

Pool'r

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CSE 440

Assignment 2H: Getting the Right Decision

Team Members/Contribution statement:

Alva Wei: 25% Writing/editing/illustrating of various sections
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Problem and Solution Overview:

Because it is uncommon for elementary school aged children to own cell phones, children in this age group often do not have a way to contact their parents in an emergency. This is usually not an issue if adults are nearby. However, for children who walk to school alone, usually because their parents have work, and perhaps because the school bus system is poor in their district, the commute to and from school can be dangerous. Our group aims make the commute to school more safe for these children by designing an application that facilitates the creation of carpools. This application would allow parents to find other parents and collectively create a chaperoning schedule so that their children will never need to walk to school alone. Parents who cannot chaperone as much can also contribute to the group by paying for gas costs. For parents who do not want to be overbearing, or are concerned about the privacy of their child, this may seem like a less invasive, more traditional way of keeping children safe than tracking devices. Additionally, users who are not good with technology could use this system with minimal technology use: after setting up the group, if their schedules are constant, they will not need to use the application. These users might miss out on a few features and flexibility of updating their schedule, but they still get the benefit and convenience of joining existing carpool groups, and, the safety of their children is still ensured by the chaperoning.

Design Research Goals, Stakeholders, and Participants:

Because our problem involves not only the children who must walk to school alone, but their parents, we targeted 2 user groups in our research - parents who are worried about their children walking home from school alone, and children who want to feel safe when walking to and from school. We also identified the school administration, elementary school teachers, and the community around the school as potential stakeholders. These groups are stakeholders because they care about children's safety when arriving and leaving school property as well as the safety of the community surrounding the school. Accordingly, we sent out interview requests to neighbors and family friends with young children, as well as several school employees who one of our members was in contact with.

Our research was limited in a few ways. Initially, we wished to do contextual inquiries with parents and children in the mornings before school. This would allow us to observe the existing ways parents send their children to school, and to observe parent-child relationships firsthand. Unfortunately, because we only had a week to conduct our research, we were not able to schedule in-person interviews, and several of our interviews were conducted via email. This also meant that we had to rely completely on self-reporting methods of user research. We also wanted to interview both parents and children, but we were apprehensive about interviewing children because of the ethical considerations of using their personal information. We ended up interviewing 3 parents, 1 child, and 2 school employees.

Design Research Results and Themes:

Summary of Findings:

Through our six interviews, we collected the thoughts of parents, school employees, and an elementary school-aged child in regards to the safety and privacy of commuting children. We found that parents were most concerned about cars and animals when their children walked to school alone. Additionally, the parents that we interviewed seemed to think that tracking could be useful not only when going to school, but whenever their children were going somewhere alone. Through our interviews we also found that the privacy of children was not as important as we thought it would be.

Design Research Themes:

Children are not concerned with privacy

All of the parents we interviewed felt that their children would not care about being tracked, which is consistent with the thoughts of the single child interviewed. This conflicts with our initial concerns about young children not wanting to be tracked - in our initial ideas for the design of our product, we wanted children to be able to control when their location was being sent to their parents in order to respect their privacy. This new information makes the children's privacy concerns less of a consideration. However, there do appear to be different opinions about privacy from the perspectives of the parents. While 2 of the parents we interviewed did not voice any concerns about intruding on their children's privacy, Participant 4 said that he would prefer not to track his child in order to give his child "some privacy, freedom and trust his judgement," indicating that different parenting philosophies might dictate how comfortable parents are with tracking their children. Because any product that we create would ostensibly be marketed to and sold to parents, perhaps a tracking device that would give children more control of their information would appeal to a group of parents who have concerns about restricting their children's freedom.

Tracking has more Applications than the Commute to School

Participants 1 and 6 told us that they drove their children to school, so tracking wouldn't be useful in that situation. Participant 2 indicated that at her school, fewer than 10 students walk or bike to school, none of them unsupervised. Despite this, these participants acknowledged the value of tracking. Participant 2 said parents should know where their children are. Participant 6 said she saw value in tracking in other circumstances, such as while her child walks to a friend's house. Participant 1 indicated that if he used such a tracker he would check it often, indicating he would use it at times other than on the way to school. The trend we're seeing is that the scope of this issue could be larger than we were originally envisioning. As we continue, we should be sure that if we keep the scope of the

project centered on walking to school, that we can justify that decision and are not restricting the scope artificially to keep our target group small.

Safety Concerns: Cars, Animals, and Strangers

The parents we interviewed seemed to be most concerned about the safety threats of cars and animals when their children walked to school alone. Two of the parents also mentioned strangers. While these concerns could definitely be aided by tracking, which could tell a parent how to find their child in case of an emergency, they also suggest different possible solutions to child safety. Two of the parents explicitly mentioned crosswalks as something they worry about when their child is walking to school. This suggests that an important aspect of ensuring the safety of young children is ensuring their safety on the road. This could mean increasing the visibility of children from cars, or even creating a system to improve crosswalk safety across an entire neighborhood. The threats of animals and strangers could possibly be addressed by some sort of deterrent. While it seems dangerous to put something like pepper spray in the hands of elementary school-aged children, there may be other ways of deterring threats that are more appropriate, such as an alarm - car alarms, for example, have been used to deter vehicle theft by drawing attention to the car. It is important to consider that most of our interviewees were from middle-class suburbs, or rural areas, where the threats of wild animals and traffic might be more common than the threats of strangers. This leaves a gap in our knowledge about the safety concerns in low-income and urban areas.

Chaperoning Young Children Seems Common

Two out of the three parents that we interviewed chaperoned their parents to school. Additionally, Participants 2 and 3, both employed by schools, said that all of the kids that they came into contact with were chaperoned by adults - in particular, Participant 3 said that after after-school activities, coaches stay with the students until they are picked up, indicating that constant adult supervision is not only practiced by parents, but enforced by schools. This seems to suggest that tracking is not a necessity for the safety of many children, because tracking seems to be so common amongst our interviewees. Again, however, it is important to note that our interviewees did not come from low-income areas, where parents might not have enough time to pick up and constantly chaperone their children. Additionally, our pool of participants only included 3 parents, so we cannot make definitive claims about the prevalence of chaperoning children.

Task Analysis

After synthesizing the information gathered from our research, we were able to identify multiple tasks to design for. We also received several suggestions on ways we can confront common concerns of parents and other stakeholders.

1. Who is going to use the design?

Our design will be used by children who typically walk to and from school and by their parents. Our research revealed that this may not be as prevalent as we initially assumed, although as stated above, none of our participants who responded are from low-income areas. Had we been able to get more respondents and specifically more diverse respondents, we do believe that we would have seen more people who fit closely into our target group. (At the time of writing this assignment, one of our interviewees, the principal of Madrona Elementary in SeaTac, had not yet replied to our interview questions.)

2. What tasks do they now perform?

Currently, the children who walk to and from school unsupervised are instructed to call their parents when they get home (if a parent is not already home). Additionally, if a student is unexpectedly absent from class, the schools we interviewed notifies the parents immediately.

3. What tasks are desired?

Our interviewees want to be able to know their child's location in case of emergency. They also would like to know when their child arrives at a certain destination (home, school, a friend's house, etc.). The child we interviewed would like a way to contact their parents while walking alone or with friends.

4. How are the tasks learned?

Children may need some instruction with our solution. However, with our carpooling design, the main knowledge the child will need is social: which parent is going to pick them up, appropriate behavior while riding with them and the other kids, etc. Parents, barring a language barrier or other circumstances, should not need any special instruction for learning the tasks: the app should be intuitive to use.

5. Where are the tasks performed?

The tasks are centered around a child's commute from home to school and back, as well as other times a child may be needing to get somewhere. The parent performs their end of

the tasks (receiving notifications when their child has been picked up and dropped off, seeing the car's location while in transit) wherever they happen to be, often at work.

6. What is the relationship between the person and data?

The primary relationship between the person and the data is a parent's desire to know that their child is safe. This takes the form of a parent receiving the location of the car they're riding in, or a notification that the child has arrived, or a child being able to convey essential information to a parent who isn't present during an emergency. Other data that is involved in these tasks is the average carpool trip length, average departure and arrival times, and the routes taken from place to place. These pieces of information are of lesser importance than those above, but they may prove useful somewhere in our design.

7. What other tools does the person have?

One tool which some parents and their children have is the ability to drive their children to school, or to accompany them while walking to school and other locations. This is actually vital to our carpool design, as those who are able to drive will be able to assist those who cannot. One participant identified that another tool they use is the home phone: after their child arrives home, the parent and child communicate using the home phone to check in and make sure that the child arrived their okay. Other parents (although none of whom we interviewed) have other child tracker devices that are on the market.

8. How do people communicate with each other?

For parents that walk or drive their children to school, communication between the parent and child happens continuously as the event happens, through verbal and physical communication. For those parents who call their children once they arrive home, communication happens verbally through the use of phones.

9. How often are the tasks performed?

The task of being notified of a child's arrival/departure is performed 4 times per day (at the endpoints of a child's commute). This would, of course, happen on every school day. It may happen additional times if the child has other activities that the carpool system is being used for.

10. What are the time constraints on the tasks?

Notifying a parent when their child has reached a destination occurs during times set by the parent (i.e. the parent must receive a timely notification if the child has arrived or not). Notifying parents/authorities during emergencies must happen immediately. Data from the

the carpool driver going to the parent in non-emergency situations should be transferred as quickly as possible, ideally in real time.

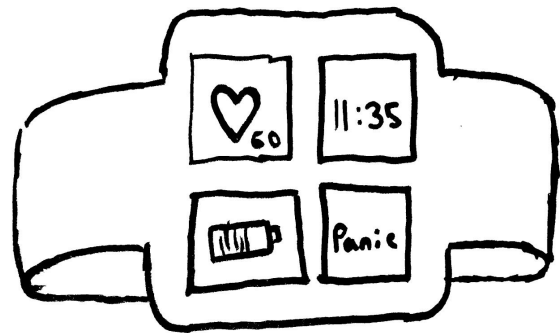
11. What happens when things go wrong?

Because we are dealing with the safety of children, if anything at all goes wrong and a parent is unsure if their child is in danger or not, they must be able to contact the appropriate authorities: either school officials or the police. If the connection between the carpool driver and parent goes down for a significant period of time, the parent should be notified of this so they can ensure by other means that their child has gotten dropped off at school/home by the carpool driver.

Proposed Design Sketches - "3x4":

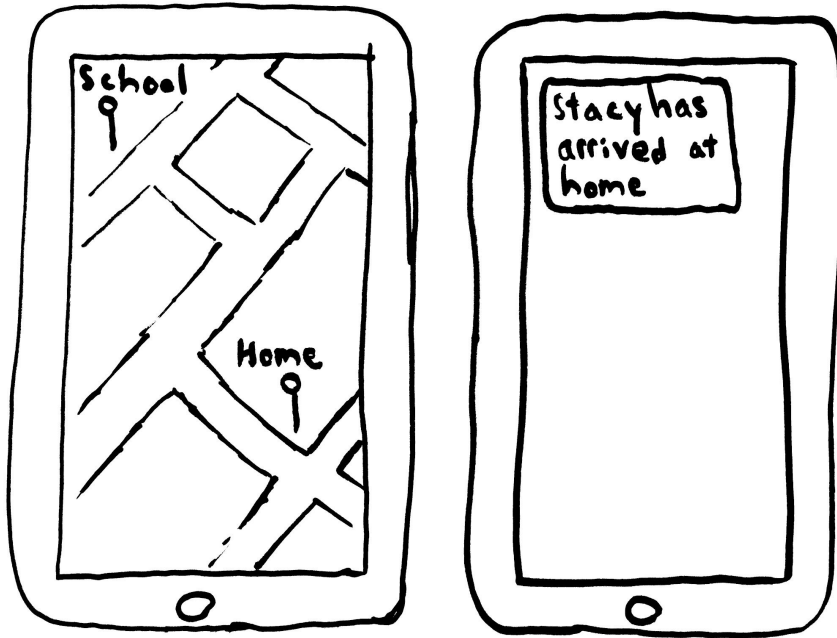
Designs:

- 1. Wearable and Mobile App:** Our first design is a wearable device that could easily track children's location and alert parents in case of emergencies. A wearable would be a simple solution as it is not intrusive to the user and easy to use. The wearable will show time, battery life, heart rate, and have a panic mode for emergencies in which parents will be contacted. The wearable will also have an accompanying mobile application for the parents where they will receive the notification from the child's wearable as well as view their location.



Task 1: Parents need to see when a child arrives and departs from a specific place set by parents such as school and home.

Parents can easily set specific locations with the mobile application. After setting up the desired location parents will be able to enable notifications to see when their child is there and when they are not.

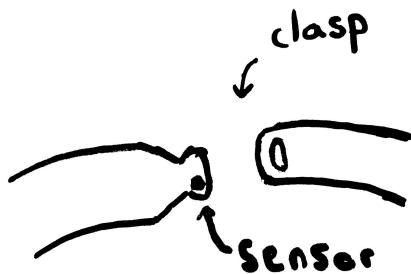


Task 2: A child can let parent know if they are in a scary situation

With the use of the “panic mode” on the wearable, children will be able to let their parents know where they are in case of an emergency with just a press of a button.

Task 3: Being able to see when device has been taken off

Due to the sensors on the clasp used to open and close the wearable, parents will be notified via the application when their child has taken off or put on the device.



Task 4: Parents need to be able to see when child is in an unsafe zone in the neighborhood, in range of sex offender, high crime area, etc.

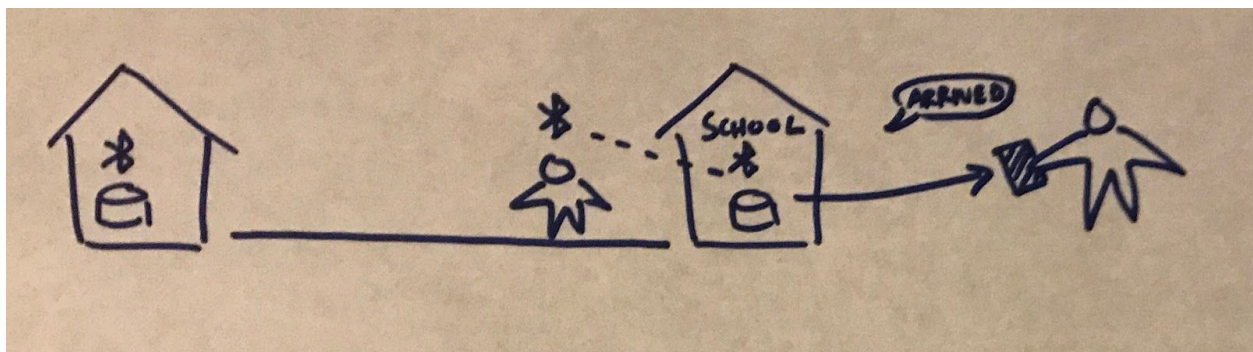
Through the mobile application parents can easily set up “unsafe” zones or locations. If their child is in one of the specified locations, parents will be notified via the application.

Task 6: Parents want to still provide their children with some space

Since this solution encompasses a wearable, it is not very intrusive to children. It also allows parents to be informed of their child's arrival at locations without having to open the app. This discourages the parent from obsessing over their child's location by only giving

them the most important information (notifications when their child arrives at their destination), rather than needless details of the child's trip. The app will also keep track of how many times the parent has opened the app to check their child's location. This will encourage self moderation.

- 2. Keychain:** Our second design is a bluetooth connected keychain that could be attached to a child's backpack. This is another very unobtrusive device and will not interfere with the child's daily life in any way. The device will work by setting up a beacon in the child's elementary school as well as one at home and when the child (the device on his or her backpack) gets close to the beacon it will automatically notify parents that the child has arrived at the location.

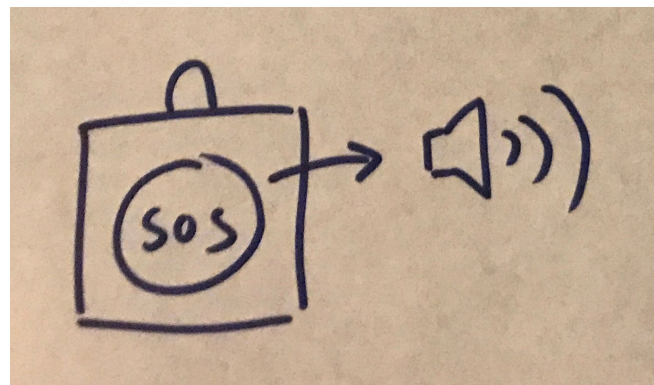


Task 1: Parents need to see when a child arrives and departs from a specific place set by parents such as school and home.

Since the device will have bluetooth it will be able to notify parents when the child is at a specific location such as school or home with a text message. The device will also be able to notify parents when their child has left the location when the keychain disconnects due to range.

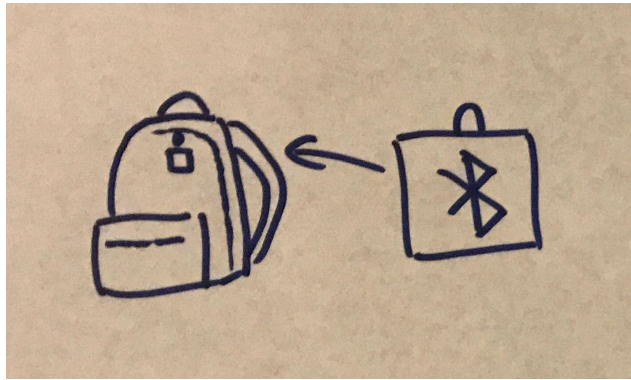
Task 2: A child can let parent know if they are in a scary situation

The keychain will have a help button in case children are in an emergency. This will trigger a loud beeping alarm that notifies anyone in the vicinity that the child is in danger.



Task 5: Grandparents and less tech-savvy parents want to use technology to keep track of their children, but find it difficult to adapt.

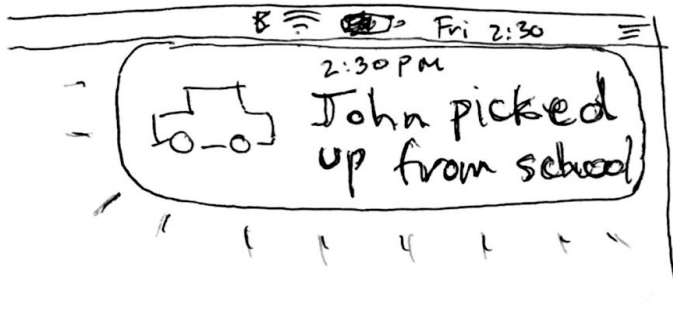
This is a great solution for people who are less tech savvy since there is no work required by the child or the parent (aside from initial setup). Parent or guardians will simply receive a text when the child is at a close proximity to the set locations.



Task 6: Parents want to still provide their children with some space.

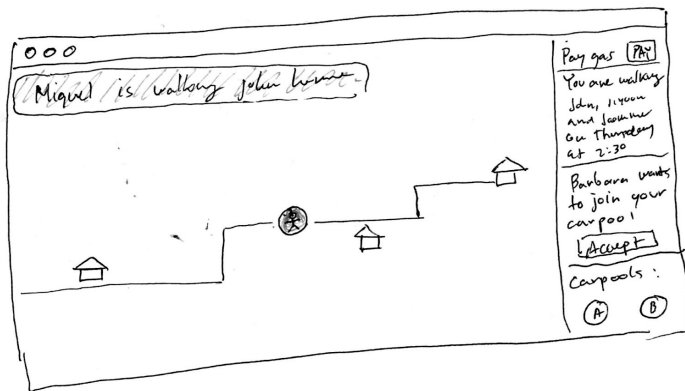
This solution also gives children a lot more freedom as parents are only aware of their location at set locations instead of all the time. Additionally, the solution is not intrusive to the user as the device simply clips on their backpack and they do not need to do anything else with it.

- 3. Carpool System:** Our third design idea is to create an application that facilitates the creation of carpools. This would be a system where parents can fill in their availabilities and then be able to collectively create a chaperoning schedule. Parents who cannot chaperone as much can also contribute to the group by paying for gas costs. For parents who do not want to be overbearing, or are concerned about the privacy of their child, this may seem like a less invasive, more traditional way of keeping children safe than tracking devices. Additionally, users who are not good with technology could use this system with minimal technology use: after setting up the group, if their schedules are constant, they will not need to use the application. These users might miss out on a few features and flexibility of updating their schedule, but they still get the benefit and convenience of joining existing carpool groups, and, the safety of their children is still ensured by the chaperoning.



Task 1: Parents need to see when a child arrives and departs from a specific place set by parents such as school and home

Chaperones can use an app to indicate that they picked up the children that they were assigned to pick up, by checking the child off on a “drop off” or “pick up” list. Parents will get a notification when their child is picked up.



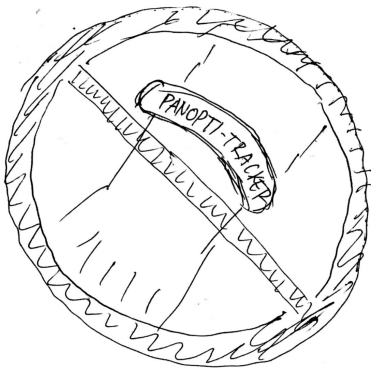
Task 4: Parents need to be able to see when child is in an unsafe zone in the neighborhood, in range of sex offender, high crime area, etc.

Parents can open the application, and if their child is currently being chaperoned and the chaperone has turned on location tracking in the integrated app, the parents can see where their child is on the route home.



Task 5: Grandparents and less tech-savvy parents want to use technology to keep track of their children, but find it difficult to adapt.

For those who are less tech inclined, a scheduled carpool can be set up so that the application does not need to be used regularly. These people would first enter their weekly availability, and then a fair schedule would be auto-generated.



Task 6: Parents want to still provide their children with some space

With this system, there is no constant tracking device that a child must wear, and any tracking is indirect, being based on the locations of the chaperones who opt in to tracking. There are no steps to this task.

Out of our two child-tracker designs and carpool system design, we chose to go forward with our carpool design, because it solved or circumvented all of the problems that we identified from our user research. Our overall goal was to design a product that would ensure the safety of children on their way to and from school if their parents could not drive them. When we asked parents what they worried about when their child walked to school alone, their primary concern was danger from traffic - their children not walking on the sidewalk, speeding cars, or busy crosswalks. The tracking designs, which did not have substantial preventative features to protect children, did not directly address these concerns. With carpooling, however, an adult will always be with the children to ensure their safety. In essence, the carpool system addresses the root of the problem we were

trying to address - children needing to get to school. Another concern that we were trying to address was parents not wanting to be overbearing in trying to ensure their children's safety. In particular, one of the parents that we interviewed said that they would not use a tracking device because they wanted to respect their child's privacy. The carpool design eliminates this concern by not forcing tracking on the children. Instead, it uses the chaperone's location from their phone to see where the children are during the duration of the child's commute. Finally, our peers were concerned about the process of buying and paying for a service plan for trackers being a barrier to entry for the tracking designs. The carpool design just involves downloading an app on a smartphone, which most parents have already, so it avoids this problem. It was a little bit difficult to choose the tasks that we would address with this design, as most of our tasks had to do with problems originating from tracking, the first solution that we had considered. We chose our first task, parents knowing that their child left and got to their destination safely, because it was the key overarching task that we set out to address. We chose our second task, parents wanting to provide their children with space, because we thought that the carpool solution uniquely circumvented ethical issues that parents might have with tracking and monitoring their children so closely, which we struggled to solve with our two tracking solutions.

Written Scenarios - "1x2":

Linda can't pick up her son Benji from school on early release Wednesdays and they live too close to the school for Benji to take the bus home, so Linda uses the Pool'r app to find another parent, Doris, who lives near Linda and is willing to drive up to 2 other kids (in addition to her own daughter Jessica) home on Wednesdays, Thursdays, and Fridays. Linda uses the app's built-in messaging platform to connect with Doris about picking up Benji on Wednesdays. After Linda, Benji, Doris, and Jessica meet in person, they agree that Doris will pick up Benji on Wednesdays and in return, Linda will give her a little gas money every month, where the amount is suggested by our app based on miles traveled. Now, every Wednesday, our app will remind Doris who she is picking up from school, as well as provide navigation to Benji's drop off location. Once Doris picks up or drops off Benji, the app sends a text to Linda's phone letting her know that Benji has been picked up or dropped off safely.

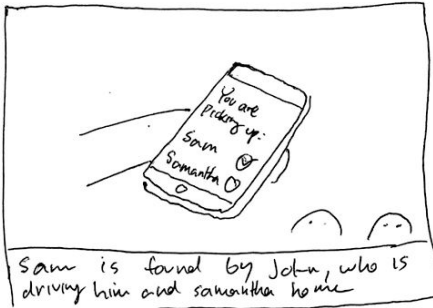
Susan is unable to drive her son Jim to school because although she works from home, she has a video conference call with her team during the time that would be optimal for driving Jim. She can't drive him earlier because the school is locked until shortly before classes start, and unfortunately Jim tends to get bullied when he rides the school bus that's closest to their house. Susan is okay with Jim walking to school since it's a fairly safe walk from their home to the school, but she still worries incessantly about him when he's alone like that. It's to the point where it's affecting her ability to focus on her work. Eventually, she learns about the Pool'r app and finds out that there is already a carpool going in her neighborhood. Since Susan can't drive, she contributes a little monetarily for gas money. After having met the other parents in the car pool, she is comfortable when them driving Jim to school. Now after he leaves the house, Susan doesn't worry.

Storyboards of the Selected Design

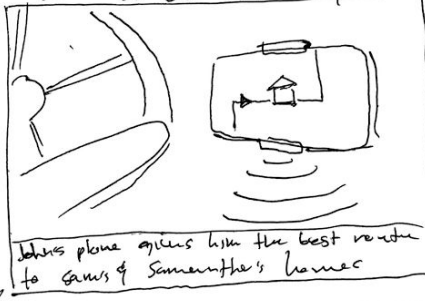
Storyboard 1:

Sarah works long hours and cannot pick up her son Sam at 2:30 when his school gets out. She uses a carpool app to make sure Sam gets home.

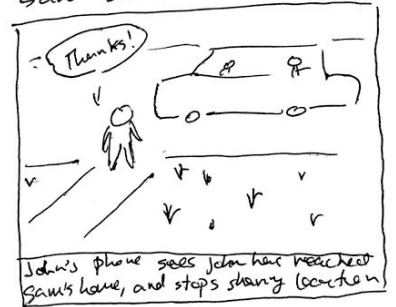
2:30 PM
Sam's school gets out



2:40 PM
Sam is on the way home



2:50 PM
Sam arrives home



Storyboard 2:

w/o carpool



7:30 am



8:15 am



9:45 am

w carpool



7:30 am



7:56 am