

HCI P3 GROUP 9

ENHANCED SENSES

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PRESENTED BY

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DESIGN FOCUS PROBLEM SPACE

As you walk around Baltimore, the Hopkins campus, anywhere really, chances are you can see students, faculty, staff, community members et cetera using their phone as they walk around. They may also have in headphones, which compounds the distraction and impairment of their senses. Perhaps, you've had to swerve around another person or animate/inanimate object because you only noticed it was in your path at the last second. In certain contexts, the stakes are even higher. Take, for example, someone who has decided to draft an email (something about getting one more thing out of the way) as they walk from one place to another. They end up at a crosswalk and look up from their phone to notice that they can walk—there's 10 seconds left. Once they enter the crosswalk they return to their phones only to find that a car is seconds away from hitting them because they failed to see that 10 seconds had run out and the light is green and the driver of the car is also distracted.

Yet, we continue these obsessive and distracted behaviors believing that our senses will always be good enough to catch us at just the right moment.

Phones, namely smartphones, hold people's entire lives and are encountered more and more nowadays. As we enter a time of increased fear of missing out (FOMO) and wanting to be productive and connected at all moments of the day, our safety risk increases. Thus, we wanted to explore the temporary impairments caused by risky behaviors such as phone usage while walking. We wanted to help our user be more aware of situations that increase his risk of injury to himself and others. We wanted to empower.



DESIGN FOCUS PROBLEM SPACE

Our design team consisting of three HCI students and an external co-designer decided that we'd tackle the problem that impaired senses via smart phone usage present today. We thought about Apple's Screen Time and how it enables users to be cognizant of their behaviors, discourages excessive phone use, and even forcibly removes access to certain applications if the user needs this.

Enter *Enhanced Senses*. The product aims to bring awareness to risky situations, encourage smarter behavior, all while helping those who will inevitably keep doing what they're doing. Our co-designer helped us focus our design on the specific context of crossing streets, intersections, and other areas where people and poles are not the only concern, but automobiles. We, thus, pushed efforts dealing with avoidance of people, poles, and other dangerous animate and inanimate objects to the backburner.

Of course, this technology could be extended to these domains also.



PROBLEM UNDERSTANDING

Methods:

We tried to do context inquiry with our user to collect user data to gain further insight into our problem space. However, the problem we want to address happens with a probability (Something happens when people walking while focusing on their phone or music) and our presence definitely interferes with the user behavior, the context inquiry wasn't ideal. Thus, we conducted a general interview with the user to further understand this problem.

User background:

We decided to focus on user empowerment. Our users may not necessarily have a specific disability, though some of the options that our technology provides are accessible. Our user is 19 years old, currently a sophomore BME student from Canada, who loves listening to music.



PROBLEM UNDERSTANDING

Findings:

Our user loves listening to music loudly and often needs to take out his headphones if he wants to hear people clearly. He uses regular earbuds with buttons, which are used to control the songs under most circumstances. However, he said: "**I occasionally use the phone to pick a song, when there is a song I really want to listen to**". When he listens to the music, he would keep both earbuds in unless walking/talking with someone, which is what most people do. He will keep sound loud enough to not hear people but can hear cars to avoid danger. **He said he sometimes missed the people who are trying to talk or get his attention or even almost bumped into someone when both were distracted by music and phones**, but nothing major and dangerous, such as getting injured or almost hit by a car, happens. Although he does try not to use the phone too much while walking in order to avoid injuries, there's is cases like continuing important conversations or picking song really wants to listen to that he will still focus on the phone while walking.



IDEATION & PROTOTYPING

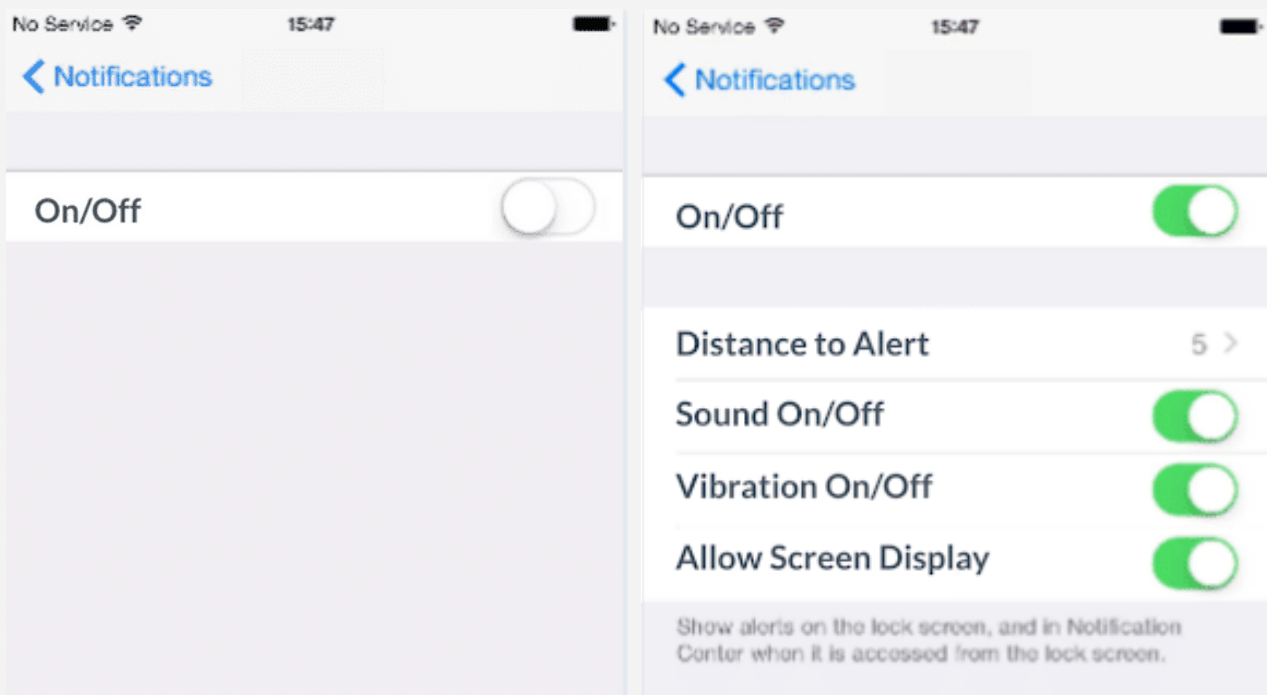
We started off by discussing with our user and asking how this idea of helping people would be best implemented. At first we thought about creating an app people could download. However we realized that this would be hard to use in terms of detecting other users as the other user would also have to have downloaded the app. Thus our user decided it was probably best to implement this within a smartphone (our demo shows IOS but would be implemented in Androids as well). The user however, will have the option to opt in or out of the service.





IDEATION & PROTOTYPING

We thought it would be important to have different forms of alerts. We asked the user what kind of alerts he thought would be useful. He said the general sound and vibration would be useful but may not get his attention if he's just walking around and texting without listening to music. So after some discussion we came up with the idea to have an overlay screen to notify the user if they're texting and walking. It will just be an alarm to notify the user.

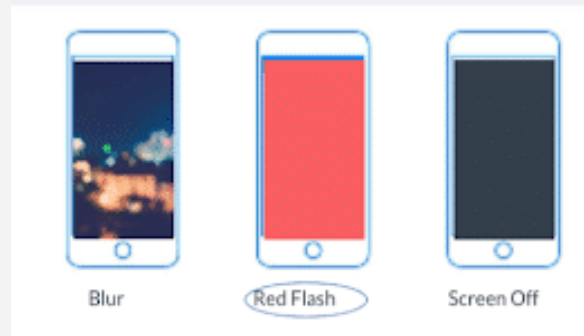




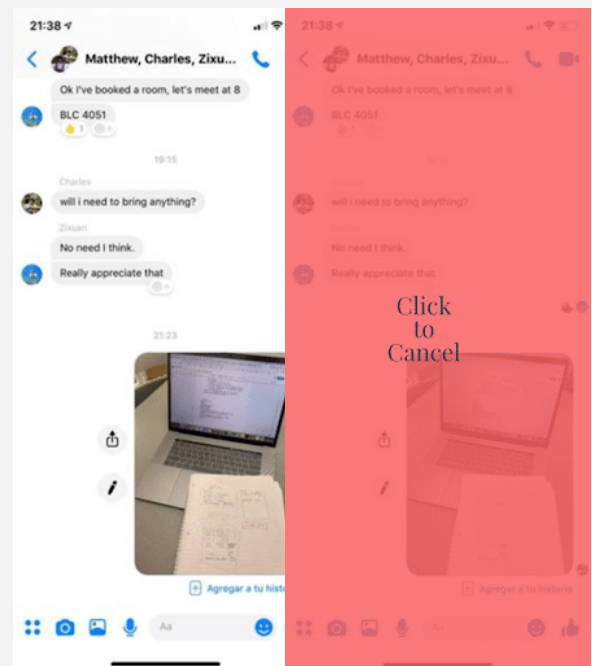
IDEATION & PROTOTYPING

We created a few options for the overlay too. We realized there could be different options our users may want. We decided to implement a feature where it would blur the users screen. Thus they wouldn't be able to see anything on their phone clearly anyways. Another option we implemented was a red flash. This would overlay whatever you have on your screen with a flash of red to alert you. You can still see through the red but it alerts you that something is going on. With this alert we provide the option to tap out of it as well. Our final option is to simply have the screen shut off. That way you can't even be tempted to look at your screen.

ALERT STYLE



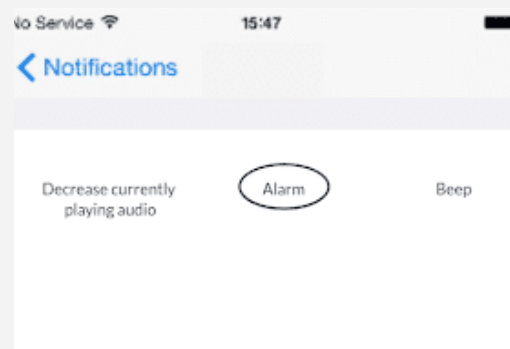
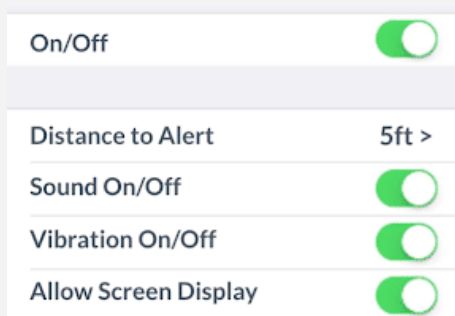
Alerts require an action before proceeding.





IDEATION & PROTOTYPING

So the two important aspects we discussed were crossing the street and bumping into other people. We realized that everyone has a different preference for what they think is being safe. Thus we introduced a section where the user could set how close to a crosswalk or another user they want to be at to get the alert. At first, we just placed a number and then our user mentioned it was better to give a form of metric. Thus, we changed it to include a unit of measurement



After showing our user the initial prototype. He suggested that we also added options for sound. As a big part of what we talked about was listening to music as well. The sound has two main variations. When you are walking and your name is called, the music is lowered so you can hear the noise beyond your headphones. With regards to crossing the street however, he recommended we give options as we did for the screen. He suggested 3 options where we either decrease the volume of the audio, make an alarm sound, or just simply beep.



STORYBOARD

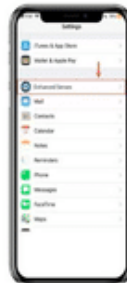
Storyboard Crosswalk Scenario



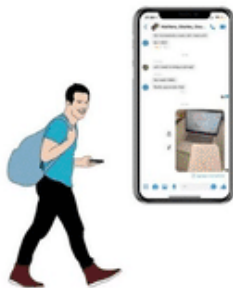
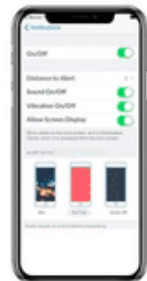
Jacob knows he has a problem with texting while walking and has tried to force himself to refrain from phone use to and from places.



Jacob learned about *Enhanced Senses*, a new feature on Apple's latest update, the other day. It's supposed to help people be more alert and safer when doing things like texting and walking.



Jacob, curious about how this all works, turns on the new feature and configures the settings before he leaves his apartment for the day.



Jacob chats with his friends on Facebook Messenger as he walks on the sidewalk to class. He looks up periodically and approaches a crosswalk.



As Jacob approaches the crosswalk, Facebook Messenger turns red for some reason. Jacob tries to cancel this out before the walk sign goes on, but he gives up and crosses.

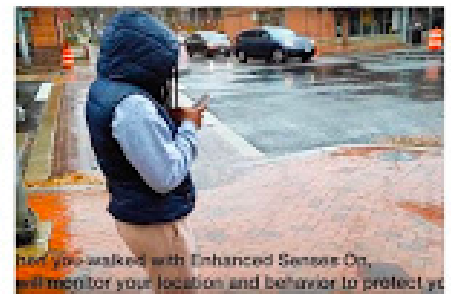
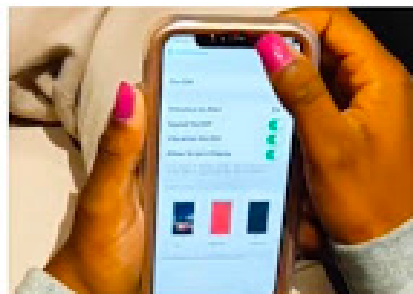
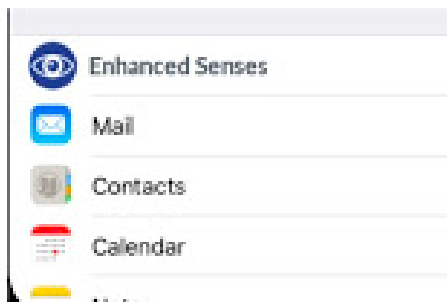


His phone goes back to normal once he's crossed and has made it to campus.



STORYBOARD

Storyboard Crosswalk Scenario (2)



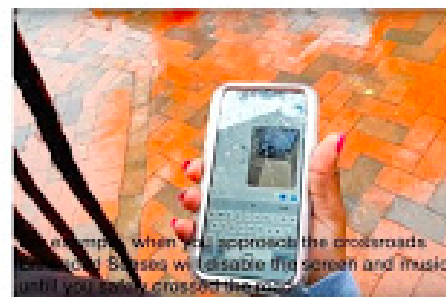
Lisa hears about *Enhanced Senses*, a new feature on Apple's latest update, the other day. It's supposed to help people be more alert and safer when doing things like texting and walking.

Lisa, curious about how this all works, turns on the new feature and configures the settings before she heads back to her apartment.

Lisa chats with his friends on Facebook Messenger as he walks on the sidewalk to class. She looks up periodically and approaches a crosswalk.



As Lisa approaches the crosswalk, Facebook Messenger turns red for some reason. She decides to put her phone away and cancel out the screen later.



When she reaches the other side of the crosswalk, she takes out her phone and realizes it has gone back to normal.



TESTING & EVALUATION

Testing:

In this project, because we are designing with the user, we have the user involved in every step of our design process, and try to get the user feedback in real-time. In the first iteration of our design, we focused on how to notify people when they are walking while staring at the screen with a few notification styles, including Blur, Red flash and Screen off. When we showed the first design prototype to our user, he mentioned that we could also involve the sound and handle the case when people are just listening to music and not looking at the screen. Therefore, in the second iteration, we added the feature of sound setting to decrease the volume or pause the current playing music plus a beep or alarm notification. In the final iteration, our user provided another valuable suggestion of allowing customization on the time in advance or distance ahead of notification. So, another customization setting: distance to alarm was added, because we thought distance is a more consistent standard due to the variance of walking speed.



TESTING & EVALUATION

Evaluation:

During the final evaluation process, we showed the video prototype to several other Johns Hopkins students who use their phones and listen to music with earbuds very often. Here are some of the feedbacks:

1. **Useful.** "It is a very useful design that will actually help improve safety. Everyone is staring at their phones, or even with their earbuds in more and more frequently, which is sometimes a bad thing in terms of safety. Enhanced senses intelligently notifies people when it is time to pay attention to the outside condition. It is something the phone companies should develop and I will definitely give it a try."
2. **Interesting.** "Enhances senses is an interesting idea. At the beginning, people may need time to get used to it. It seems annoying when you are interrupted, but it is actually protecting you, just like an alarm clock. After getting used to it, people will be thankful to this product."
3. **Concerns.** "It is a really great idea and good design. The only concern I have is maybe the design requires the GPS to be very accurate."



TESTING & EVALUATION

Overall, Enhanced Senses achieved the design purpose to help enhance the senses when people are distracted by their phones and are temporarily unaware of their surrounding circumstances.

We also prodded our original user to ask for more suggestions for improvement. Because he was involved throughout the entire design process, he would have more insight in this project. Because of the same reason, it was more challenging than we expected. Nevertheless, he gave us another valuable suggestion: **“It is a really good design. Maybe it can be applied to more circumstances like driving or cycling. It would be very helpful if the phone can just disable the screen to prevent you from texting when it detects that you are driving.”**

In conclusion, the feedback we received taken as a whole was positive. However, as noted above, the design requires very accurate GPS, which may be a limitation. Despite that, our user also pointed out that we could further branch Enhanced Senses to more circumstances. This was a feature we had considered at the beginning but decided not to include due to the time limit, so that we could focus on perfecting our current design of enhancing senses while walking. For future iterations, we would include this.



REFLECTION

Our team enjoyed the flexibility of a participatory design approach and how it enabled us to be focused not just in our design intervention, but on our user. Other common HCD approaches and methods let customers be useful only in the understanding/research phases and the evaluation/testing phases. Using a contextual inquiry method (outside of a participatory design context), for example, allows us to discover opportunities for innovation, but at the end of the day, the designers have to make decisions about the most important features and even make assumptions, albeit informed assumptions, about what users would value. In these situations, the designers are more likely to impose ideas on the user and miss out on some interventions that may be arrived at if the user were on board the entire time. Participatory design removes or at least diminishes the power differences between user(s) and the designers that exists in other human-centered design processes.



REFLECTION

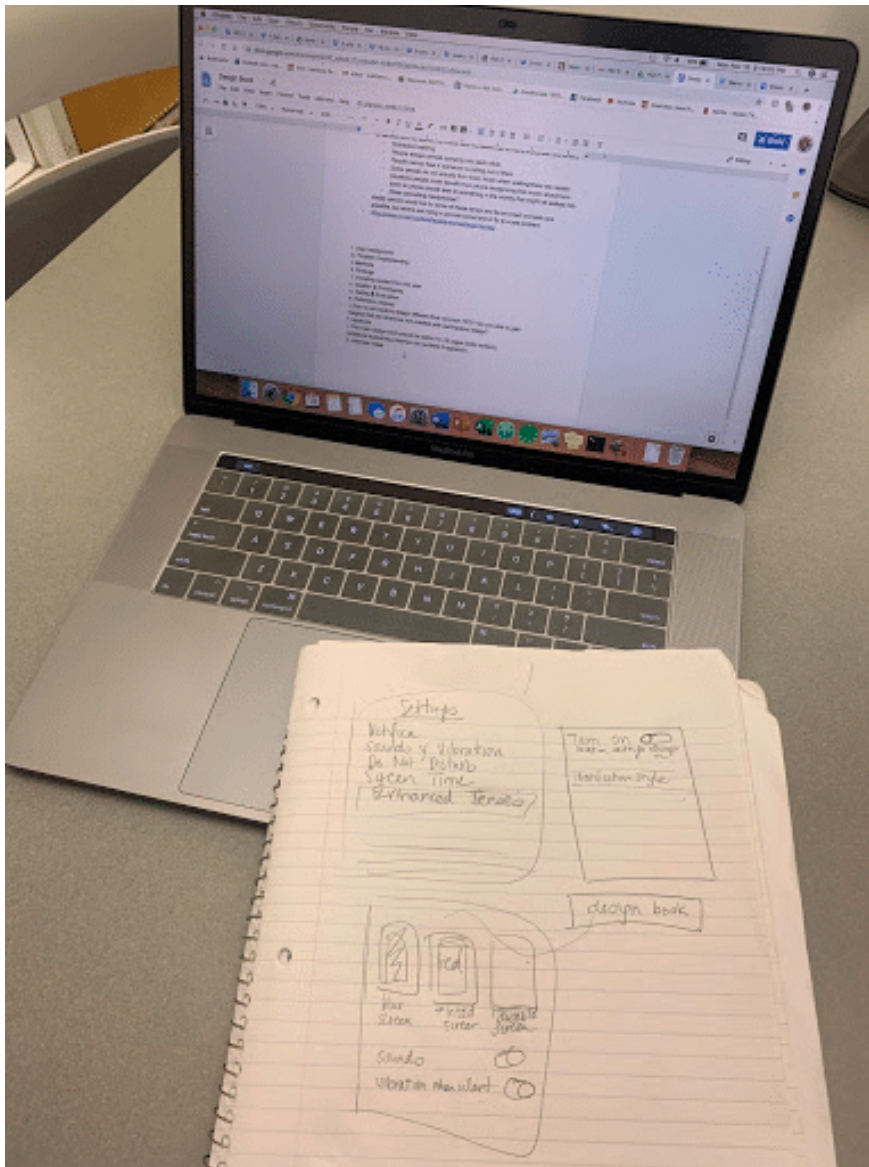
Participatory design is helpful because it keeps everyone in check and accountable to the user as the co-designer(s) have say and power at most, if not all parts of the process. If our co-designer felt that we were veering away from our intended goal, he held us accountable and we'd have to assess where we fell short. The constant communication engenders efficiency and the ability to move forward confidently as we know that what we've done has been approved. We spent significantly less time brainstorming and ideating than in previous projects, which enabled us to begin prototyping, getting feedback, and meeting our user's needs as best as possible.

Finally, we believe that participatory design enables both the user/co-designer and the internal designers to feel confident that the needs we have identified and the solutions align. We see that participatory design generates trust among participants and in the final products as well as enables diversity and inclusion work to be more than just words. We gave the user more than just a seat at the table, but said "hey, we can't move forward without you."



APPENDIX

AN INITIAL PROTOTYPE



INTERVIEW QUESTIONS

- **Name, Age, Major, Gender, Where Are They From**

19, BME, Male, Canada

- **Tell me about a time that listening to music while walking around or using your phone while walking around put you in a dangerous, scary, surprising situation (e.g. injury, bumping into someone, almost hit by car, didn't see or hear someone who called out to you)?**

Nothing major -- probably some things

- **What do you do in order to avoid injuries and the like while walking?**

Try not to use phone screen too much

- **Are there times when you miss someone talking to you or trying to get your attention?**

Cars yes, people no

- **Are there times when you don't use your phone in certain situations? What are those situations and why?**

Crossing street or late at night ... when it's more dangerous

- **Do you listen to your music loud? Do you keep both earbuds in?**

Can't hear people. Keep both in unless walking/talking with someone

- **What kinds of things do you do on your phone while walking?**

Continue important conversations; pick song really wants to listen to

- **What kind of earbuds do you use?**

Reg with the button

INTERVIEW QUESTIONS CONT'D

- **How loud do you listen to your music?**

Loud enough to not hear people but can hear cars

- **Someone bumping into you?**

Yes - both distracted, music and other was phone or music... almost bumped, avoid last minute

- **Change music when walking?**

Earbud usually has button, occasionally uses phone. Uses phone when there is a song he really listens to.

SOME BRAINSTORMING

- Google maps uses number of phones to show traffic so can implement that too
- Can't stop people - making people aware doesn't seem helpful
- When cars use detectors to sense getting too close, maybe phones?
- Alerts help people vs people but not necessarily trees or poles
- Only danger is crossing the street, otherwise just awkwardness
- New app or feature, shortcuts ... on when phone screen is on. User sets notifications. Could be audio warning
- Lower music when name is called ... use audio warning to let user know
- General usefulness is crossing the street, on campus is just trees
- Crosswalk first, times for safety
- Maybe when driving too
- Enjoyed "starting at the beginning with us" - liked that he was in the know/on the same page with us the entire time
- Suggestion that we branch technology out to deal with drivers and cars i.e. situations where people text while driving