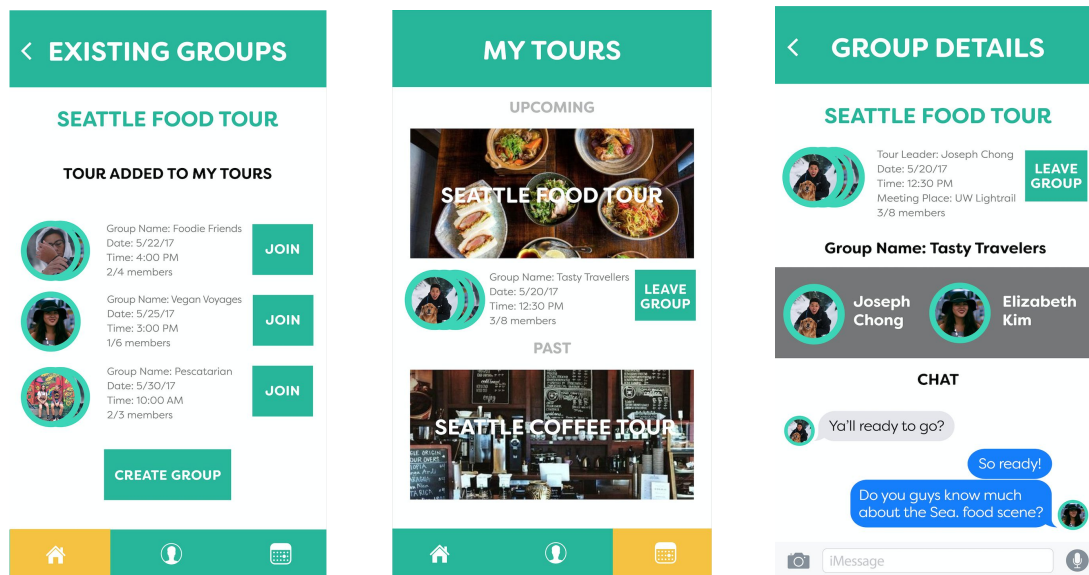
Screen 2.6: The group is replaced by a message informing the user that it has been added to "MY TOURS"

Screen 2.7: The user clicks on the "MY TOURS" tab and sees the newly added group at the top of the page. Then the user clicks on the group.

Screen 2.8: The user is taken to the "GROUP DETAILS" page where they can chat with other group members.

Major decisions and changes:

Much of the transition from paper prototype to digital mock up was cosmetic. We decided on a color scheme, teal green, and eliminated the Sherpa logo at the top of the screen as it was deemed unnecessary. We also edited the descriptions for nearby tours to include only the most relevant information. This meant removing the name of the person who made the tour and adding the length of the tour is and how far away it is from the user's current location. We did the same for the groups lists, keeping only the most important information in the group list previews and the reserving the rest for the group details page. The other big change we made was in the navigating around the app. In the paper prototype, we had two ways for user to go back a screen and to the home screen. In our revised version, we have the home bar at the bottom for all screens except when the user is on the tour in real time. When the user is on the tour, they can only use the "End Tour" button to exit the tour and the back arrow button to go back to the tour overview. Overall, our changes help the user to better understand the environment of the self guided tour and make our app easier to use.

9. Discussion

What did you learn from the process of iterative design?

We learned the iterative process is not easy. It is very easy to get attached to a design, but when we really listened to what our users wanted we ended up with a better product. Talking to our user group directly really made an impact on the

design. For example, we would never have thought of adding an audio option for navigation if Molly had not mentioned it to us. We also learned how important it is to have frequent meetings with the entire team. During the ideation process, it was crucial to have as many people as possible to generate new ideas. Later, when we met just to complete our assigned work, it was less crucial to be in the same room together, but helped to ensure that we were all on schedule.

How did the process shape your final design?

The process really allowed us to refine areas where our app was weakest. For example, we had the challenge of allowing users to join group tours in a way that was intuitive to use. At first, our design involved being able to join a group in many different places. By the end of our iterations, we were able to discover: joining a group in one set place was ideal. We also made sure the "My Tours" icon was a list of tours a user can view instead of a tabbed format in our initial design. This gave users a more simple and sequential design. The process always allowed us to more slowly toward a better and better interface that satisfied the main needs that were highlighted in all of our usability tests.

How have your tasks changed as a result of your usability tests?

Our tasks did not change very much and that is because we spent a lot of time iterating on tasks even before we started prototyping. Our tasks, initially, were far too broad so we spend a large deal of time trying to narrow our scope for our tasks. We really used our usability research to really understand our user and tap into the tasks they really need. Therefore, when we showed our prototype to our users, they were really satisfied with the result. Our wheelchair user participant Molly really enjoyed learning about our solution and thought it was a great way to meet new wheelchair users and explore travelling in a safer and more local environment.

Do you think you could have used more, or fewer, iterations upon your design?

We believe the number of iterations was a perfect number. The iterations especially after heuristic evaluation and our first usability test were crucial to the improvement of our design. We actually also added a step between the final prototype and the final digital mockup: of a cartoonish mockup in Balsamiq so we were clear what would go on the final product. The five iterations we did were crucial to the polished product we have today.

10. Appendix

Script for Usability Testing

"Thank you for agreeing to participate in this experiment! My name is _____. We are conducting a usability test on our application and would like you to help us learn how to make it better. We have a couple of tasks that we would like you to complete for us. The first is going on a solo, self-guided tour. The second is finding a group tour to join.

Here is the way the test works: You will try to sort through each task by treating this wooden panel as a smart phone. When you touch the screen of the phone I will

simulate the app by displaying alerts and changing screens as necessary. At all times, you are encouraged to think out loud and critique the app as you go. Please feel free to ask questions at any time, especially if you are unsure what to do.

Finally, we would like you to know that the only thing being tested here is this app, not you. All critiques, remarks, and recommendations are welcome.

Now, please proceed through task 1:
- Select a tour you'd like to go on
- Now you're on this screen interact with it a bit, then start the tour
- Pretend you are on a tour, say you get to the next destination about...now
- Interact with this screen, and then move on to the next stop when you are ready
- Let's assume the tour is over, and this screen pops up: view it, and then end tour
- Task one is completed!

Then, we are going to process through task 2:
- From this point choose join a group tour
- Find a group tour you like and click on it
- View the group details and click to confirm you want to join the tour
- Now navigate to your home screen
- View your groups
- See if your group has been added to your tours joined page!
- Task two completed!

Critical Incidents From Your Usability Testing
- Group tours page was confusing and needed a more simplistic interface
- How do users get from point A to point B on a tour?
- How can I return to main screen page screen and go back?
- Messaging between users for group tours is not intuitive. How do I set a time to meet for the tour?
- I would much prefer a map that highlights the route and position of the user.
- When I am on the go, I want to be able to listen to instructions instead of producing my phone every time I want to check for directions.
- I want to be able to see other people in a group before I join.
- What happens if I try to leave a group who's tour date has already past?
- I'd like to see other groups led by the person leading my current group.
- The picture of the person giving the tour doesn't give me any useful information and takes up a lot of space.
- I don't want to have to scroll all the way down the page to start a tour.

References

[1]   R. Reznik, 'Wheelchair Facts, Numbers and Figures [Infographic]', 2015. [Online]. Available: https://kdsmartchair.com/blogs/news/18706123-wheelchair-facts-numbers-and-figures-infographic. [Accessed: 10- Oct- 2013].