DECO3200 Portfolio

Visual Impairment Awareness

Visibility Tile Flip

Gabriella Hartono

Introduction

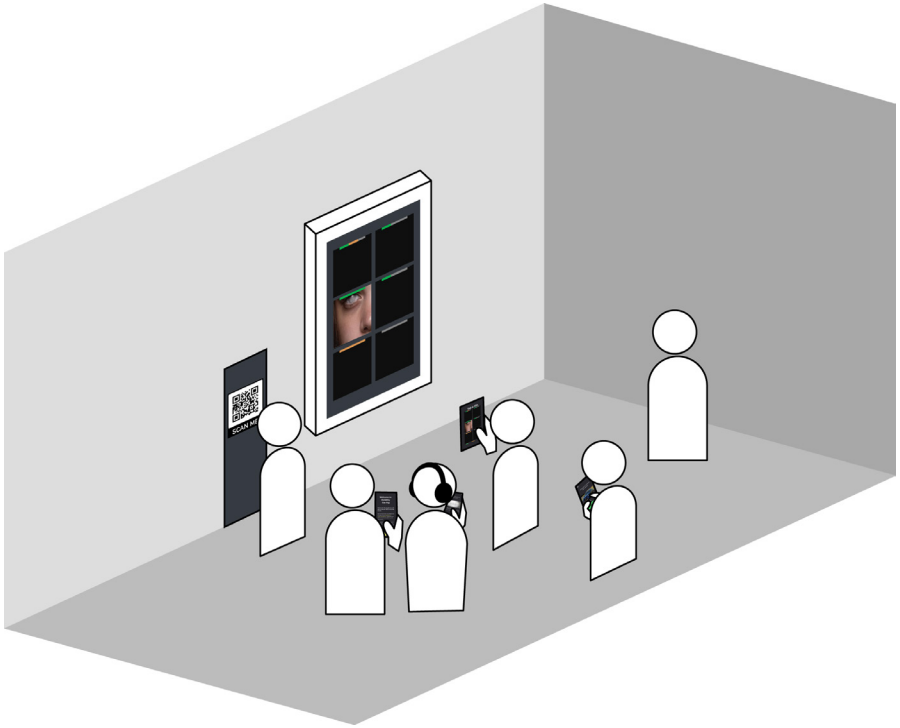
Cities are cluttered with signs and noises vying for our attention. Urban environments can already be difficult to navigate by these alone, but how does it affect people who have limited vision? While products such as the white cane, tactile paving and GPS voice navigation have enabled people with visual impairment to gain back the independence to navigate daily life, they still face an increasing number of challenges as today's fast-paced technological world often leave people with disabilities behind (Manzoor & Vimarlund, 2018, p.377). There exists a lack of inclusivity which has led to a gap in the general public's understanding of how to approach and help people with visual impairment.

Our aim was to design a product that engages those with sight to learn more about the experience of people with visual impairment and improve social attitudes towards them.

Final Concept: Visibility Tile Flip

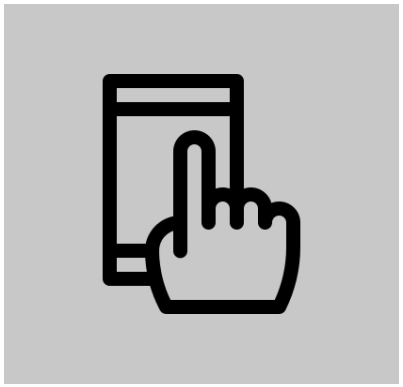
Our team's final prototype is Visibility Tile Flip, a multiplayer game where people flip tiles and guess objects viewed through the lens of people with visual impairment. It aims to engage people to identify types of visual impairment and empathise with people with this disability as it is difficult to use sight to guess the objects.

It is a screen installation interacted with using mobile devices by scanning the QR code beside the screen which links to the website where the game can be played. When tapping on a black tile, users are given a randomised activity to guess an everyday object that has been obscured according to a type of visual impairment or a tool used by those with visual impairment. When a black tile has been tapped 3 times and each activity given has been guessed correctly, the tile would change to a part of a face of someone with visual impairment. Once all tiles are "flipped", the face is complete and the screen will change to informative instructions on how to help people with visual impairment.



Team Structure

Team members

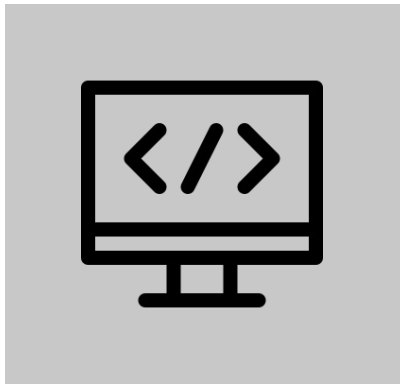


Nicholas Ho

- User experience design
- User testing
- Documentation

Milton Kim

- Graphic design
- User testing
- Video editing



Andrew Le

- Programming
- Concept design
- Prototyping

Gabriella Hartono

- All-rounder
- User experience design
- Editing

Our team delegated its members the above key responsibilities, but there were many tasks that we shared throughout the design process. Each member was responsible for contributing to design concept discussion, to writing parts of documentation and helping in the conduction of user evaluation sessions. Tasks also usually overlapped based on what needed the most attention and who would be available to help on any part of the project.

My Role

Gabriella Hartono

- All-rounder
- User experience design
- Editing

It was decided in the early stages of the project that I was our team all-rounder due to my flexibility across graphic design, user experience and programming. I supported my team where it was needed in all phases of the project, particularly for documentation, visual and user experience design.

Responsibilities per Project Phase

Research

Responsible for research on existing technologies used for raising awareness and the modes of interaction these technologies had.

Ideation

Every member contributed a concept to consider and I created 2 concepts.

I was responsible for creating decision matrices based on criteria identified in the research phase in order to narrow down and improve on our pool of concepts.

Prototyping and Testing

As I was familiar with the concepts I created the best, I created the low-fidelity prototype for Where is There and led the user evaluation sessions for it.

I further aided in deciding on the final concept and collaborated on creating the mid-fidelity prototype.

Development

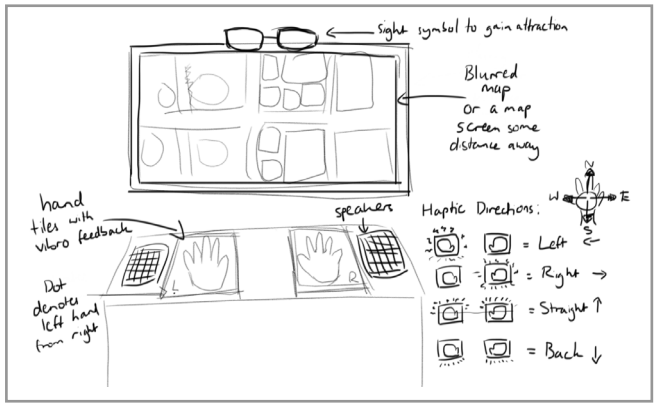
Helped in creating filter images for different visual impairments and overall editing of the final document.

I aided in improving the user experience by mocking up additional activities to the application and implemented these into the application where it was appropriate in the timeframe.

My key contributions involve the creation of concepts, prototyping and implementation of more activities into the final prototype.

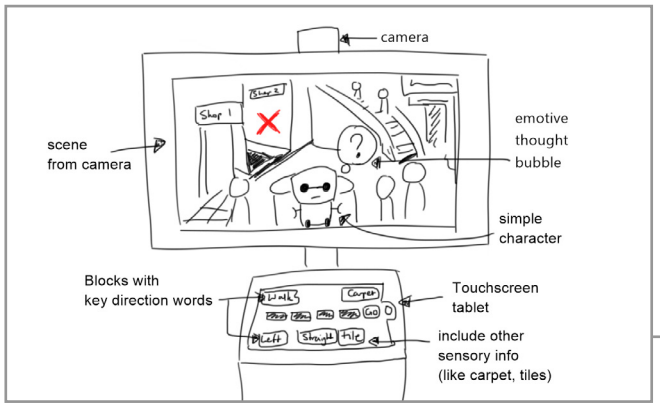
Contributions

In the ideation phase, I created two concepts aimed at navigation awareness for people with visual impairment:



Touch to See

A multi-sensory navigation installation involving hand touch panels, speakers and a blurred screen that provides directions through vibrations and spoken directions.

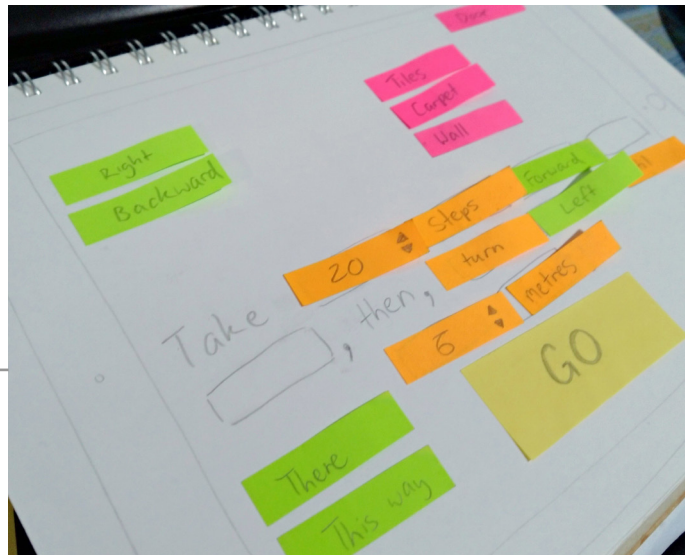


Where is There

A site-aware activity which requires users to get an on-screen character to a spot in the actual environment in front of them by dragging and dropping blocks on a tablet to form directions.

prototyped

Touch to See was discarded for prototyping as it wasn't as strong a concept for raising awareness as the other concepts. Where is There was chosen to be prototyped as it was more interactive and it involved the user to learn about helping people with visual impairment.



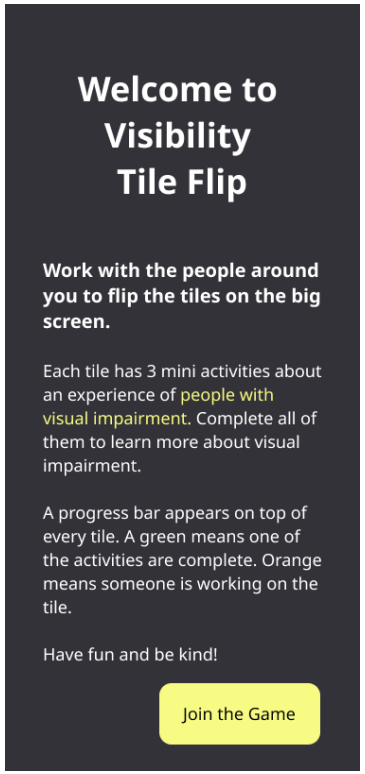
As I knew the concept best, I created the concept's low-fidelity prototype using a mix of paper prototyping with post-its for the tablet drag-n-drop activity, and a digital prototype to simulate the monitor. These were evaluated with users in our first round of testing sessions where observations were noted as participants were asked to go through the arranging directions activity, and the participant was asked questions for a post-test interview about their thoughts.

Due to the complexity of the activity as a standalone, this was simplified and integrated into another concept. While none of these concepts made it into the final prototype, they helped in the team's exploration in understanding what engaged others.

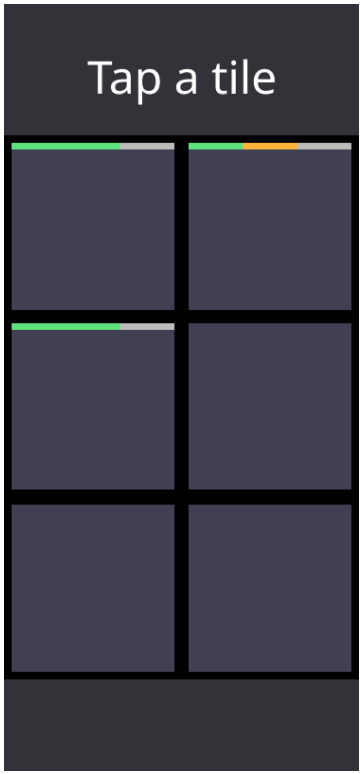
Final concept development

I helped in organising user insights gained from user testing which contributed to choosing our final concept design. This involved mapping advantages and disadvantages of our concepts based on these insights from interviews and test observations, and creating a decision matrix to quantify the value each concept had to the design problem.

This led to the development of Visibility Tile Flip, previously called Community Tile Flip. The contributions I made to the mid-fidelity prototype of our final concept is as follows:

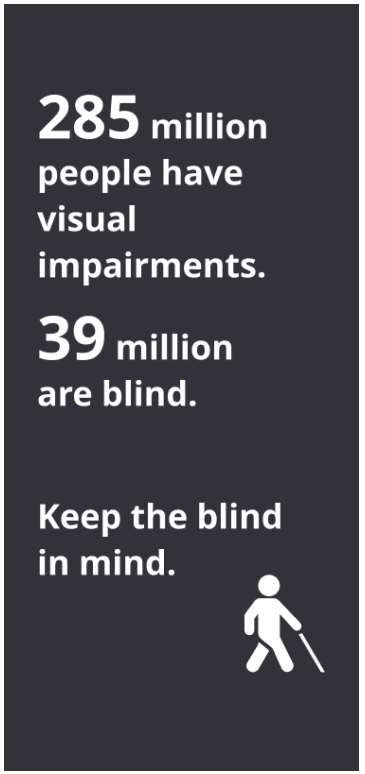


Worked on instruction content for the welcome screen so that it would be more succinct and easy to read through the use of colour and bold text arrangement.

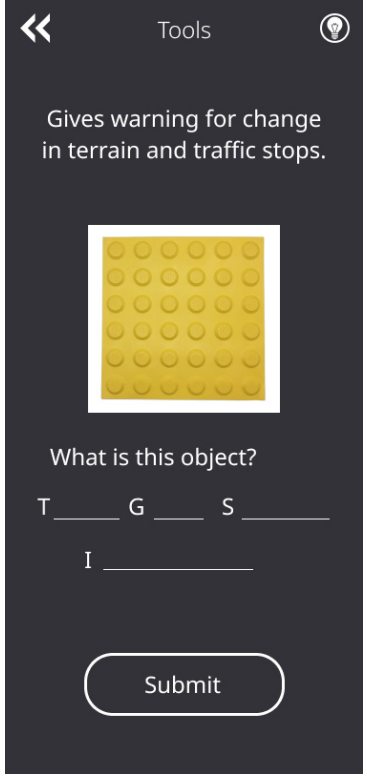


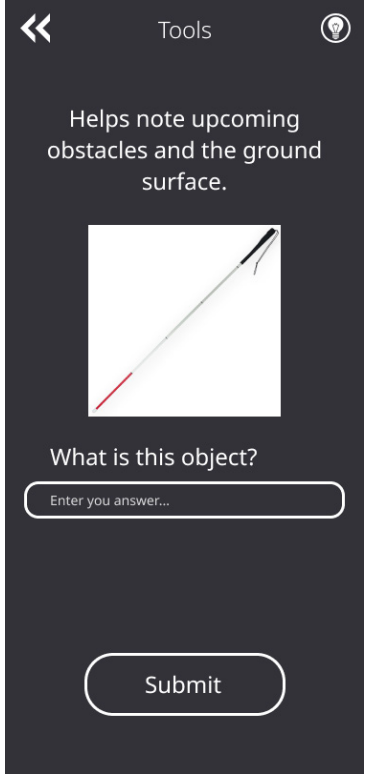
Discussed the multiplayer and progress design, before deciding to indicate progress through coloured bars on top of the tiles.

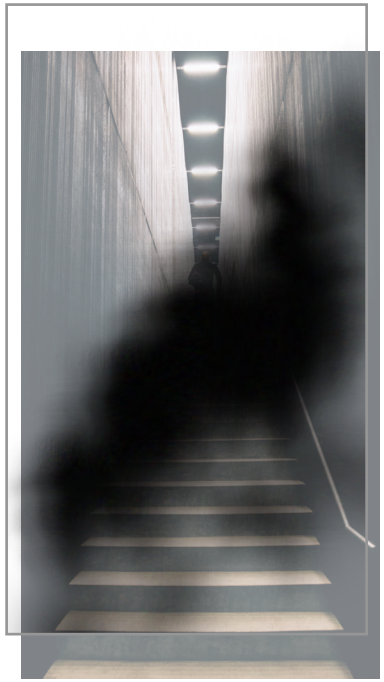
Added a sound component through hints conveyed as the sound of the object, to add a sensory aspect and emphasise the use of hearing by people with sight loss.

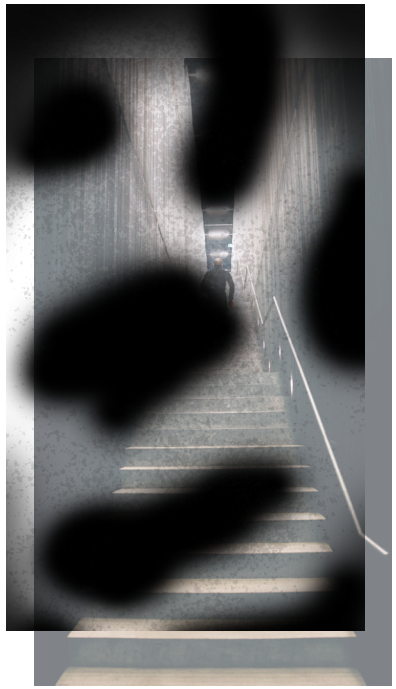


Decided to have one, changing statistic at the end that was easy to read for repeatability. I further added the international symbol of blindness of a person with a white cane to emphasise visual impairment.









Final prototype

For our final prototype, I aided in improving the user experience by mocking up additional activities to the application based on successful interactions from previous concepts. These involved guessing objects linked to visual impairment such as tactile paving and the white cane, the directions activity and using filters as an augmented reality component.

Only one of these made it in the final prototype as it was similar to the main object identification activities and because of the time constraints. The filter images I created for glaucoma, retinopathy and macular degeneration types of visual impairment, however, ended in the final prototype. I implemented the tools of impairment guessing activity into the application once all core functionality was coded by the team's main programmer. For the audio hint of the tools, I decided to have a free text-to-speech generator speak the names of the objects as during demonstration, people were unable to guess them without prior knowledge.

Challenges

Team communication

There were often communication issues during the project, as people were unable to meet up due to other commitments or external matters. While most team meetings tried to accommodate to everyone's availability, there was often someone absent especially if outside allocated class time. We made up for this by managing and posting all work online through a shared Google Drive, my suggestion to use Figma to create a mid-fidelity prototype as it allowed for design collaboration, and regular group communication through the Messenger app. By using online tools, we created the possibility for our team to talk, work and access project-related works remotely.

Implementation tasks

In the implementation phase of the project, I felt uncertain about task delegation as most of the actual final prototype development was done by our team's programmer. As most of the interaction was coded and the interface design did not change much from our mid-fidelity prototype, most of our group was responsible for documenting the design process and sourcing extra assets. However, this could not be done unless the final prototype was completed and a clear understanding of the implementation process, which involves problems with code, were necessary.

Therefore, we had to reconsider our tasks to ensure the project would be done within the timeframe, as well as ensure all team members contributed to the final works. Roles were delegated towards providing game assets like loading animation screens and for documentation, including final product visualisation and video editing. The game was also hosted on online platform itch.io so everyone could access and test the interactions. While this worked on Android phones and on desktop, it was unforeseen that it would not load on iOS devices, as the ones who worked on the app had Android phones. Since this was found later on, we did not have time to consider how to make it work for all devices for demonstration.

For collaboration, the development files were uploaded onto GitHub, so I was able to look-through and download the game files. This allowed me to add features such as sound and the extra guessing activity. By the time, I had access though, most of the functionality had already been added and the time was restricted, so I was not able to add and explore more ways to improve the experience. As the game engine that was used, Godot, lacked online documentation and sources for augmented reality (one of the suggestions to increase engagement), it was also difficult for me to implement or quickly test augmented reality tutorials. It was also discovered that Android and iOS devices only had different packages required for AR development so the idea unfortunately could not be used in the timeframe.

Final Reflection

I worked in my team fairly well as I have contributed to the team's overall concept and was active throughout the entire process. It enjoyable to brainstorm ideas and explore the overall concept for visual impairment awareness together, as well as learn more about the disability itself. Our final prototype is fully-operational and involves the main functionality and interactions we found to be successful in the user testing phase.

However, because the team as a whole were less involved in the development of the final prototype, perhaps it would have been better if we had spent more time as a group to improve on the final concept and work on its visual presentation. This would have required group opinions for further discussion and is something each of us is capable of working on. I could have been more involved in the development of the application early-on by making use of git for collaboration, which would have left time for me to learn the game engine used and for us to explore ways to make the design more interactive, and more meaningful.

While I am unsure if the design concept can make a real difference in bringing awareness to the experiences of people with visual impairment, I hope to work with the team further so that the concept may bring deeper insight into visual impairment through augmented reality.

Bibliography

Manzoor, M., & Vimarlund, V. (2018). Digital technologies for social inclusion of individuals with disabilities. Health and Technology, 377-390. Retrieved from https://link.springer.com/article/10.1007/s12553-018-0239-1

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User experience icon made by Freepik from https://www.flaticon.com/

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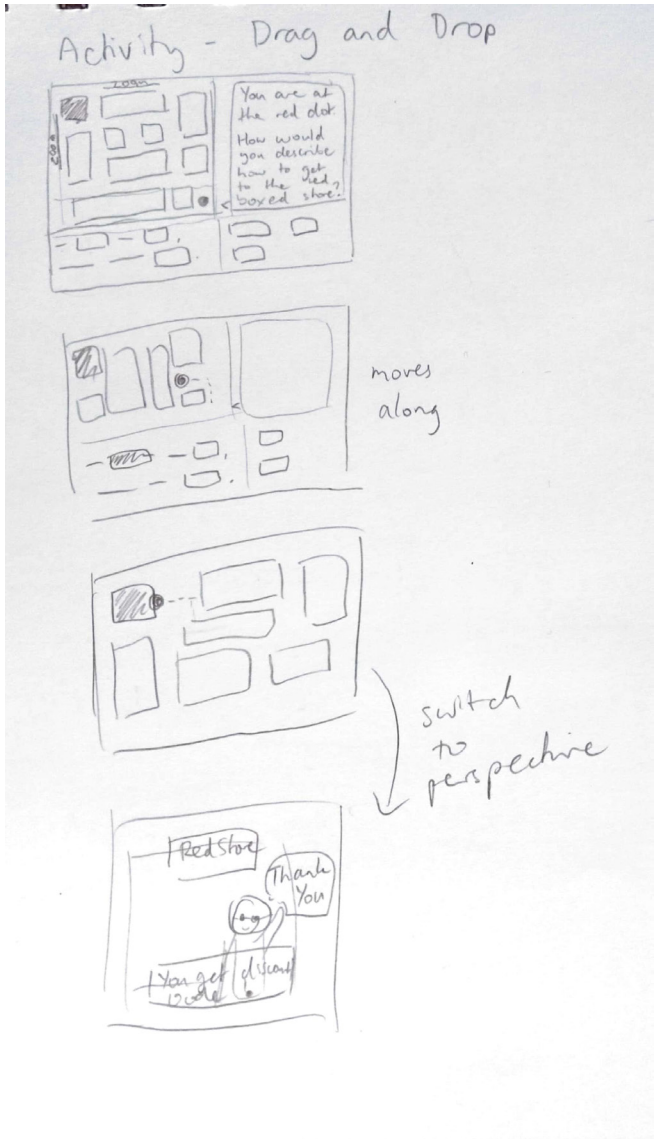
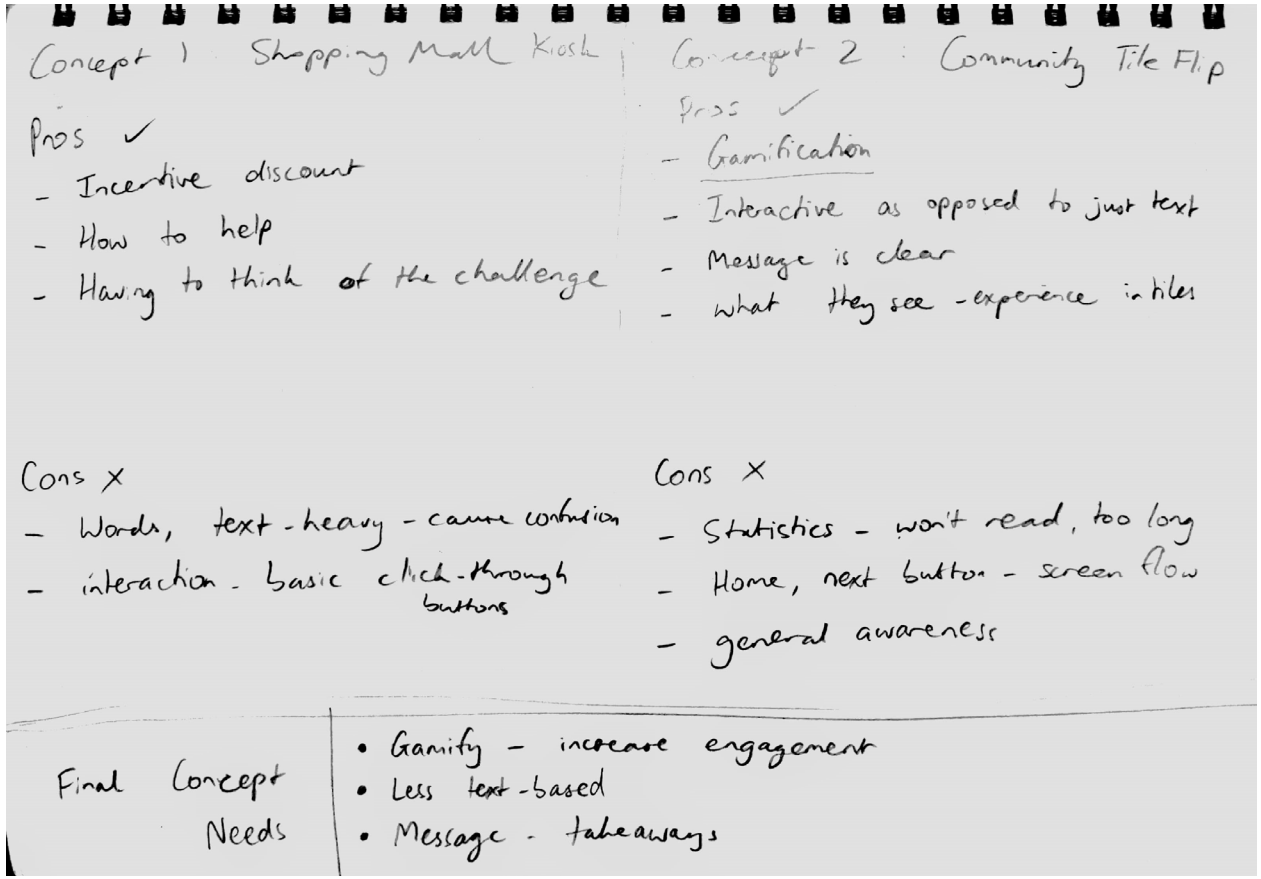
man in black pants going down stairs Photo by Heidi Sandstrom. on Unsplash https://unsplash.com/photos/iy_l7l-sD_0

Appendix

Marvel App Link to Where is There screen prototype - https://marvelapp.com/672a9ad





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