

# Design Report

DECO3200

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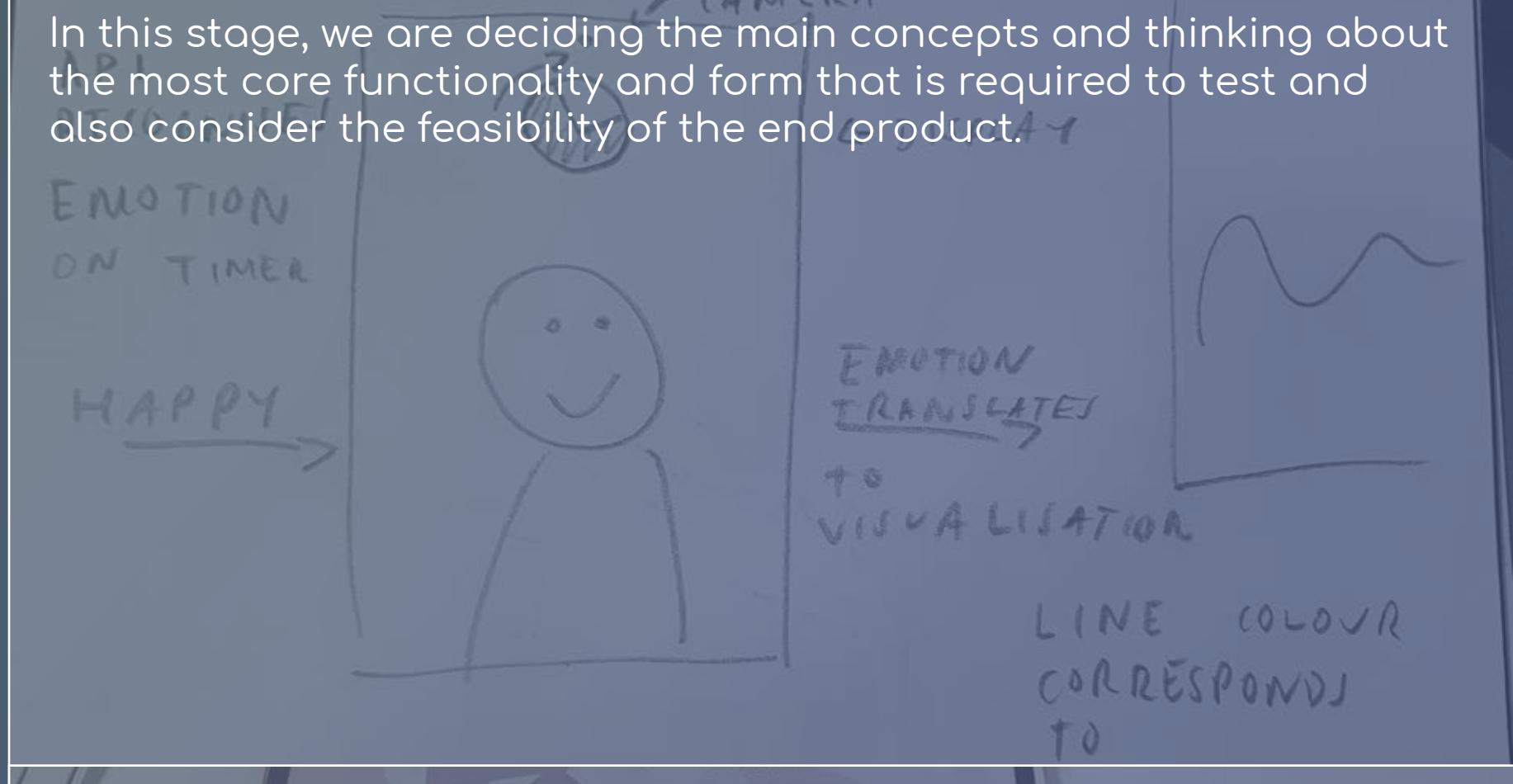
# Problem Statement

Due to increasing urbanisation, the city streets become overpopulated causing pedestrian congestion. With such unsustainable numbers of people crowding these urban environments walkability within the city continues to decline and the need for repairs and safety concerns constantly rising.

Lack of walkability has been proven to cause an increase in stress and anxiety levels for people leading to a lack of empathy and openness towards other people on the street.

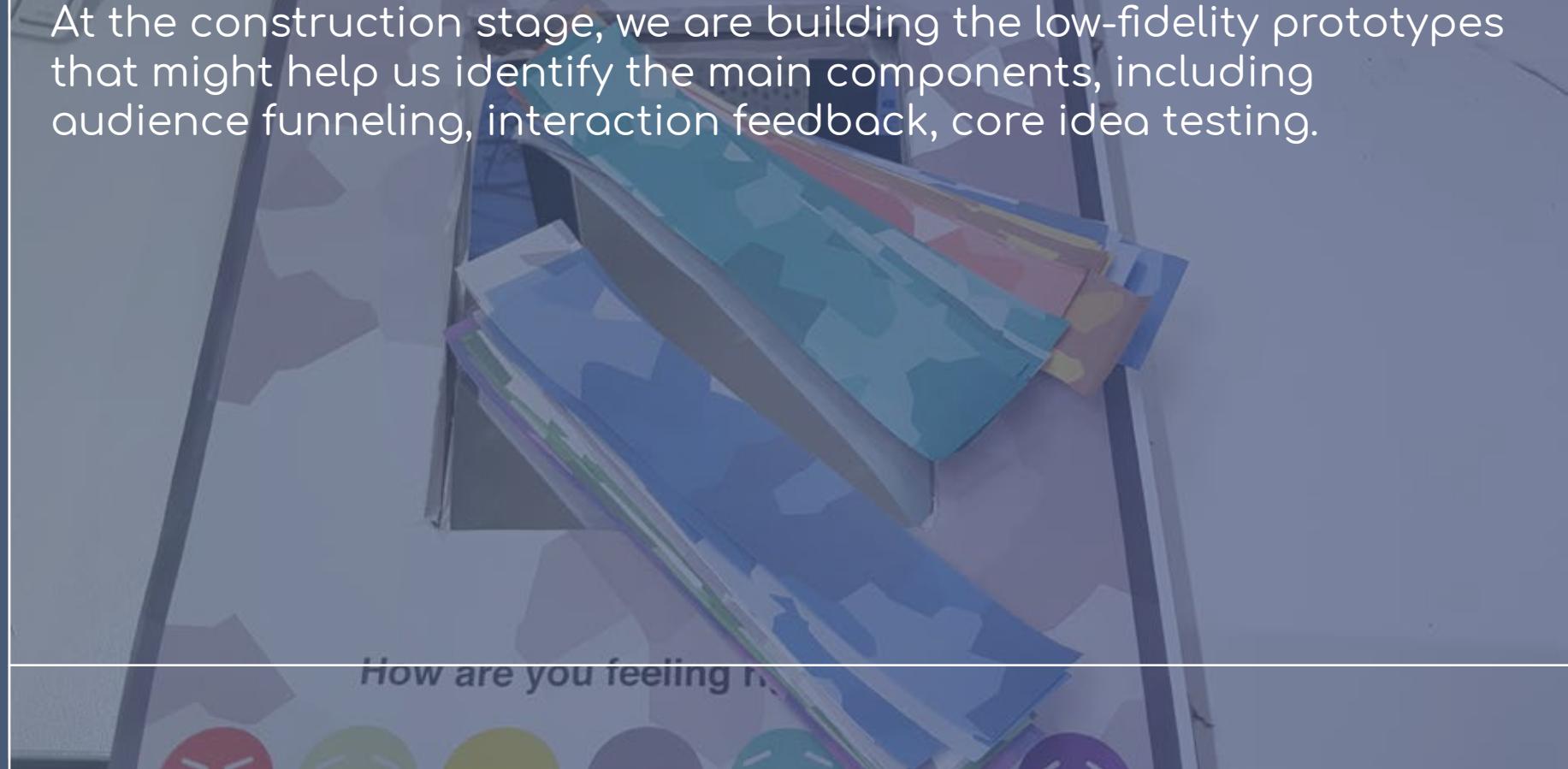
In order to address this issue we are looking to conceptualise solutions and user test low-fidelity prototypes that looks at audience funnelling and function, and then narrow it down to a preferred solution through data analysis methods.

# 1



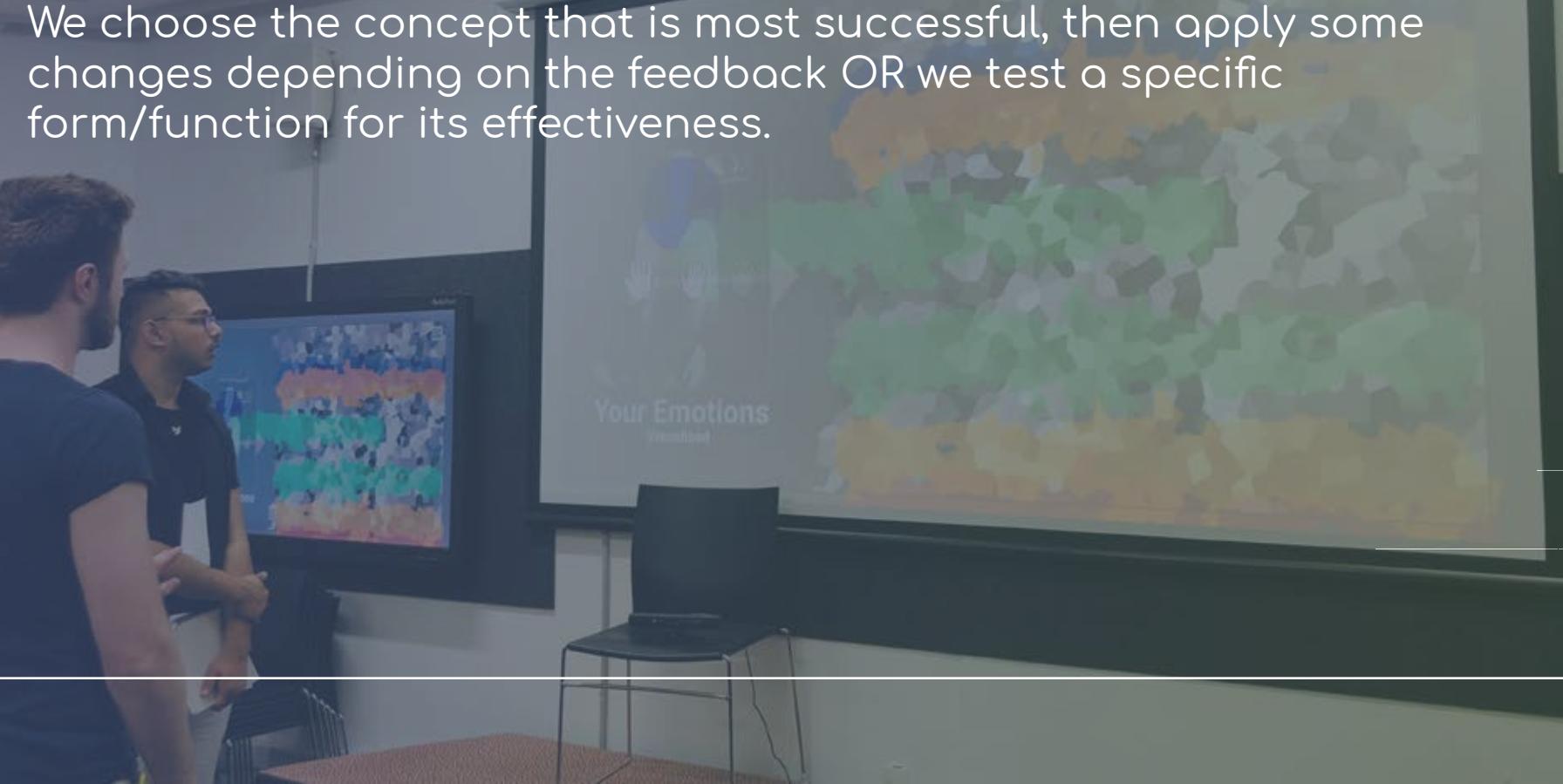
In this stage, we are deciding the main concepts and thinking about the most core functionality and form that is required to test and also consider the feasibility of the end product.

# 2



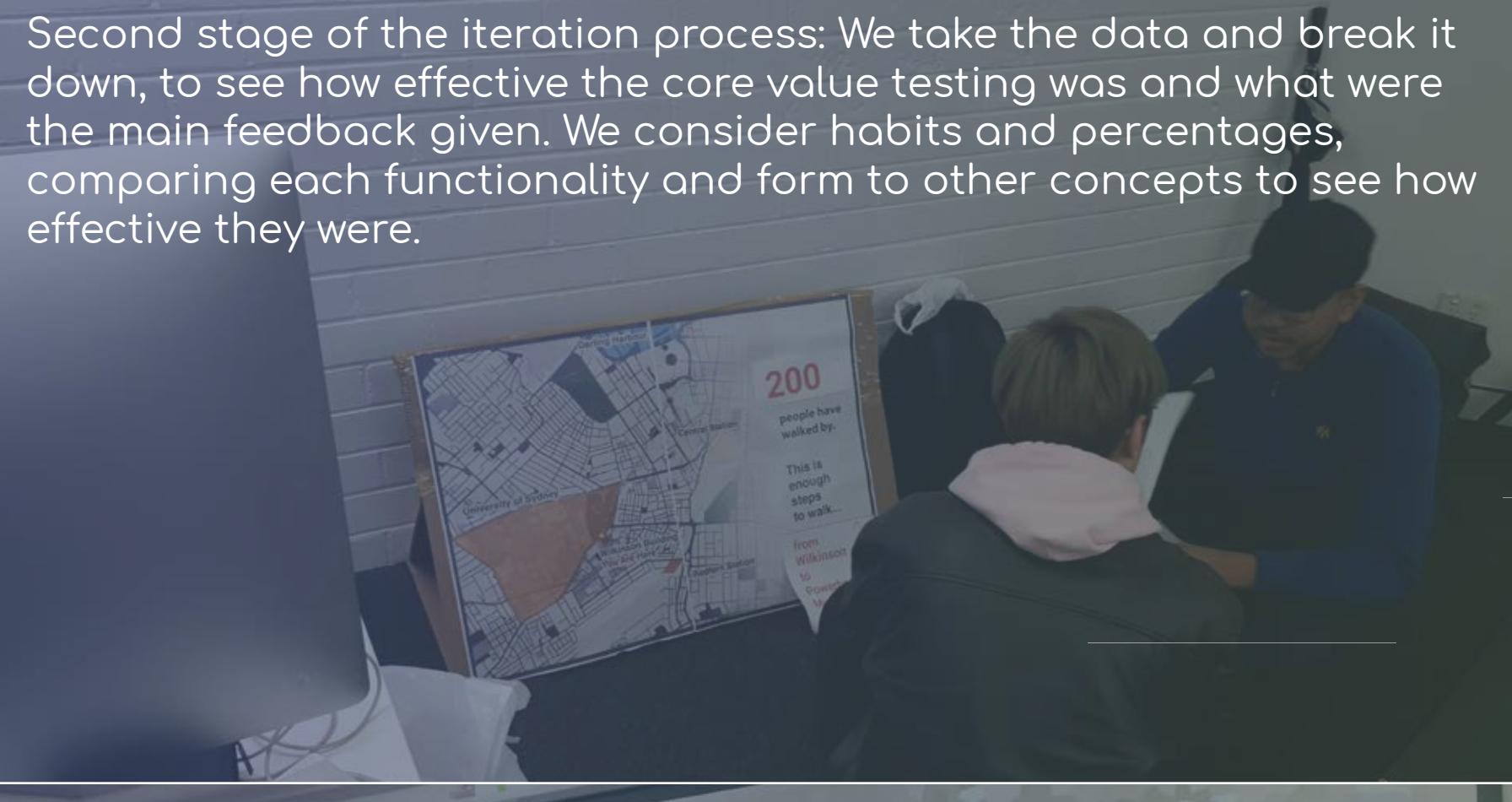
At the construction stage, we are building the low-fidelity prototypes that might help us identify the main components, including audience funneling, interaction feedback, core idea testing.

# 5



We choose the concept that is most successful, then apply some changes depending on the feedback OR we test a specific form/function for its effectiveness.

# 4



Second stage of the iteration process: We take the data and break it down, to see how effective the core value testing was and what were the main feedback given. We consider habits and percentages, comparing each functionality and form to other concepts to see how effective they were.

# 3



First stage of the iteration process: We take the concept(s) and set it up in a considered time and date, recording progress and process with interviews, questions to users, background research/data gathering and photos.

# Approach

## The Iterations

# Approach

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## Data to be Collected

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When testing our iterations, we wanted to track a few key things that would determine the success of each concept. We decided to track the amount of people walking by each prototype, as well as the amount of people that looked at the prototype, and the amount of people that engaged with the prototype.

These quantitative stats would give us a general idea of the effectiveness of each concept to attract people. We also collected photos and videos of people interacting with the prototype. For random people that were interested in the prototypes, we would record general opinions and reactions, and observe how they interacted with each.

We also had dedicated participants for each with whom we could sit down with for a more extended interview to discuss the features and opinions of the prototypes with more nuance.

## How it was Interpreted

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The quantitative stats were analysed in a spreadsheet, converted to percentages and placed into graphs to compare with each other effectively and easily. The observational images and videos were analysed to find actions that people were often drawn to do, as well as annotated. The interviews were summarised into key findings and feedback, and all of our data was used to create affinity diagrams to gain a general idea of the types of people that would be drawn to use each of these concepts.

# Approach

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## Global Footprint

This concept creates a live visualisation based on the amount of people that walk in an area, and presents this information in with a metaphorical comparison to other interesting distances. The live updating nature of the concept lets people feel connected to their walking environment and encourages walking to contribute to the greater goals as set by the visualisation.

## Concepts for iteration

## Emotion Capture

This concept uses the often unseen and unheard emotions of people walking in cities and captures this to display a digital mosaic of these collected emotions. This allows people passing by to gain a perception of how the world around them thinks and feels, to increase the empathy that people feel for one another.

## Music Interaction

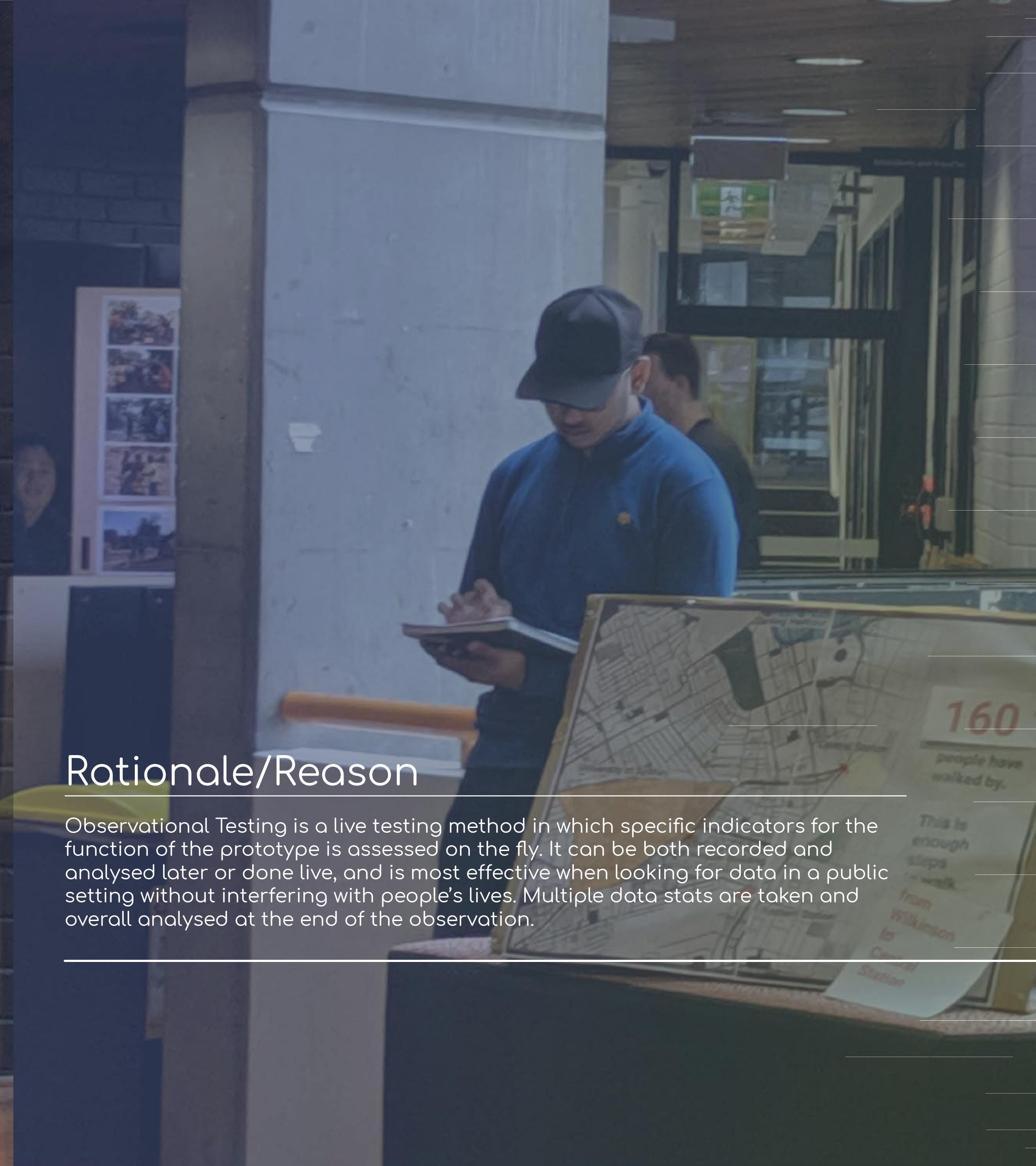
This concept uses theory behind the power of music to draw people away from congested areas and allow for community interaction with a live musical arrangement. Through placemaking this concept has the potential to allow for underutilised spaces to be given purpose, and provides an engaging and fun way for people to interact with their surroundings.

# Method

## User Testing Methods

### Observational Testing

Observational Testing is a live testing method in which specific indicators for the function of the prototype is assessed on the fly. It can be both recorded and analysed later or done live, and is most effective when looking for data in a public setting without interfering with people's lives. Multiple data stats are taken and overall analysed at the end of the observation.



### Rationale/Reason

Observational Testing is a live testing method in which specific indicators for the function of the prototype is assessed on the fly. It can be both recorded and analysed later or done live, and is most effective when looking for data in a public setting without interfering with people's lives. Multiple data stats are taken and overall analysed at the end of the observation.

## Rationale/Reason

Interviews is a crucial part to a human-centred design as it allows potential stakeholders to be an active part of the design process without investing so much into it. Semi-structured interviews allows us to go further than first impressions and helps users empathise with the reasons behind each prototype, making it an effective data gathering method for analysis methods afterwards.

## Interviews

Semi-structured interviews are a good way to gain qualitative data and further insights from audiences and users without leading astray or very bounded to the main idea. Discussing ideas and feedback directly with the user gives us first hand information combined with personal experiences and direct responses to the interaction with the prototype.

# Method

## User Testing Methods

Strongly  
Disagree

1

2

3

4

5

Strongly  
Agree

## System Usability Scale

The System Usability Scale consists of multiple questions and a couple of open-response questions, mostly judged through a 'Strongly Agree' to 'Strongly Disagree' Scale. It's a useful tool for measuring the usability of prototypes and differentiate between usable and unusable systems about the prototype.

## Rationale/Reason

The System Usability Scale is a fast way of allowing users and audiences to answer interview-esque questions in a quick and concise manner. For our prototypes, the audience's choice to interact with them or not are completely free of their choosing, and therefore allows us to receive definite data on first impressions which then helps us with audience funnelling.

Music  
Participant

Walking  
Participant

Emotion  
Participant

Environment  
Participant

I like new and interesting visualisations in cities

# Method

## Analysis Methods

### Affinity Diagramming

Affinity Diagramming is a data analysis method that addresses users/audiences' needs and wants with a single sentence. The large amount of data gathered is broken down into opinionated, suggestive or emotional phrases, then grouped up into similar perspectives that target the general need and want of the user/audience.

lack of interaction

boring

kind of useful

takes time to understand

seems redundant

is confusing

boring to look at

the highlights on the map are distracting

purpose is unclear

should be easy to understand

is distracting

### Rationale/Reason

Affinity Diagramming is one of the most common and effective methods of practicing bottom-up data analysis. It helps us sort through myriads of complex data (which are mostly unbinary) and allows the data to come to a conclusion on the most important user needs and wants, as well as frustrations that we can target in our further prototypes.

I just want to walk easily in cities

## Analysis Methods

less congestion = easy

congestion is frustrating

### Usability

### Accessibility

### Harris Profile / Decision Matrix

### Feasibility

The Harris Profile or Decision Matrix is a simple but effective analysis method that allows prototypes to be judged overall with an emphasis on how effective each aspect of the prototype was. Each aspects of the prototype is weighed, then given a scalar score in order to find the total effectiveness of the prototype.

### Informativeness

### Visual attractiveness

### Reducing congestion

### Rationale/Reason

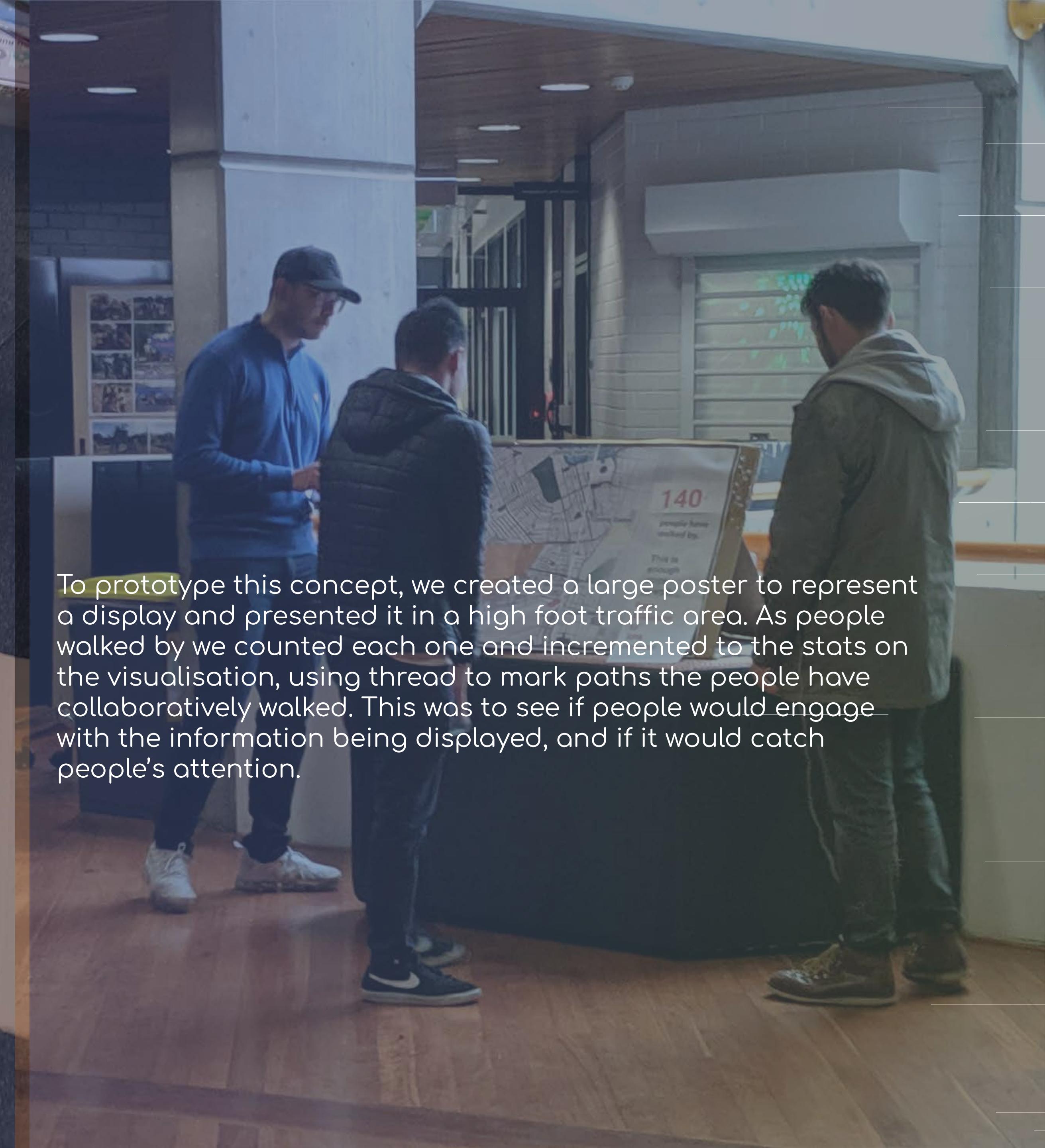
The Harris Profile and Decision Matrix gives us the final decision based on the data we gathered and analysed. The way the decision matrix divides the aspects of each prototype and judges the weight according to data makes this a crucial and definite judgement on what concept we are choosing as our conclusive goal.

### Interactivity

### Feasibility

# Method

## Global Footprint LowFi



To prototype this concept, we created a large poster to represent a display and presented it in a high foot traffic area. As people walked by we counted each one and incremented to the stats on the visualisation, using thread to mark paths the people have collaboratively walked. This was to see if people would engage with the information being displayed, and if it would catch people's attention.

# Method

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## Prototypes

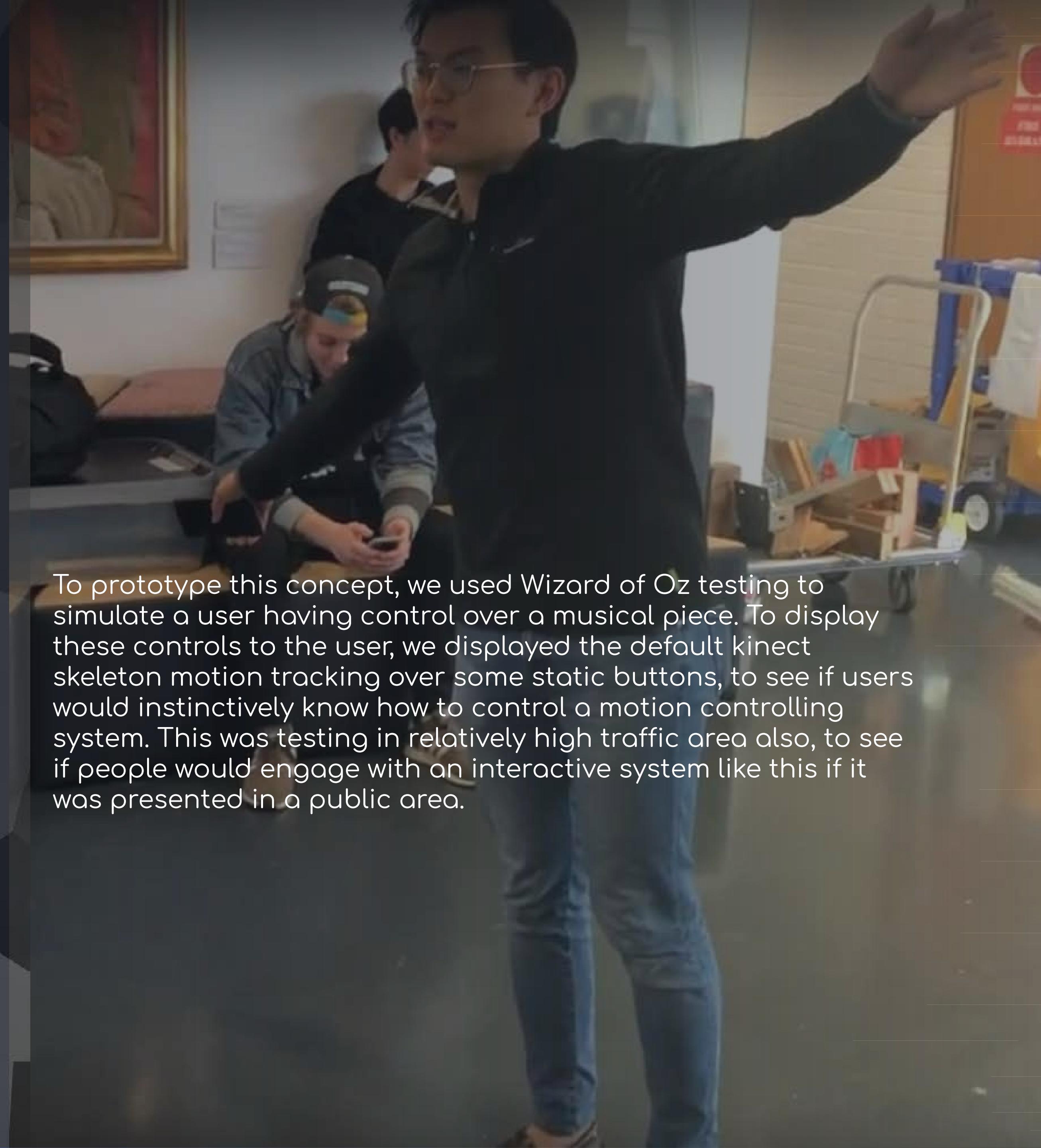
### Emotion Capture LowFi

To prototype this concept, we used paper to represent the displays with printed paper strips to represent the emotions being contributed. A mirror was also used to represent a camera. These paper screens were presented on an easel within a busy walking area as to test if this idea has the potential to attract people passing by.

As people look into the mirror of the prototype, they would be asked what emotion correlates the most to how they currently feel, to simulate how a potential facial recognition API would detect their emotions. Their emotions colour was then pinned up on the corresponding visualisation, resulting in a mosaic of colours.

# Method

## Music Interaction LowFi



To prototype this concept, we used Wizard of Oz testing to simulate a user having control over a musical piece. To display these controls to the user, we displayed the default Kinect skeleton motion tracking over some static buttons, to see if users would instinctively know how to control a motion controlling system. This was testing in relatively high traffic area also, to see if people would engage with an interactive system like this if it was presented in a public area.

# Findings

## Prototype - Global Footsteps LowFi

### Observations

1:15pm ~ 2:00pm (45minutes)

12 Interactions (coming up close, asking questions, actual interaction, etc.)

122 Look as they walk pass

239 total.

- People just look and walk past.
- People who interact usually start with "what is this?"
- People who wait for something/ stand still are more likely to interact (waiting for an elevator)
- Some people who walk pass multiple times look constantly as they walk past, but don't interact.
- Most skim across first glance then read/ look longer second time.
- People tend to look when someone is already interacting with it out of curiosity.

# Findings

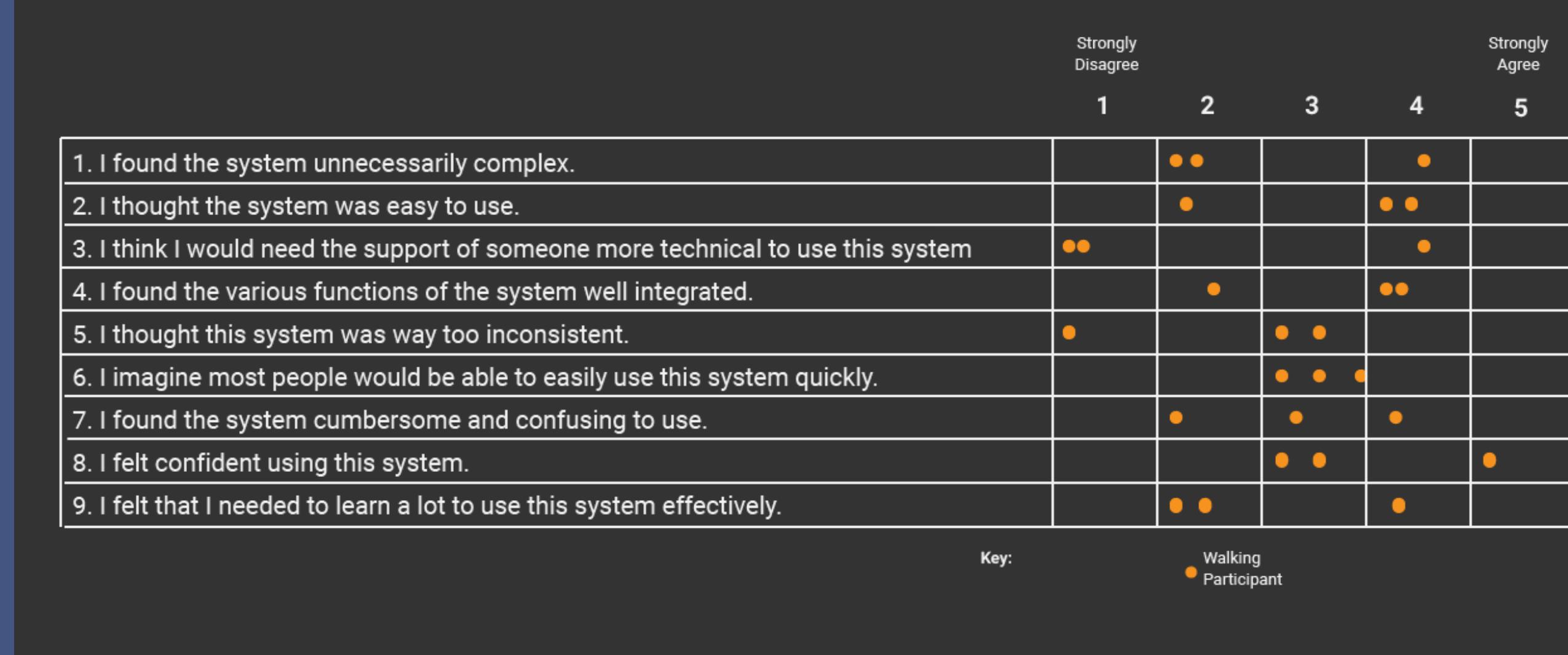
## Prototype - Global Footsteps LowFi

### Interviews

#### Insights:

- Real-time updation element is cool.
- Very confusing to first look at due to visual complexity.
- Hard to understand the relationship between the metaphor and footsteps.
- Needs more subtle visual queue to guide viewers eyes.
- The text and footstep number count triggers curiosity.

### System Usability Scale



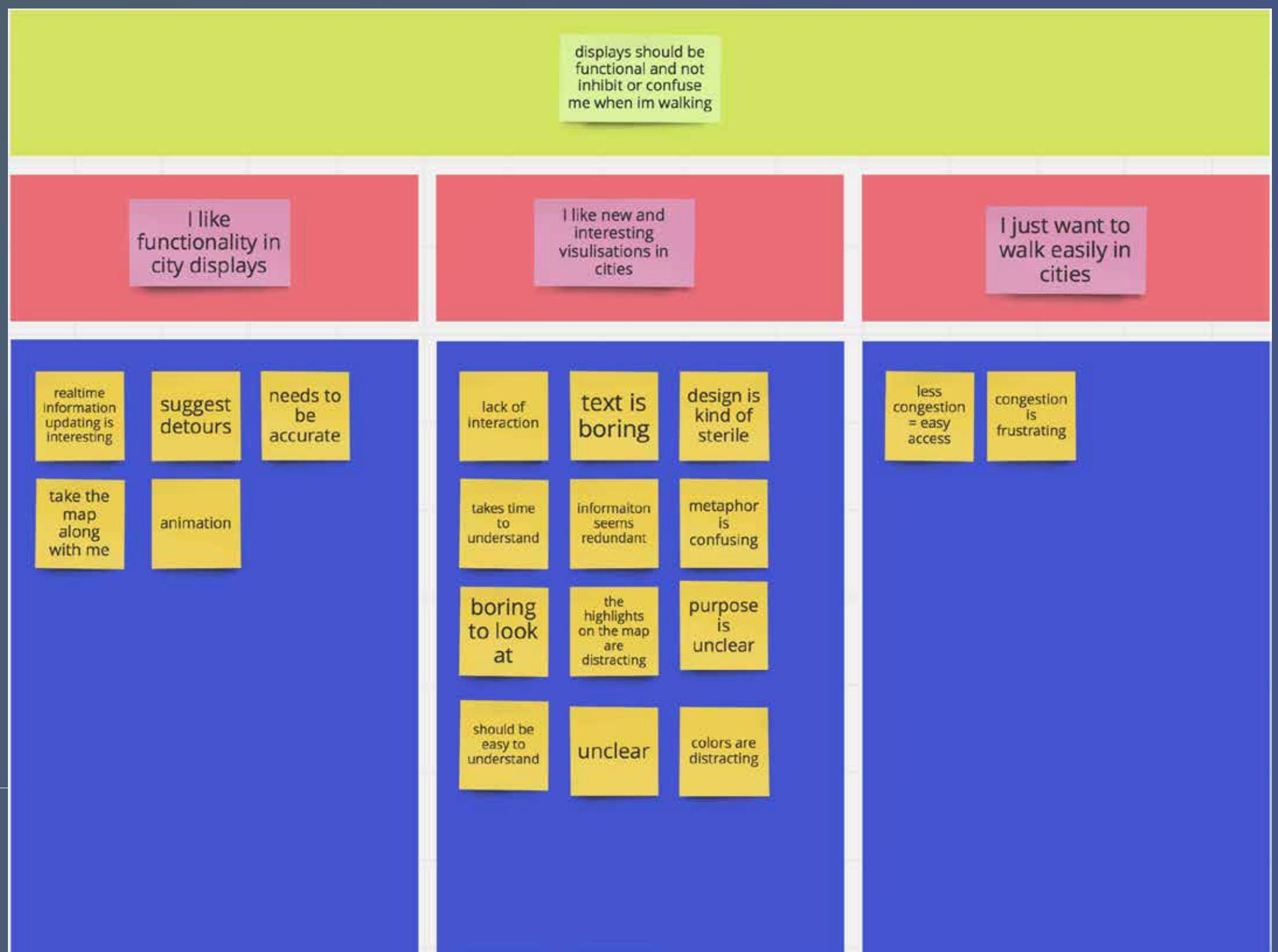
# Findings

## Prototype - Global Footsteps LowFi

### Affinity Diagramming

"Displays should be functional and not inhibit or confuse me when I'm walking"

- "I like functionality in city displays"
- "I like new and interesting visualisations in cities"
- "I just want to walk easily in cities"



### Decision Matrix

Criteria	Walking	x Weight
Feasibility	5	25
Increasing walkability	3	12
Interactivity	1	4
Usability	3	9
Engagement	2	6
Accessibility	4	8
Visual Atractiveness	3	6
Shared Experience	3	6
Infomative	3	3
Increases Empathy	2	2
		81

# Findings

## Prototype - Emotion Capture LowFi

### Observations

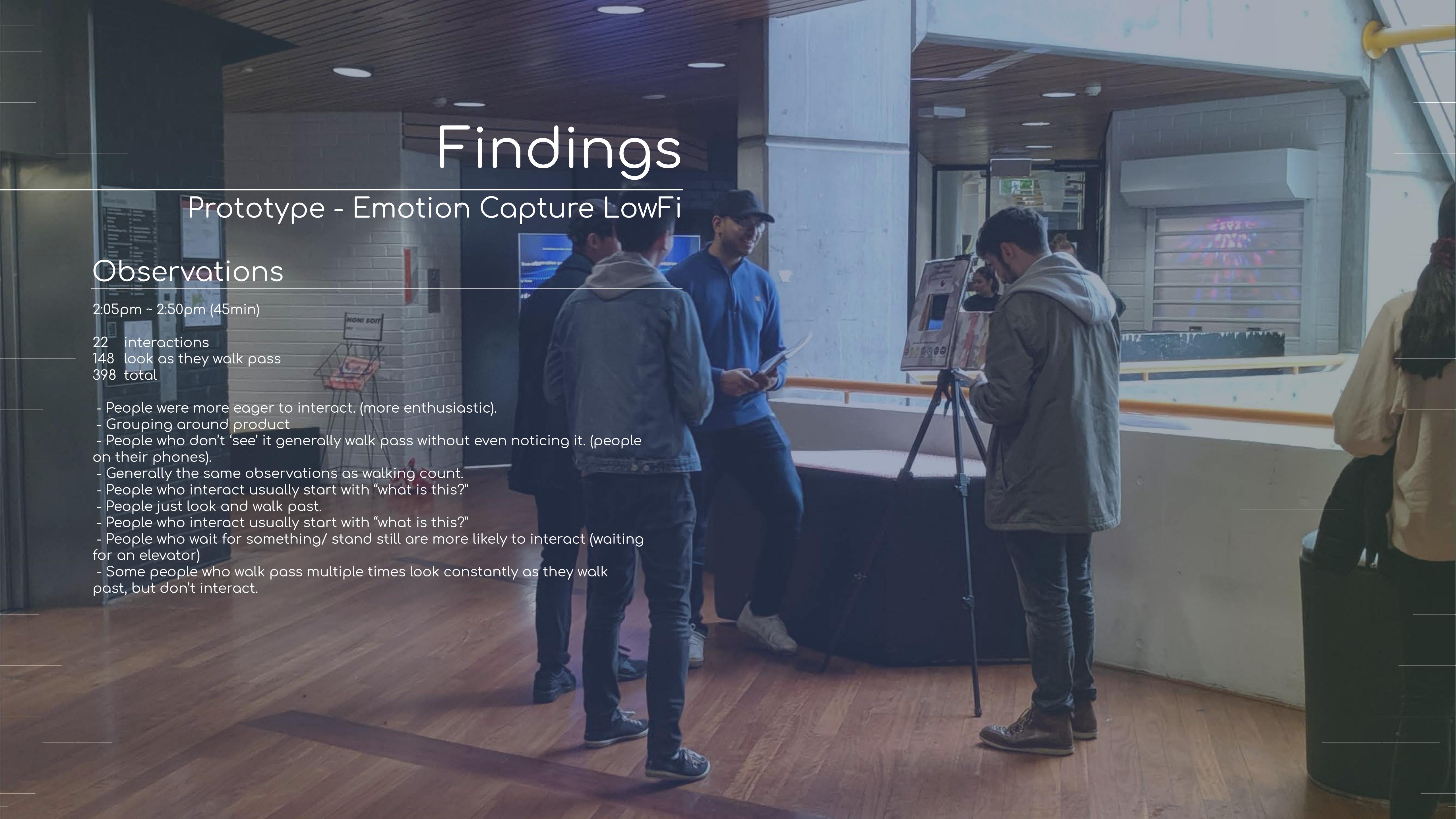
2:05pm ~ 2:50pm (45min)

22 interactions

148 look as they walk pass

398 total

- People were more eager to interact. (more enthusiastic).
- Grouping around product
- People who don't 'see' it generally walk pass without even noticing it. (people on their phones).
- Generally the same observations as walking count.
- People who interact usually start with "what is this?"
- People just look and walk past.
- People who interact usually start with "what is this?"
- People who wait for something/ stand still are more likely to interact (waiting for an elevator)
- Some people who walk pass multiple times look constantly as they walk past, but don't interact.



# Findings

## Prototype - Emotion Capture LowFi

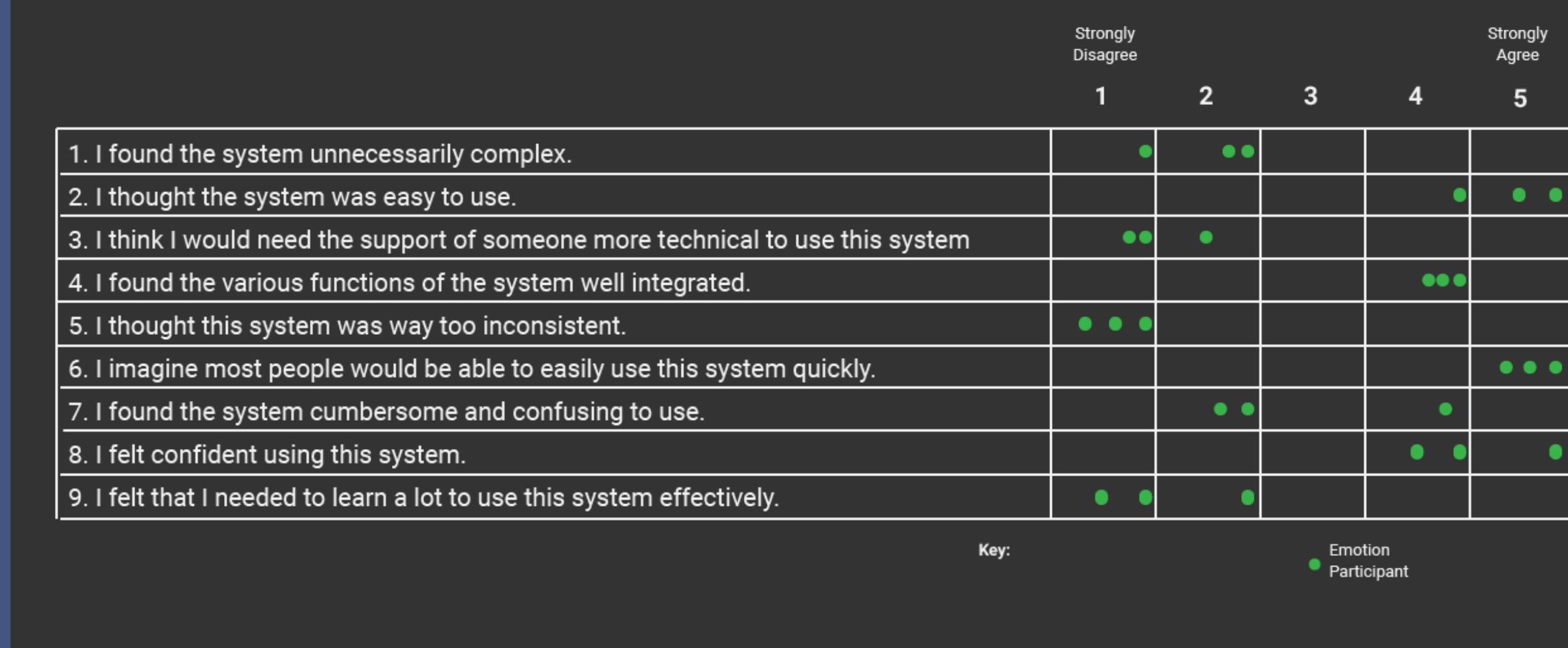
### Interviews

#### Insights:

- It becomes more interesting to see other's emotions.
- Gives a sense of understanding about how the community is feeling.
- The unsurety about the concept, colors and data collection exists.
- Persistence of the art piece is important decisive factor.
- Need more interactivity in the art work and continuity of the current short lived engagement.
- Willing to see more range of emotions and colors.
- Placement of this exhibit is important, so that it doesn't act as an obstruction.



### System Usability Scale



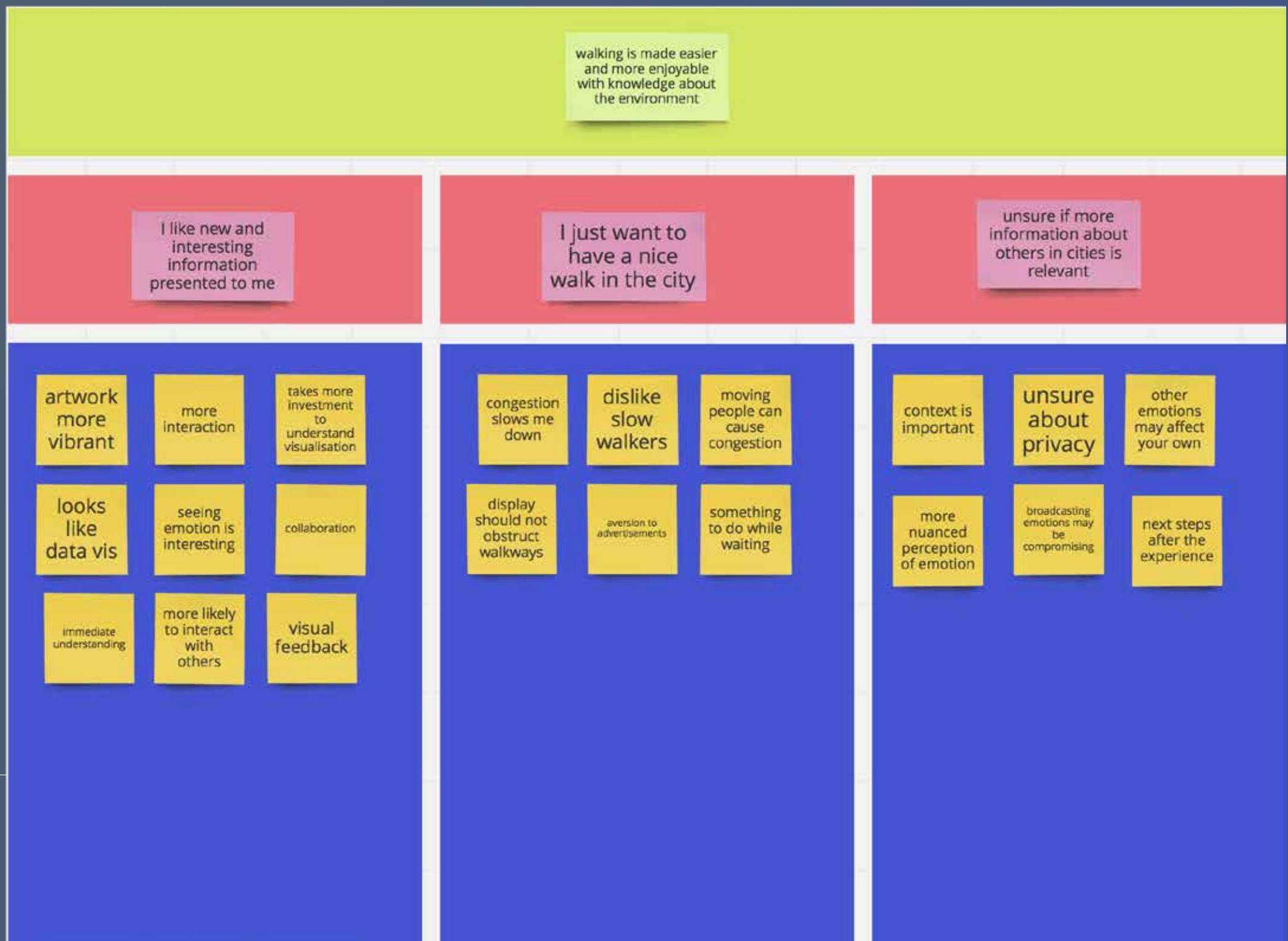
# Findings

## Prototype - Emotion Capture LowFi

### Affinity Diagramming

"Walking is made easier and enjoyable with knowledge about the environment"

- "I like interesting and new information presented to me"
- "I just want to have a nice walk in the city"
- "Unsure if more information about others in cities is relevant"



### Decision Matrix

Criteria	Emotion	x Weight
Feasibility	4	20
Increasing walkability	4	16
Interactivity	3	12
Usability	4	12
Engagement	4	12
Accessibility	3	6
Visual Atractiveness	4	8
Shared Experience	4	8
Infomative	4	4
Increases Empathy	4	4
		102

# Findings

## Prototype - Music Interaction LowFi

### Observations

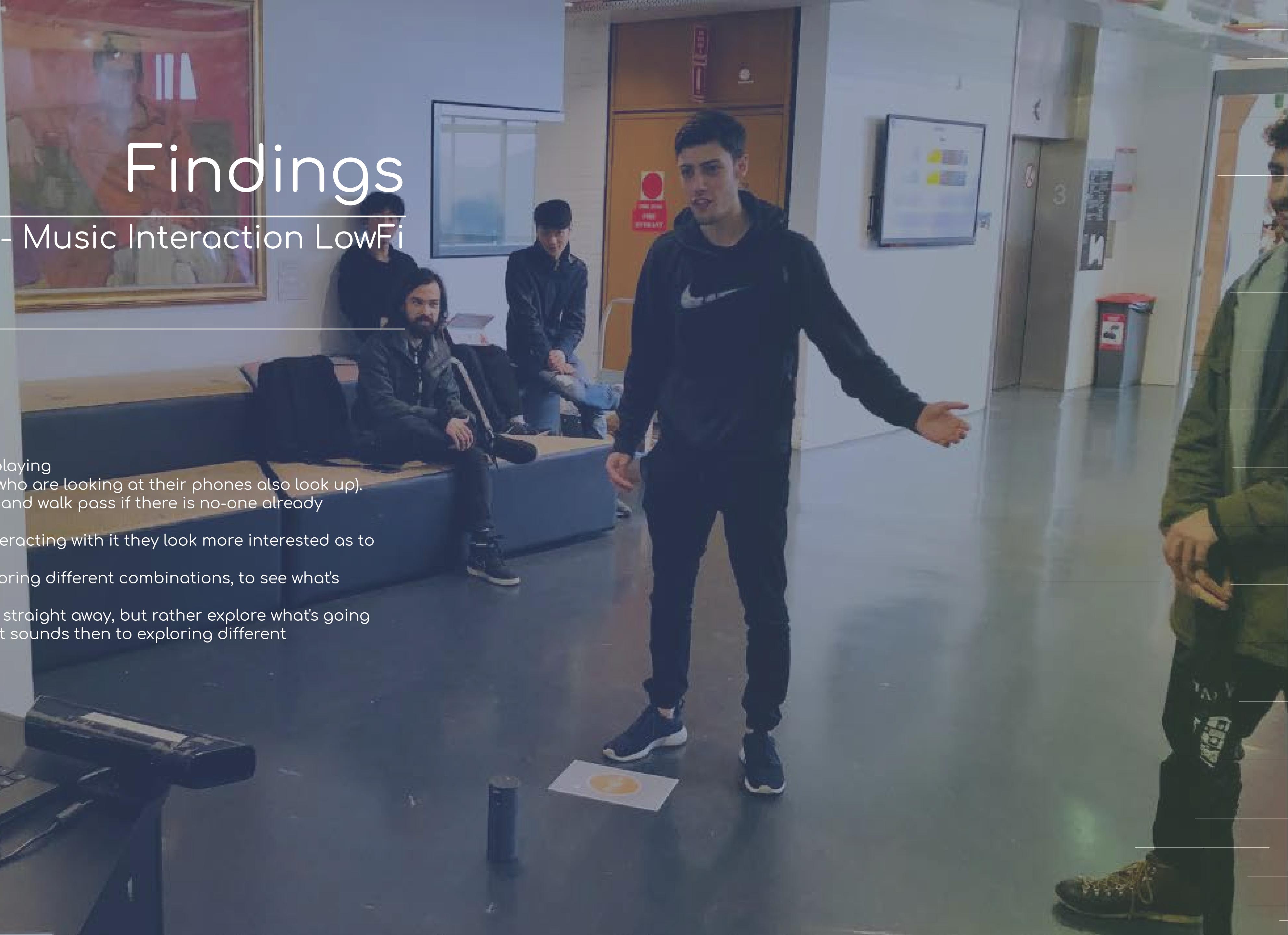
2:00pm ~ 2:45pm (45min)

7 interactions

180 look as they walk pass

289 total

- People look once music starts playing
- Music draws attention (people who are looking at their phones also look up).
- People noticing music just look and walk pass if there is no-one already interacting with it.
- However if there is someone interacting with it they look more interested as to what's going on.
- Users are most of the time exploring different combinations, to see what's available (different sounds).
- Don't usually try to make music straight away, but rather explore what's going on first then to exploring different sounds then to exploring different combinations.



# Findings

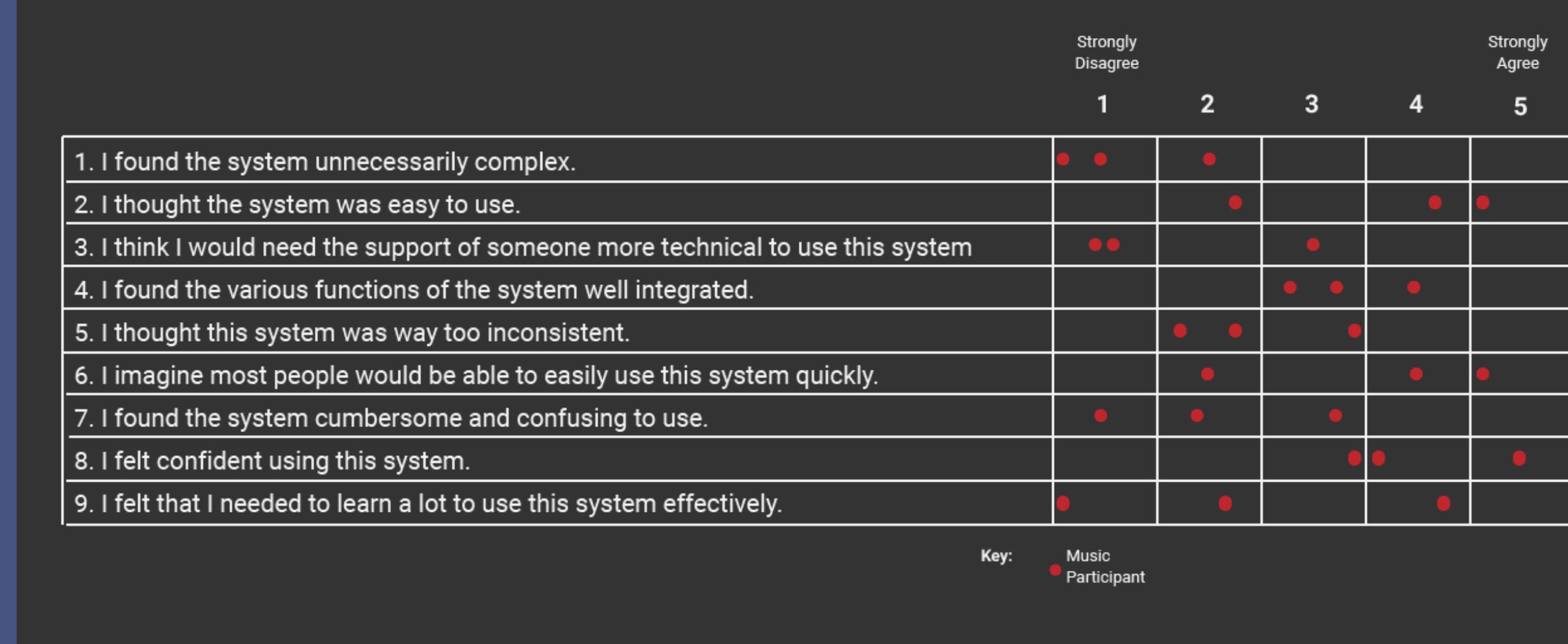
## Prototype - Music Interaction LowFi

### Interviews

#### Insights:

- Fun to interact with, captures attention.
- Needs more visual feedback.
- Needs a better UI with gamification, animation, using musical instruments to keep the user engaged.
- Dancing or moving around with music in public as a solo act seems daunting.
- Great to see, the avatar/ stick figure representation of myself.
- Not immediately concept revealing or informative.
- Could be used as a positive distraction to divert pedestrian flow.

### System Usability Scale



# Findings

## Prototype - Music Interaction LowFi

### Affinity Diagramming

"Novelty and relationships help to make something easier to approach"

- "I like interesting and new things"
- "I like to work with others when creating"
- "It takes more investment to become interested in something"



### Decision Matrix

Criteria	Music	x Weight
Feasibility	3	15
Increasing walkability	4	16
Interactivity	5	20
Usability	3	9
Engagement	4	12
Accessibility	3	6
Visual Atractiveness	4	8
Shared Experience	2	4
Infomative	1	1
Increases Empathy	2	2
		93

# Further Findings

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## Emotion Capture further testing

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We decided to iterate on this concept using the feedback we got from our user testing for the previous version about lack of interactivity, continuity of interaction, incoherent feedback and visualisations, privacy issues.

## Prototype Construction

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We used a digital display to help visualise the art and give us a higher level of interactivity, as well as a kinect to add some more advance controls. We also used a silhouette instead of camera footage display to address privacy issues. A QR code was also added to help people learn more statistics and information about the project. The interaction was implemented via Wizard of oz Testing, manipulating the visualisation manually as the user input.

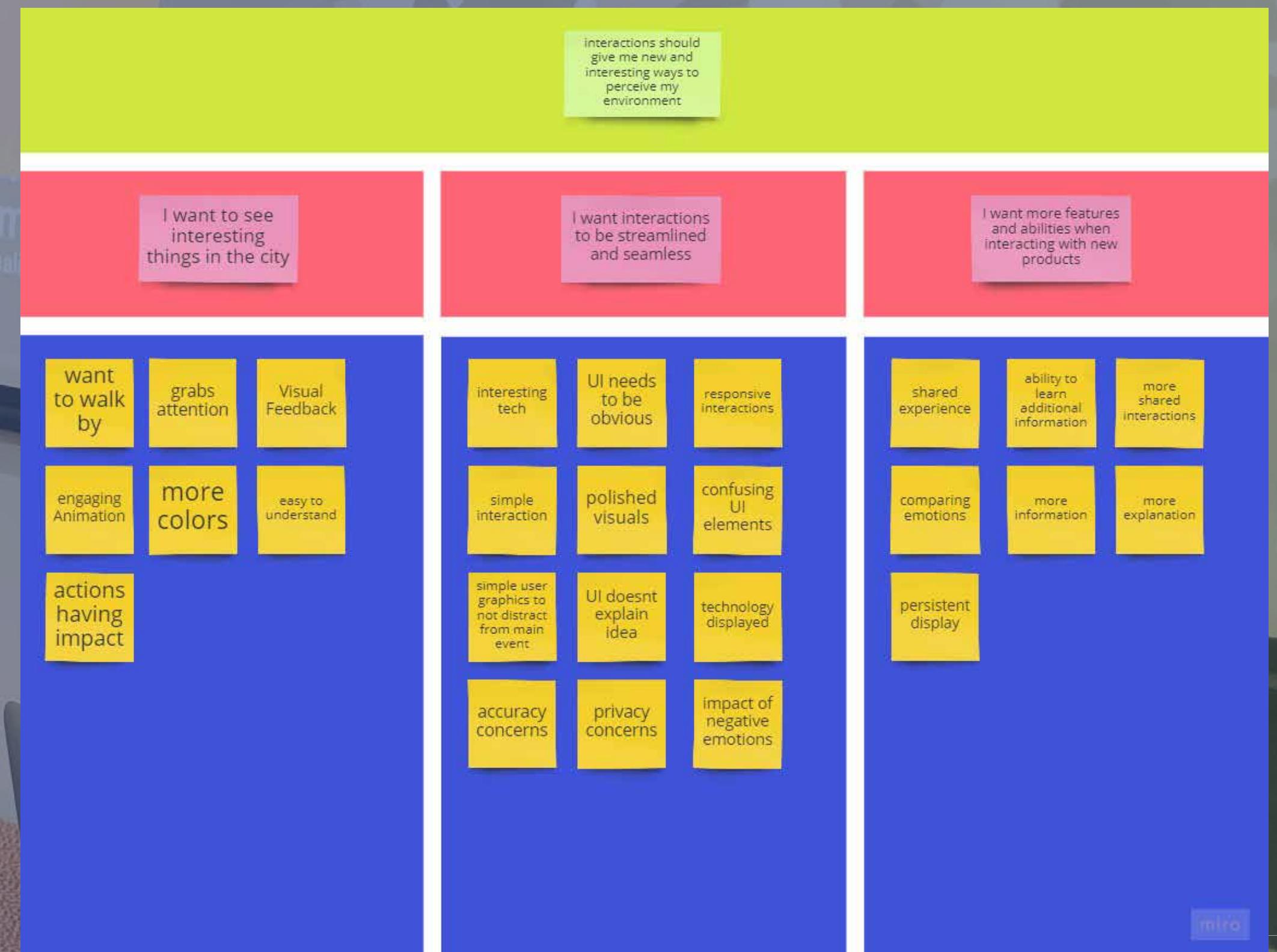
# Further Findings

## Prototype - Emotion Capture LowFi

### Interviews

- Impressive and interactive
- Needs focus on accuracy
- Silhouette adds a subtle interaction using gesture tracking, while not distracting the user from the real piece of art.
- Feedback element is solid through the QR code but needs to be made available more clearly.
- Needs a form of shared interaction rather than solo interaction
- Needs more work done on the visual side of the user interface.
- Needs to have explanations available for the concept, the colour meanings, the art piece and the data collection.

### Affinity Diagramming



# Findings Summary

## Overall Findings and Summary

UI and Interactivity needs to be clear and precise, as well as making the objective of each clear from the initial introduction to the concept.

People want to have simple but engaging interactions in cities, that don't necessarily obstruct them but enhance their average experience.

A balance needs to be struck between interactivity, usability, and the potential to solve the problems - the Musical Nexus may be more engaging on an interaction level, but ends up being less usable or feasible than the Emotion Tracking Idea.

People may gravitate towards novel installments or objects in an urban environment, but for regular pedestrians this novelty wears thin and reduces the impact of repeat experiences.

# Chosen Concept

Emotion Capture  
“eMotus”

Your Emotions  
Visualised



# eMotus

## What is it?

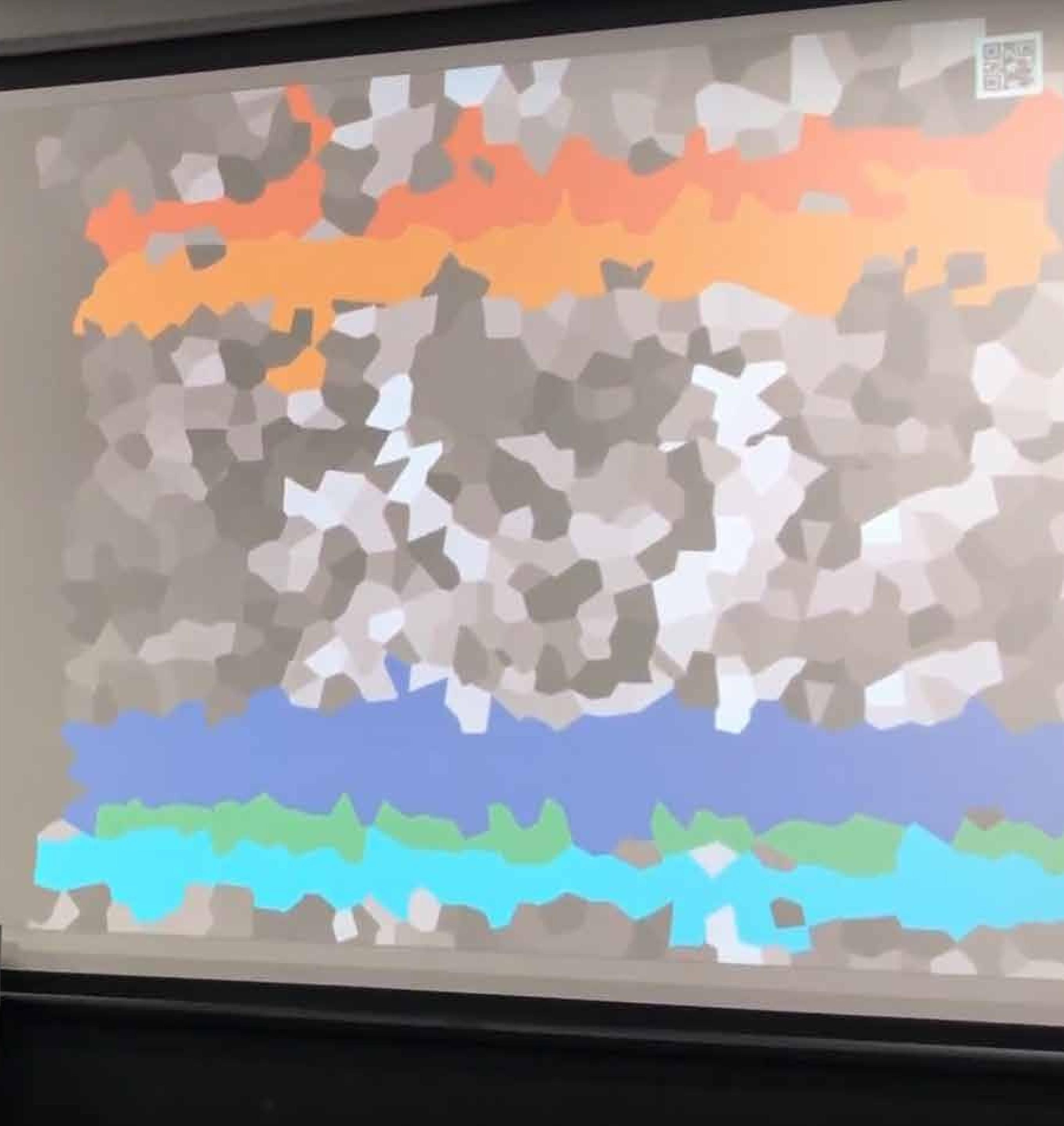
The eMotus is an interactive display that detects the emotions of a passerby that engages with it. The facial recognition for determining the emotion of the person interacting is followed by some interactions incorporating gesture control which allow the user to transfer the visual representation of one's emotions to an art piece creating a mosaic of emotions.

## Interaction?

Modern interactive technologies can bring a difference to the existing infrastructure by augmenting aesthetically pleasing walk appeal to the current walking experience.

Our research highlights that lack of walkability leads to increasing stress and anxiety levels of the pedestrians. eMotus is a concept and method of increasing walkability and decreasing stress/ anxiety levels in the pedestrians. This interactive emotion tracking and visualisation system as a method of augmenting urban experiences.

It contains a display/projection , camera, kinect, lights.



# Chosen Concept

## Why this Concept

To definitively decide which concept we wanted to pursue, we decided to use a Decision Matrix with weighting values placed on each of our criteria, and fill these out based on the research and testing we had completed.

We established the criteria, with an emphasis on Feasibility, Increasing Walkability, and Interactivity as the key areas we wanted to achieve.

Overall, the result was the Emotion concept, as it was the most consistently scored over all criteria.

Criteria	Weight	Music	x Weight	Emotion	x Weight	Walking	x Weight
Feasibility	5	3	15	4	20	5	25
Increasing walkability	4	4	16	4	16	3	12
Interactivity	4	5	20	3	12	1	4
Usability	3	3	9	4	12	3	9
Engagement	3	4	12	4	12	2	6
Accessibility	2	3	6	3	6	4	8
Visual Atractiveness	2	4	8	4	8	3	6
Shared Experience	2	2	4	4	8	3	6
Informative	1	1	1	4	4	3	3
Increases Empathy	1	2	2	4	4	2	2
TOTALS:			93	102		81	

# Chosen Concept

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## Target Audience

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Our target audience is primarily composed of people that travel throughout the city on foot, focusing on two main user needs; walking in cities purely out of function (Work, School, A to B) or walking in cities for leisure (Tourism, Exercise).

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These people are also continuously on the street, dealing with pedestrian congestion issues on a regular basis, and also beginning to be fatigued with their surroundings and its appearance.

# Chosen Concept

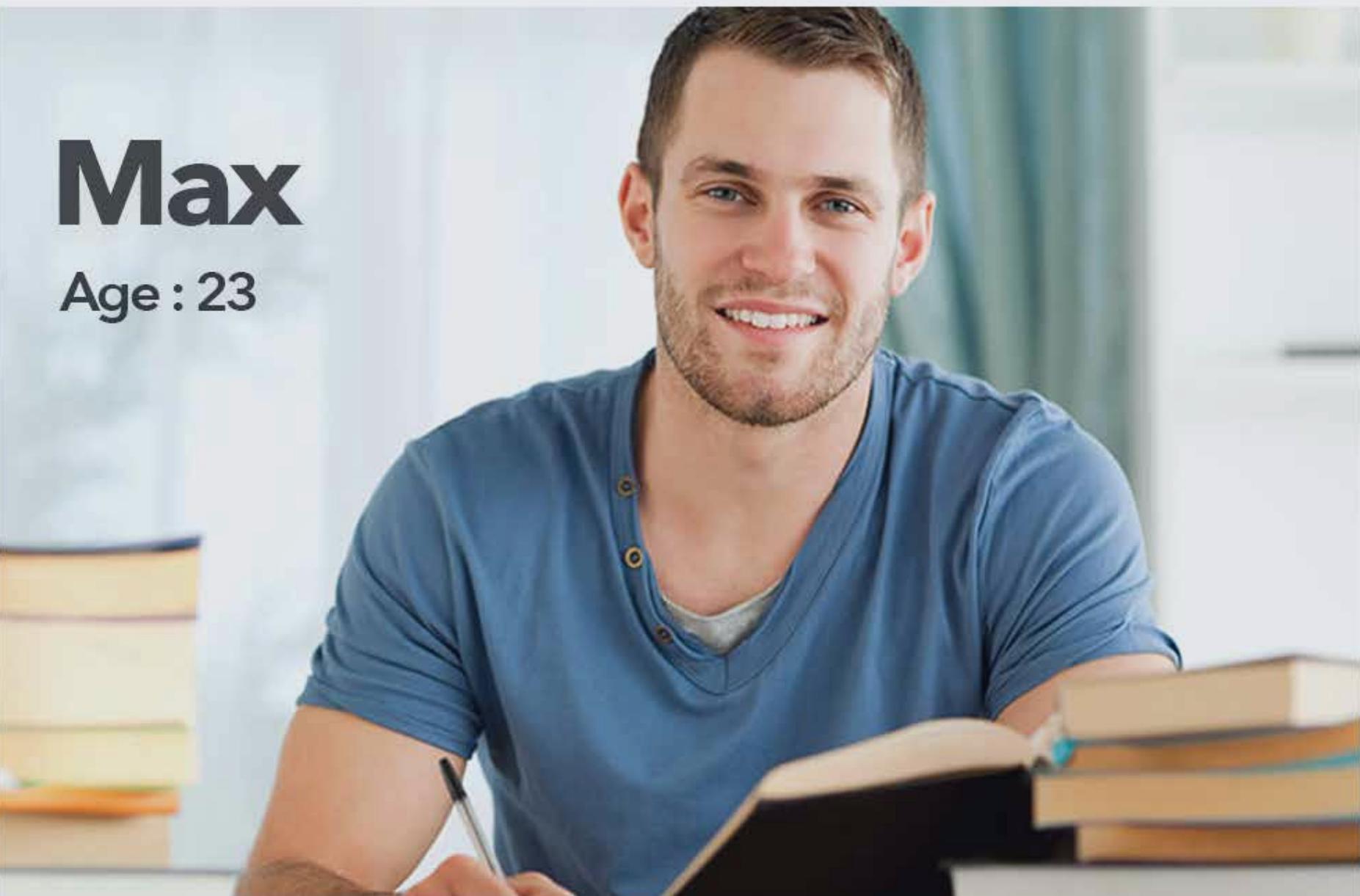
## Personas

INTELLIGENT

OBSERVANT

PLAYFUL

CREATIVE



**Max**

Age : 23

### ABOUT

Max is a full-time bachelor of science student. He is crazy about technology. He loves to watch Sci-fi movies and play games. Max spends most of his time by himself either studying or working and does not have time to socialize and thus he does not have many friends. He is very observant about things around him and that gets him concerned about the rise in congestion and walkability in the city scapes.

*"Sometimes I wish my locality could have more interesting things to see."*

### GOALS

1. Live in an aesthetically pleasing environment.
2. Getting hands on latest gadgets and technology.
3. Feel comfortable and live in a socially adaptive society.

### FRUSTATIONS

1. Experiencing delays because of the city streets becoming overpopulated causing pedestrian congestion.
2. Declining walkability of his locality and everyday commute.
3. Lack of empathy and openness of people towards each other.

# Chosen Concept

## Personas

PASSIONATE    CONFIDENT    EXTROVERT    CREATIVE



### ABOUT

Lucy is a very enthusiastic and energetic person. She is an international student studying international taxation. She loves travelling and exploring areas around her. She usually takes public transport to commute to uni, work or other spots, but she isn't very happy with the overcrowded city scape. She finds the localities less empathetic about each other. She needs to find some good friends and carry on with her travel list.

*"I miss the calm and peaceful streets of my country, but the city here is very beautiful. It could be great to see something which weaves common people's emotions to the urban landscapes and make it more livable."*

### GOALS

1. Live, travel and explore.
2. Make new friends and learn about different people.
3. Share good and informative stories with her friends back home.

### FRUSTATIONS

1. Experiencing monotony on her daily routes of commute.
2. Not synchronizing with people of the new country enough.
3. Lack fun stuff happening around for her social media stories.

# Chosen Concept

## Hardware and Software

In terms of the physical hardware we are getting in a camera which will be used for the facial recognition, kinect which will be required for gesture recognition and control. We might need a projector in later stages depending on the mode of display. With future versions we might consider adding some ambient lighting or music depending on how the iterations follow.

For software we are using Microsoft Azure and one of its face recognition API's and adobe illustrator/ photoshops/ sketch to create better UI versions for the product. Microsoft visual studio for kinect to run. For the feedback element we are using a simple static website to display information and statics of the project if any one wants to access them via scanning the QR codes.

## Phrases of Development

### 1 - Conceptual and technical collaboration for mid fidelity

Amalgamating all our research, evaluations, findings and synthesis into crafting our final idea. In the next few weeks this is the point where we come to concrete our foundation of concept and start writing code for it, making improved user interface designs, interactions etc.

### 2 - User testing and analysis for high fidelity

In the weeks to follow there will be an iterative cycle running through creating, testing and iterating the product to work in an agile approach, in order to create the highest fidelity possible.

### 3 - Final Product

This will be the final stage where we will be polishing final remaining bits and pieces of the product and preparing it for showcasing.

# Chosen Concept

## Team Member Responsibilities



UX design  
Front End



Visual Art  
Creative Tech



Programmer  
Curation



Interaction  
Creative Tech

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