

# Smart Gate

Design Proposal

Lachlan Forsyth-Smith

Logan Bondoc

David Liu



# Design Brief

The aim of this project is to design an original product for Sydney's university students to improve their experience with the train system.

From our previous research, we found that students riding on trains need :

- To feel **safe**
- To feel **comfortable**
- **Personal space** on trains
- To avoid wasting **time** (be efficient)
- multiple sources of information to help them with **navigating** the train system
- Space to store their **luggage**

# Background Research



## Comfort

Haywood, Koning and Monchambert (2017) found that **density of people** (e.g. people per m<sup>2</sup>) in a vehicle decreases customer satisfaction. They identified 3 reasons as to why people dislike crowding on public transport: the **physical closeness** of other people, the inconvenience of standing instead of sitting and the inability to engage in **productive** activities during transit (such as reading newspapers or working). Therefore, a solution that reduces people density on trains would address the user needs of personal space, comfort and efficiency on trains.



## Luggage

Cucu, Crisan and Stoica (2019) found that issues with luggage while commuting on the train are often associated with a **lack of storage space**. This lack of space creates a **limited area** to move within aisles and difficulty in going up and down staircases while holding luggage. Furthermore, there was also concern regarding the **security of belongings** as there was a lack of a system to protect luggage from being stolen, while it could be easily damaged due to movement of other passengers or the carriage. Henceforth, a method of safely storing belongings during a train commute is a user need for public transport.



## Safety

User-centred research concluded that students felt unsafe when taking trains late at night, often taking other modes of transit instead (e.g. buses) and would rather travel with others to feel safer. It outlined that while the Sydney train system has an extensive camera surveillance system, it lacks **physical security presence** that would reinforce a sense of comfort for the user. Delbosca and Curriea (2012) outlined that the **perceived notion of safety** when taking the train has a strong influence over train ridership.

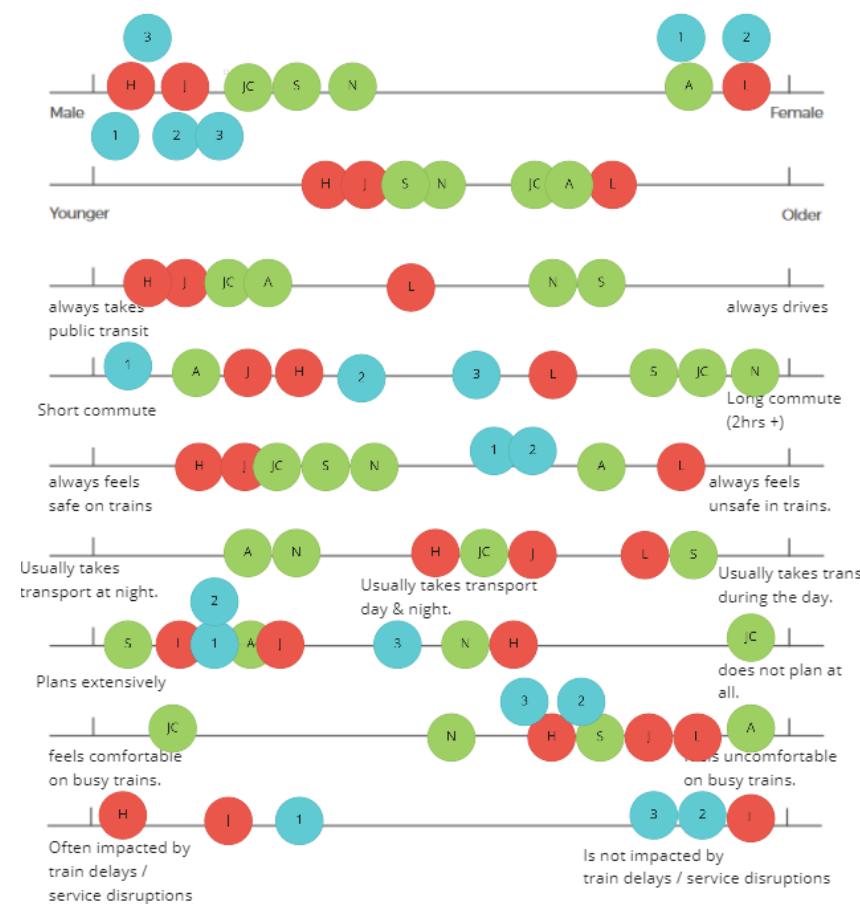


(Image Source: Sydney Morning Herald, 2018)

# Personas

Based on primary background research into the problem space, three **user personas** were constructed (see appendix F). User personas allow designers to “engage socially and emotionally” (Tomish et al., 2021) with the needs of users throughout the design process. We would use our personas to verify that our solutions met the requirements of the brief.

Personas were generated according to the procedure outlined in the book *Design. Think. Make. Break. Repeat.* Behavioural and demographic variables were identified from existing interview transcripts and interview participants were mapped according to these variables (see below). Logical patterns were identified in the mapped data and converted into a unique persona.



Data analysis to generate personas

## Persona Summary



**Name:** Harold

**Occupation:** 1st Year Uni Student

**Age:** 18

**Gender:** Male

**Motivations:** Travel comfortably and safely across Sydney day & night.

**Frustrations:** Crowded trains make him feel uncomfortable

**Quote:**

"I want to feel comfortable while taking the train, even during peak-hours!"

Image source right: (Getty Images, n.d.)

# Personas

## Persona Summaries



**Name:** Joanne

**Occupation:** 3rd Year Uni Student on work placement

**Age:** 24

**Gender:** Female

**Motivations:** Travel to Uni and work during day and night

**Frustrations:** The lack of personal space on public transit during busy hours

**Quote:**

"The busy trains trigger my anxiety, if driving was cheaper I would"



**Name:** John

**Occupation:** Uni Student & casually works at a Café

**Age:** 23

**Gender:** Male

**Motivations:** Wants to get to uni and work on time and hates waiting in traffic / for delays.

**Frustrations:** delays and confusing train service infomation

**Quote:**

"I shouldn't have to worry about my commute. I've got enough on my mind"

# Possible Design Precedents

## Parking Lot Vehicle Sensors

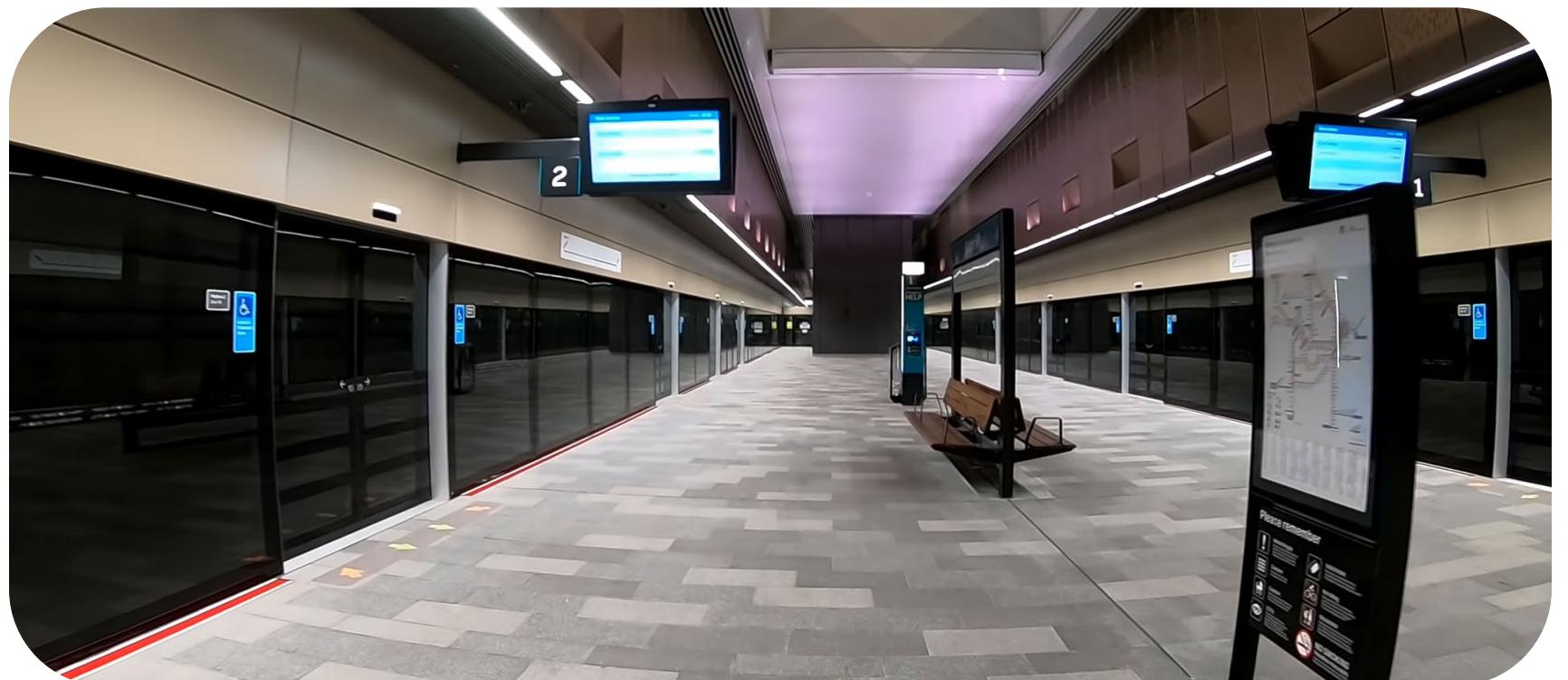
Some in-door car parks contain overhead, colour-coded lights. Red and green lights usually denote unoccupied and occupied parking spaces respectively. This mimics the well-known visual language of traffic lights. Drivers using this system can find empty parking spots more **efficiently**. **Use of space** and traffic flow is optimised (Smart Parking, 2022).



(Image Source: Smart Parking, n.d.)

## Train Platform Glass Doors

The Sydney Metro employs a platform design wherein a glass barrier runs along the edge of the standing area. This increases **platform safety** by preventing people from falling onto the tracks. Sliding doors built into the glass barrier open up to allow access to stopped trains. A light above each door turns on when they open, to help travellers navigate the platform (MoreLocations, 2019).

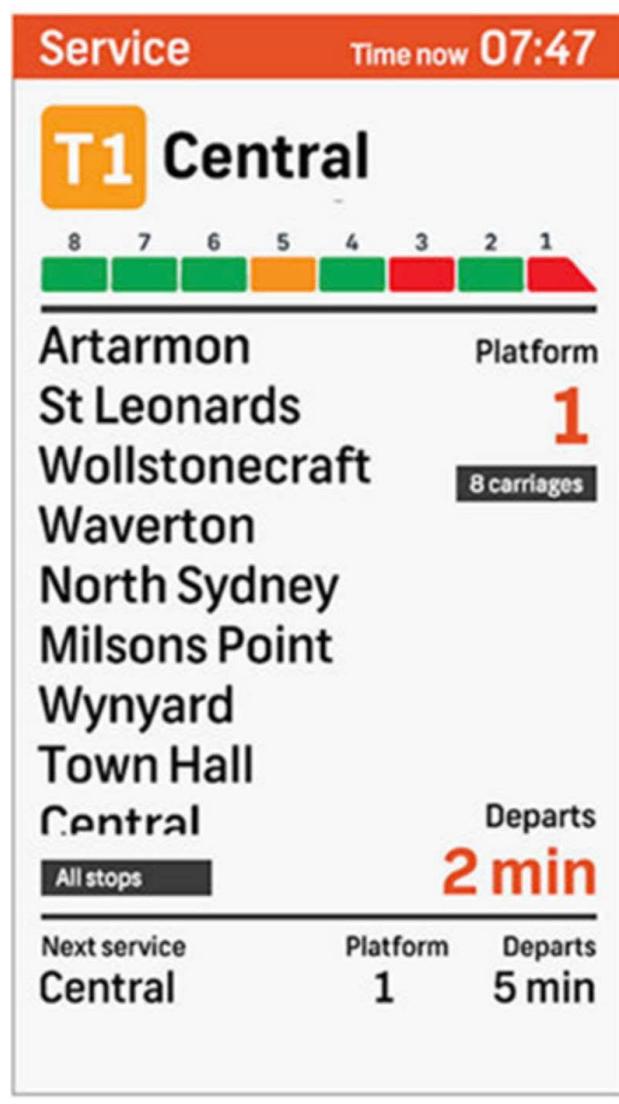


(Image Source: MoreLocations, 2019)

# Possible Design Precedents

## Sydney Trains Indicator boards

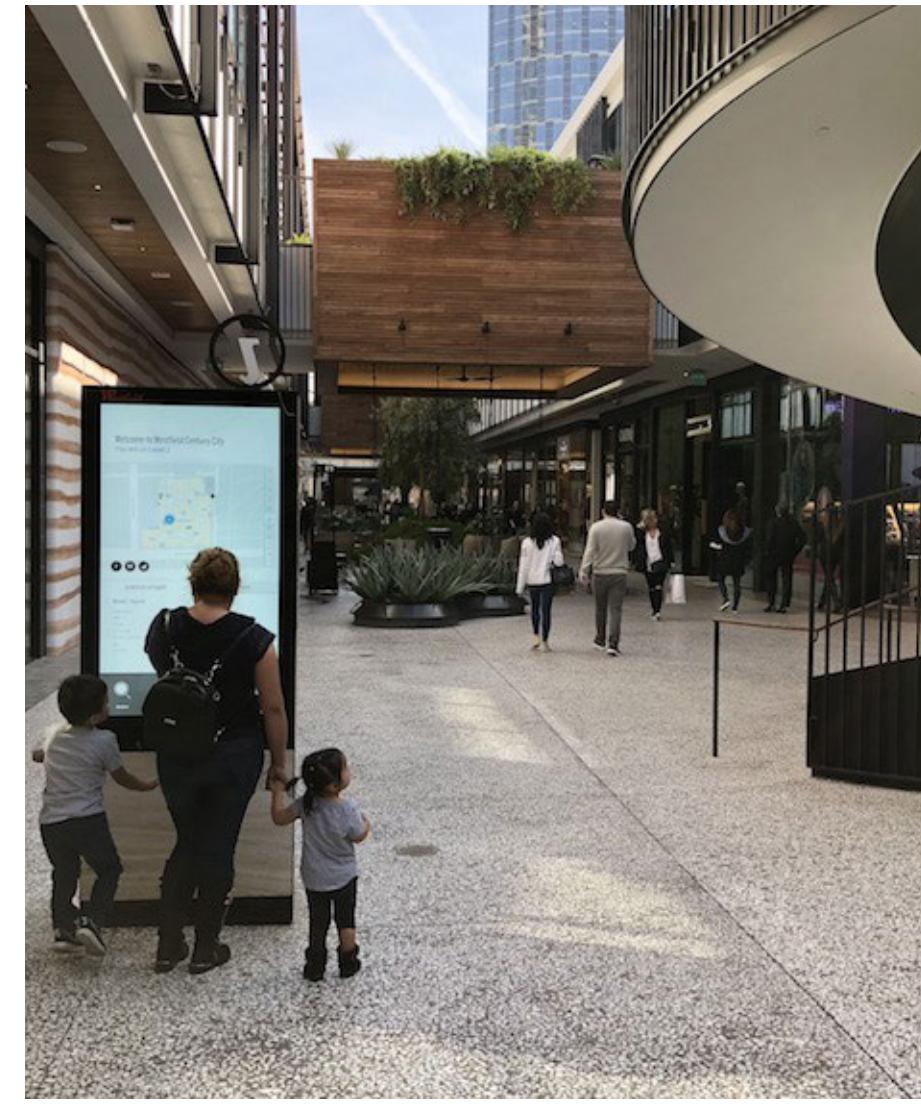
The existing indicator boards show the arrival times of the next 3 train services to pass through a station. It also shows which stations the next service will stop at, by scrolling through a vertical list of station names. At some stations, the seat availability of each carriage on board the next service is shown using the colours of traffic lights (see below). Thus, indicator boards already address the needs of **navigation**, **personal space** and **efficiency** and could inspire our solution.



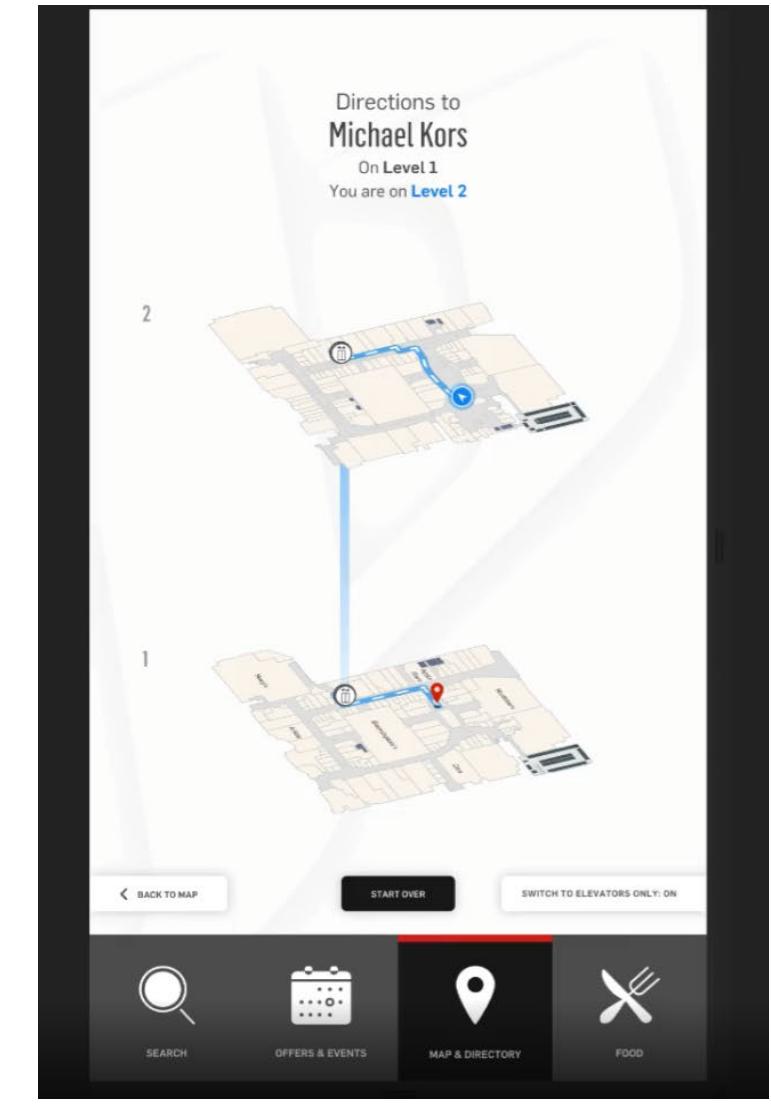
(Image Source: Sydney Trains, 2019)

## Interactive Mall Directory

Some shopping centres provide a digital directory that assists shoppers with **wayfinding**. These directories are usually free-standing touchscreen monitors. Users search for the name of a store with the directory and the fastest route to the store appears on screen. Directories may include additional information about promotions or special events. This design makes navigating shopping centres more **efficient**.



(Image Source: TR business, 2015)

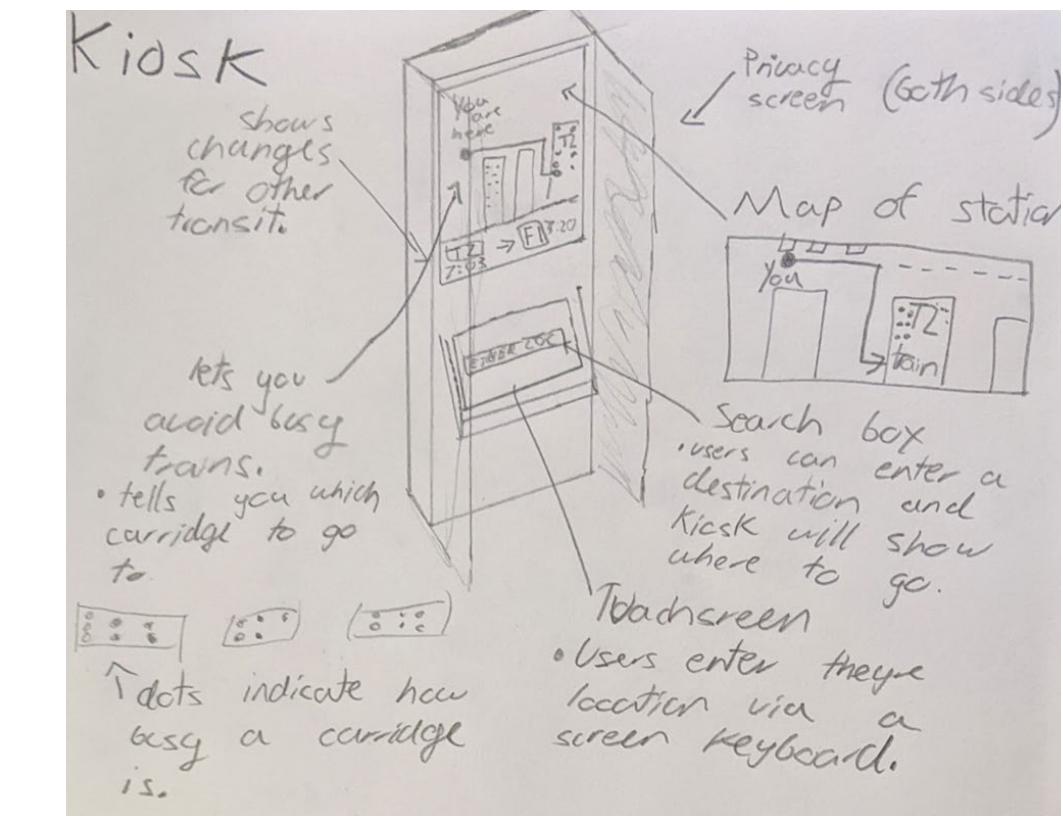
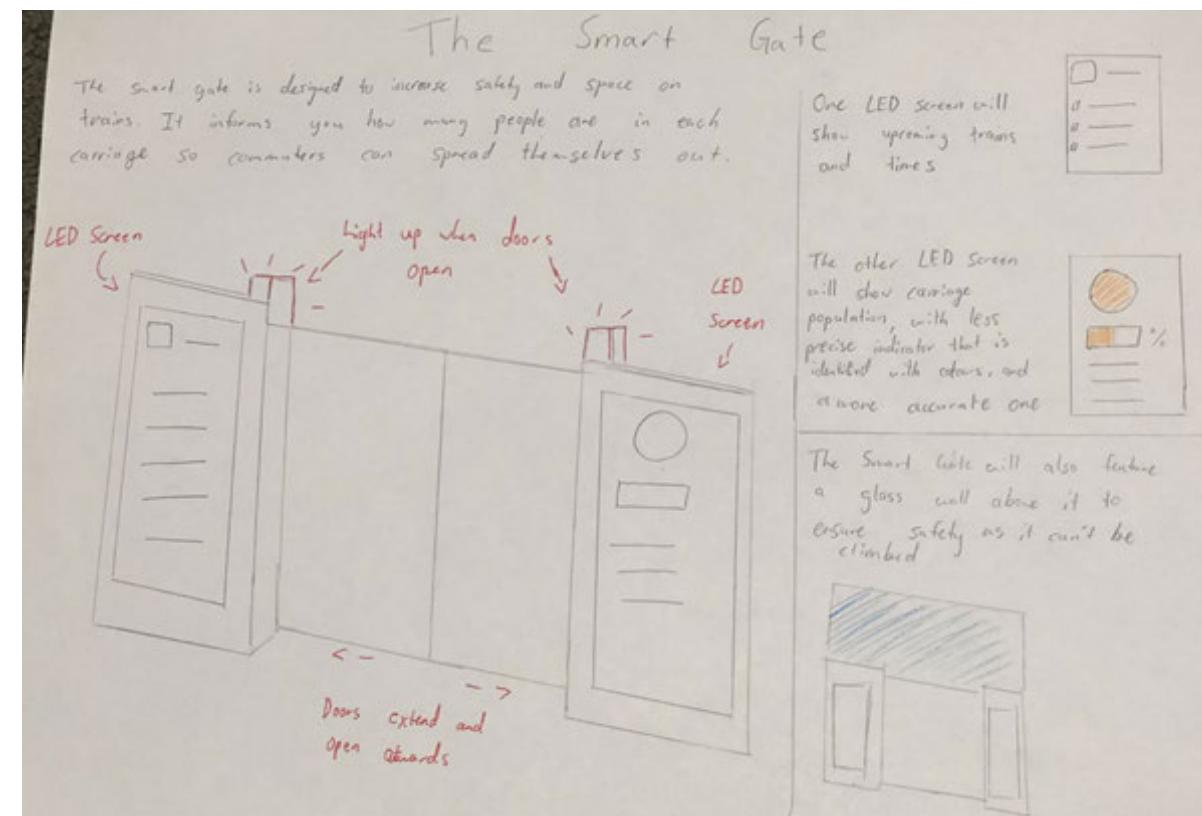
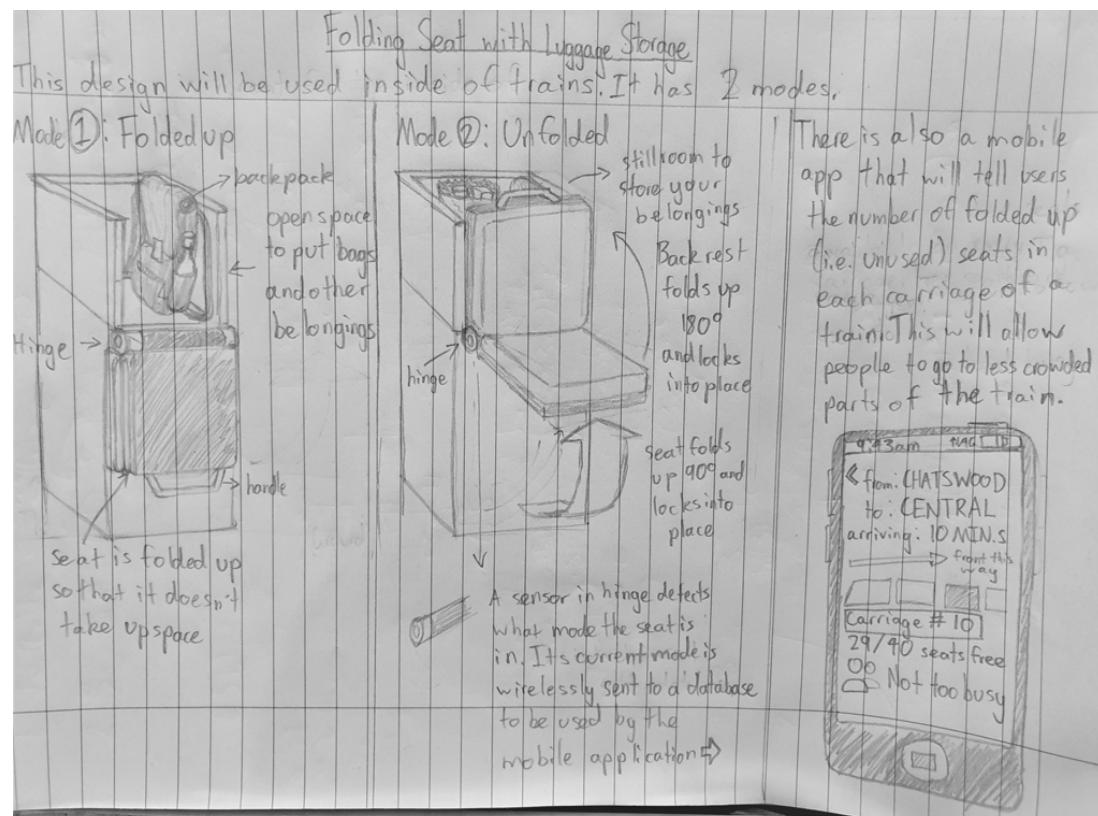


(Image Source: Wallflower Global, n.d.)

# Idea Generation

## Sketches

Following a group brainstorming session, 3 potential designs emerged (see appendix A). Each design addressed the user needs in a unique way. **Rough sketches** of each idea were shown to University students for initial informal feedback. The sketching method was chosen because it is a cheap and quick way to facilitate discussion and critique (Tomish et al., 2021) about the designs.



### Idea 1: Seat with luggage Storage

Idea 1 depicts a seating system which would address the need for luggage storage and personal space.

### Idea 2: Smart Gate Idea

Idea 2 depicts an idea for a platform-mounted smart gate, that would increase safety, comfortability and efficiency by helping passengers find less crowded carriages.

### Idea 3: Kiosk Idea

Idea 3 depicts an information kiosk for train stations, inspired by mall directories. It would assist with navigation, efficiency and maximise personal space.

# Idea Generation

## Informal Feedback

To evaluate these idea sketches, we solicited informal feedback from university students and peers. The seat and kiosk ideas received a mixed response. People were concerned about the seat's ergonomics and worried about luggage theft. People questioned the usefulness of the kiosk idea. They pointed out that everyday commuters would have no use for it and that existing phone apps already help with navigation.

With the Smart Gate idea, the necessity for the screens that display the upcoming train services was questioned, as people believed that the existing indicator boards hanging from ceiling of stations were sufficient. However, the increased safety from having a gate on the train platform was received well, as one person stated that their fear of falling onto the tracks would be reduced. Others also believed that use of colour coding to identify carriage traffic would be an improvement upon the unclear visual system utilised in the train system today.

## Decision Matrix

To synthesise the informal feedback, we used a **decision matrix** (see appendix B). The matrix helped us make an informed choice about which idea to select, by “systematically evaluating” (Tomisch et al., 2021) them against certain criteria.

Overall, the “Smart Gate” concept scored the highest and was chosen as our final design because it most effectively addressed the user needs outlined in the brief.



	Infomation Kiosk	Folding Storage Seat	Smart Platform Gate
Does this increase space on the train?	1	1	0.3
Does this provide safety from environmental hazards	0.5	0.625	0.6
Does this make the experience more Comfortable?	2	1.125	1.6
Does this make luggage storage easier?	0.25	2.125	0
Does this improve access to information?	2	1.25	3
Does this make navigating the train system easier?	2.5	0.875	3
Does this increase safety from other people?	0.25	0.75	2
Does this make navigating the train system faster/ more efficient?	0.25	0.875	2
Total	8.75	8.625	12.5

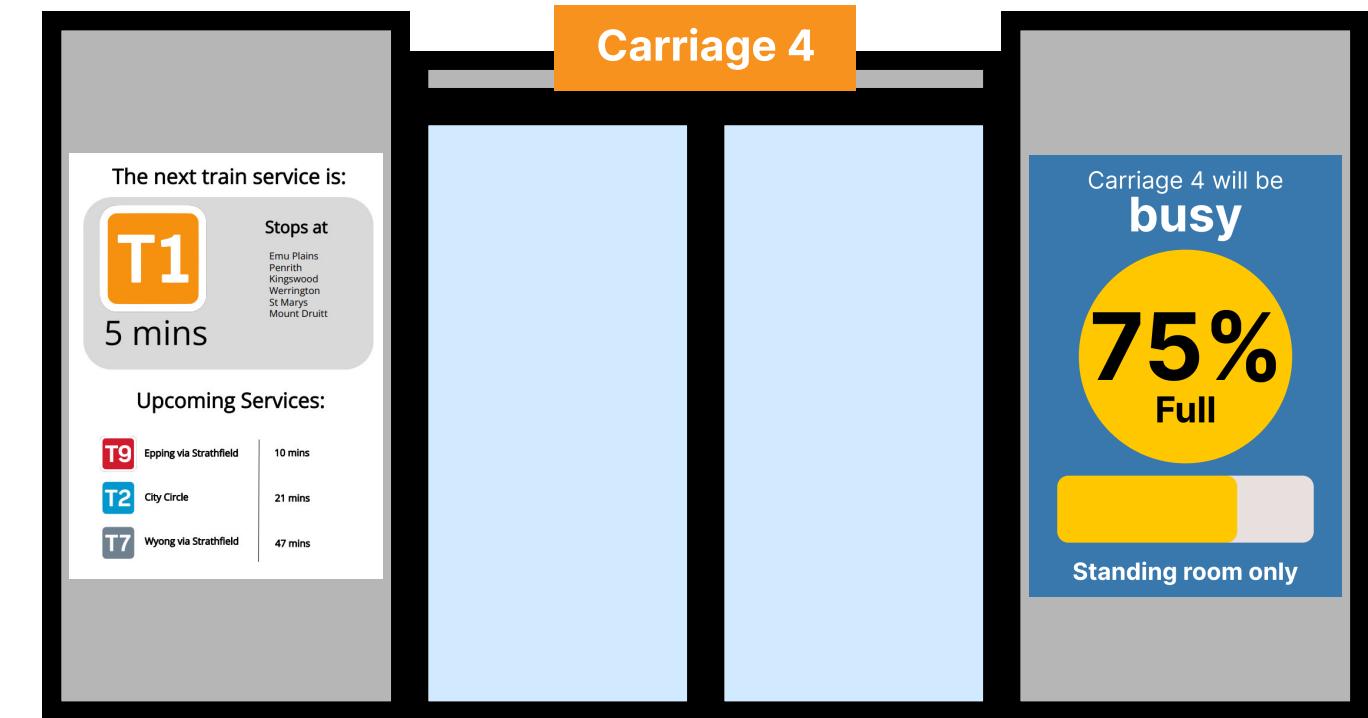
Decision matrix (above)

# Prototyping

## Initial Idea

The Smart Gate system is comprised of a glass barrier that runs along the edge of a train platform with sliding glass doors integrated into it. The doors only open up to let people onto stopped trains. This prevents people from falling onto the tracks. Two screens would flank each of these doors, each with a unique function. One screen would indicate the crowdedness of a carriage on the next train service to stop at the platform. The other would show wait times and stops for upcoming trains.

To evaluate the Smart Gate concept, we began prototyping. This phase of the design process allowed us to identify any potential design flaws by “thinking through making” (Borthwick, 2022).



Initial Smart Gate Concept (Above)

Smart Gate in Context (Below)



# Prototyping

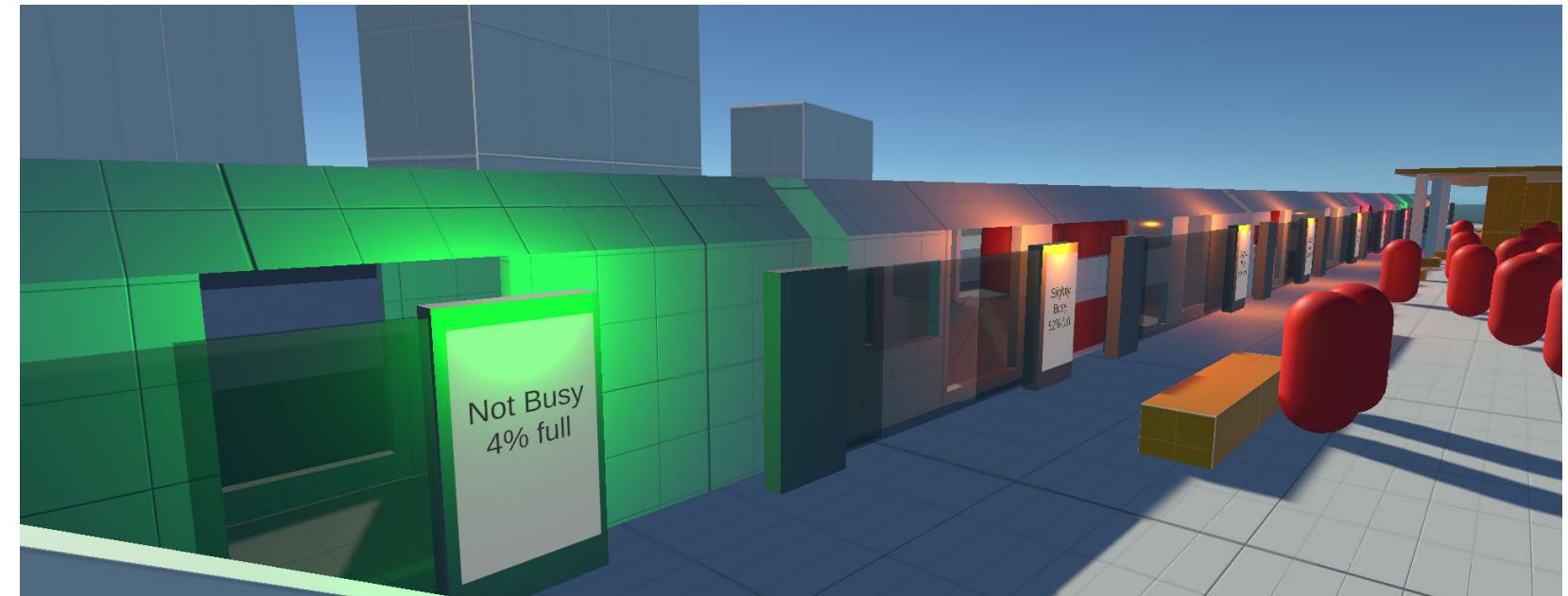
Three prototypes were created to test different aspects of the design (see appendix C).

## Unity Experience Prototype

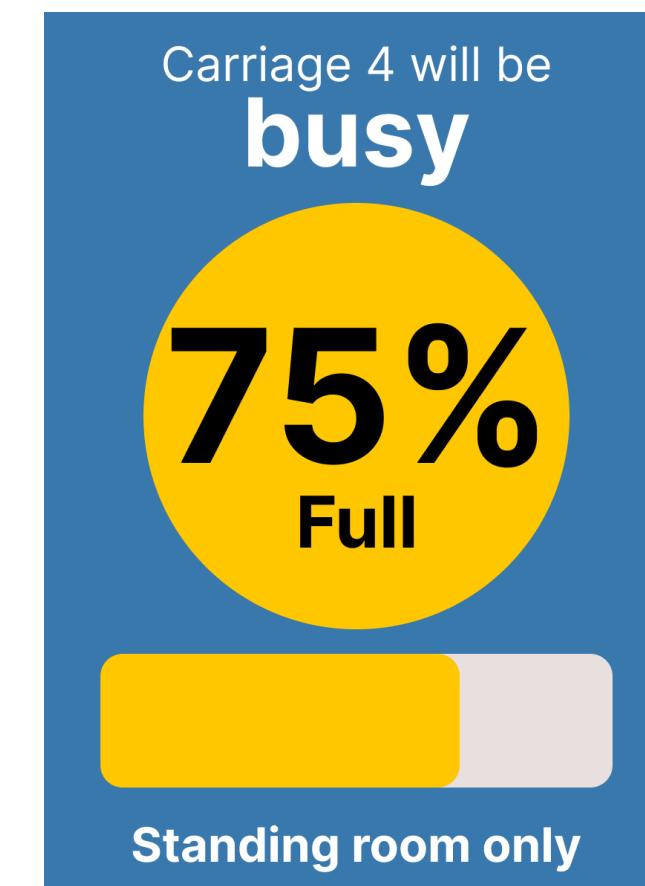
A low-fidelity **experience prototype** of the gate system was created in the Unity game engine. This prototype simulated the experience of navigating to the least crowded part of a train as a passenger (see right). Experience prototypes represent the design as an “integrated experience” (Buchenau & Suri, 2000) rather than several discrete artefacts. With this prototype, we aimed to discover how the combination of the glass barrier, the carriage capacity screens, and the pre-existing layout of Sydney trains platform influenced user behaviour and wayfinding.

## Screen Mock-ups

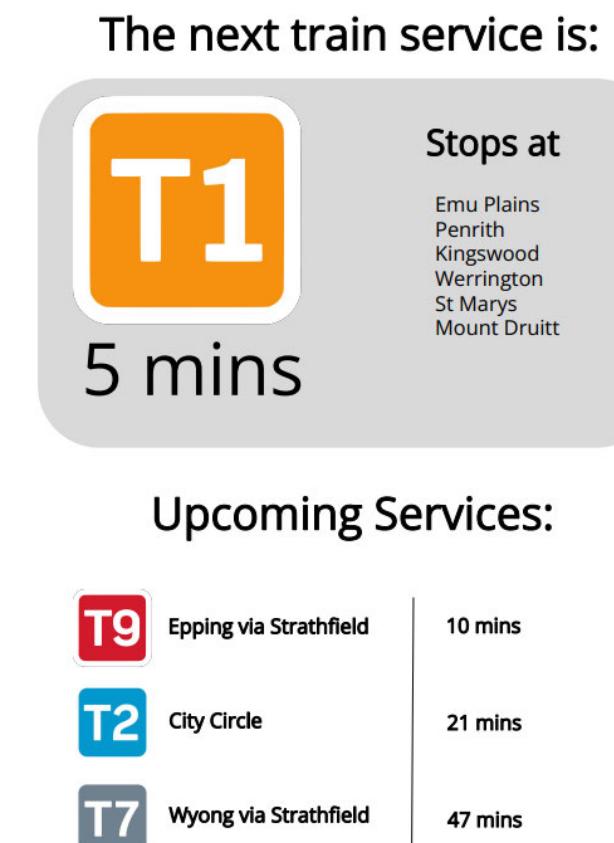
**Mock-ups** of both the ‘upcoming services’ and the carriage capacity screens were designed. These designs were made to resemble the final visual representation of the product as closely as possible. Actual content (e.g. station names) was depicted in the mock-ups and careful attention was given to the mock-up’s visual composition, font choice and colour schemes. With these mock-ups, we aimed to test the legibility and effectiveness of the digital component of our design.



*Unity Experience Prototype (Above)*



*Screen Mockups (Above)*



# Idea Evaluation

To determine whether users would be able to understand how the smart gate functions, we employed the three prototypes in **usability tests**. 11 people participated in the tests (see appendix E), which meant that theoretically, over 80% of the issues in our design were revealed (Tomish et al., 2021).

Neilsen (1994) refers to usability as the combination of **efficiency, effectiveness and satisfaction**. All 3 of these components were addressed during testing. Unique tests were created for each of the 3 prototypes, but every prototype presented participants with a set of simple tasks to complete (see appendices C, D and E). The time taken for each participant was recorded to measure the product's **efficiency**. The success rate of each task was a measure of the product's **effectiveness**.

User tests ended with a short concluding interview or questionnaire that asked participants to talk about their opinion of the product (or product feature). These post-test questions **helped us to gain deep insights** into the experiences of participants as they were interacting with prototypes. Participant responses allowed us to identify which user needs were being **satisfied** and which needs were being neglected.

Smart Gate Capacity UI Test

Sign in to Google to save your progress. [Learn more](#)

Test 1

We will be timing each of these tests

Which carriage will have more space?

Carriage 4 will be **busy** 75% Full Standing room only A

Carriage 4 will be **not busy** 20% Full seats available B

A  
 B

Back Next Clear form

Usability Post-test Forms

Train Platform Gate Wayfinding Experiment

[Sign in to Google to save your progress. Learn more](#)

\*Required

CTRL + V: Paste your game data here! (the game should have already be copied to your clipboard) \*

Your answer

Response to the statement: The platform gate system helped me avoid busy trains.

Strongly Agree  
 Agree  
 Neutral  
 Disagree  
 Strongly Disagree

Response to the statement: A platform gate system would make me feel safer at train platforms.

Strongly Agree  
 Agree  
 Neutral  
 Disagree  
 Strongly Disagree

Any other feedback? (Optional)

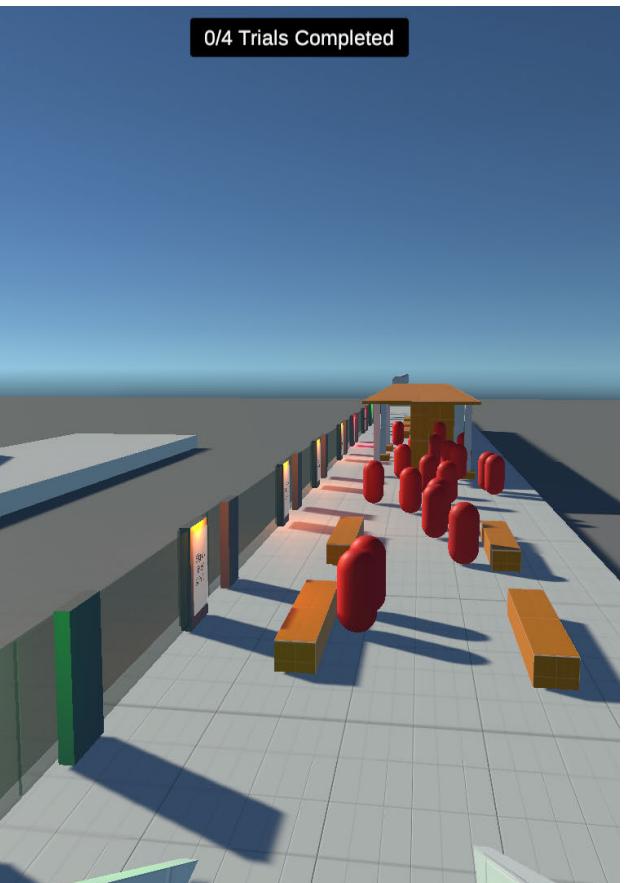
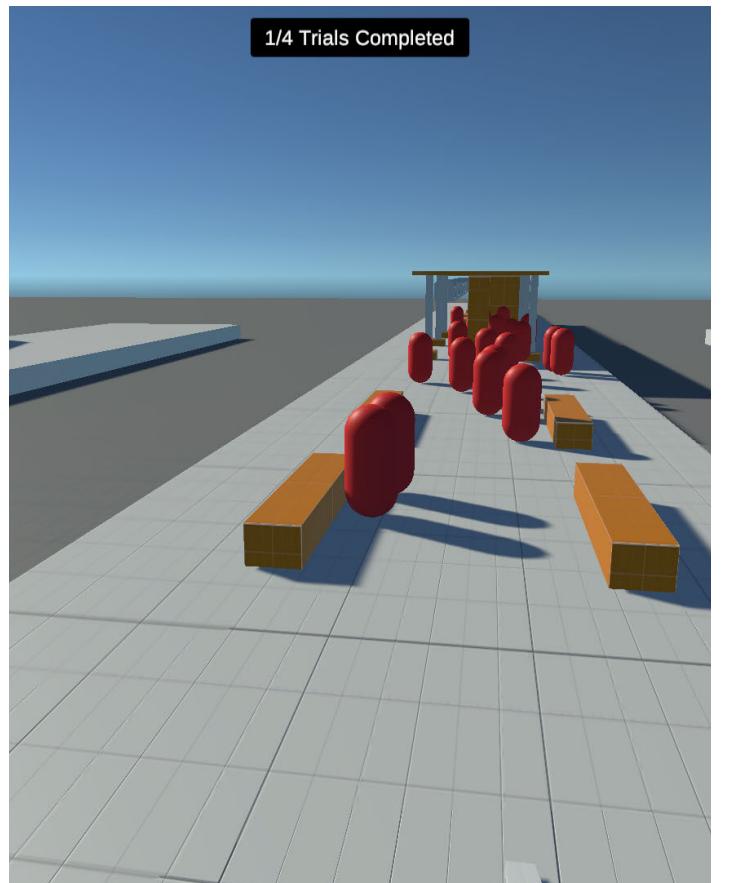
Your answer

Thanks :)

Submit Clear form

# Idea Evaluation

for some tests, participants were encouraged to “**think aloud**”. In other words, users were encouraged to verbalise their thoughts as they completed the usability tasks. The think-aloud protocol revealed when a user’s actual experience with a product differed from our expectations (Tomisch et al., 2021).



*Both versions of the simulation prototype  
(See appendix E)*

**A/B testing** was used during the experience prototype tests. This is an evaluation method where users are presented with two or more variations of a product that differ by one isolated design variable. The best performing variant is then identified through testing (King, Churchill & Tan, 2017).

Participants were instructed to enter the least crowded carriage on a train. They were asked to attempt this task multiple times, twice in a simulation containing the Smart Gate and twice in a simulation without the gate. By changing only one variable, the prototype could measure the true effect of our product on the user’s ability to navigate the platform.

**On average there was a 17% improvement in walking distance when using the platform gate system.**

*“Having the gate system meant I didn't have to move as much and could focus on getting on rather than waiting to find a suitable place to board.” - Participant 3*

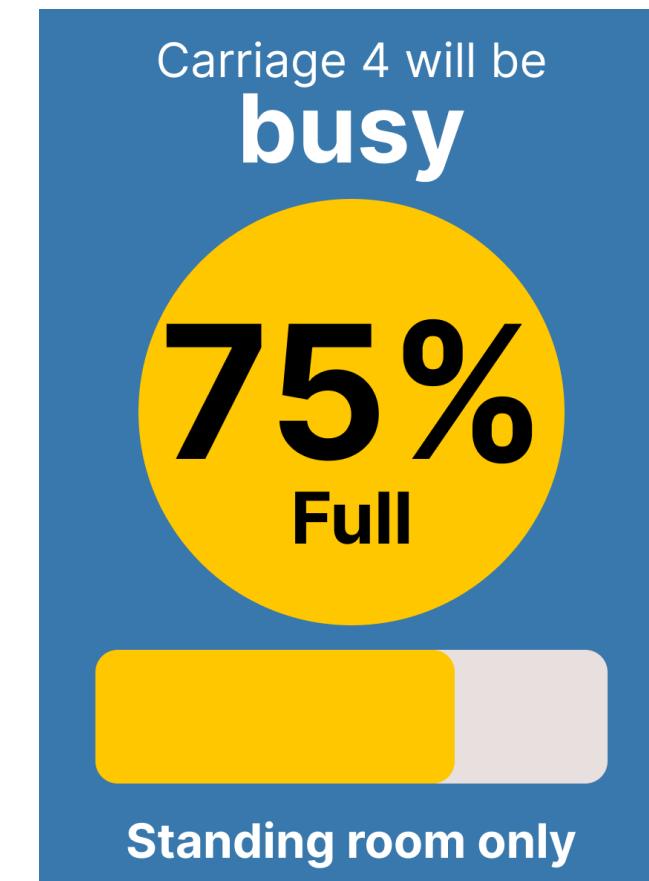
*“didn't realise that the colours meant less people, should have just put colours in shades instead of giving percentages, having it fade to red” - Participant 4*

# Design Iteration

After analysing feedback from usability tests and discussion amongst team members, changes were made to the Smart Gate, so that it could better meet user needs.

## Capacity Screen

Users were generally satisfied with the screen's visual design and learned to use it quickly during testing. One user pointed out that it would be **time consuming to scan every gate** on a platform to find the optimal carriage to board. Thus, a 'best carriages' section was added at the bottom of the capacity screen to address this concern. The capacity screens now **direct users to the two least crowded carriages** on the next train service. Changes were also made to the font and colour choice so that it would match the aesthetic of the 'Next Service' screen.



Previous design → Current iteration

### Previous design

The next train service is:	
Richmond via Central	Stops at
<b>T1</b>	Emu Plains Penrith Kingswood Werrington St Marys Mount Druitt
5 mins	
Upcoming Services:	
<b>T9</b> Epping via Strathfield	10 mins
<b>T2</b> City Circle	21 mins
<b>T7</b> Wyong via Strathfield	47 mins

Increased font size & weight for important info.

### Current iteration

<b>Richmond</b> via Central	
<b>T1</b>	5 mins
Stops at	
Emu Plains Penrith Kingswood Werrington St Marys Mount Druitt	
<b>T9</b> Epping Via Strathfield	10 mins
<b>T2</b> City Circle	21 mins
<b>T7</b> Wyong via Strathfield	47 mins

Added lines to visually divide information

## “Next Service” Screen

Overall, we increased text size for all screen elements and emphasised important information by increases its font weight e.g., departure time to establish a stronger information hierarchy.

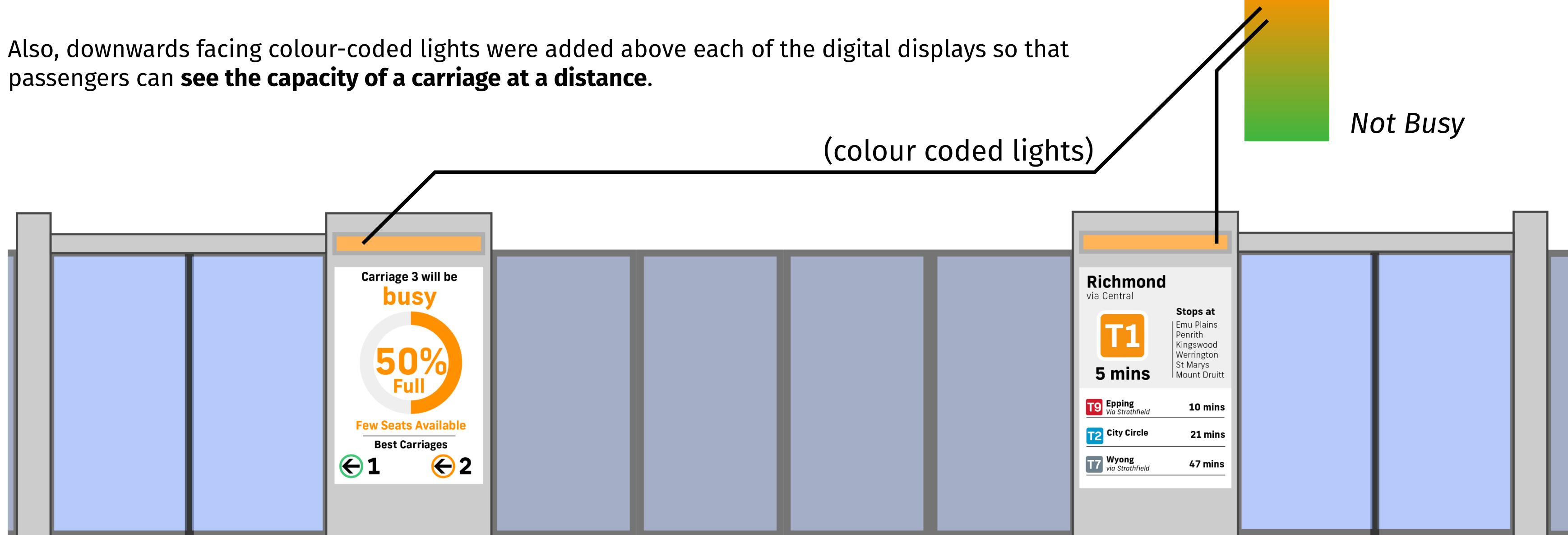
We also removed the “The next train service is:” and “Upcoming Services:” text because it was redundant and was taking up space. By removing this we could scale up the entire design to be **more readable at a distance**.

# Design Iteration

## Overhead Lights Key

Upon reflection, we decided that placing two screens on either side of every door was **redundant**. Since all Sydney trains carriages have two doors, this meant that two screens would be displaying the capacity of the same carriage. We updated the design so that each door would have one screen adjacent to it.

Also, downwards facing colour-coded lights were added above each of the digital displays so that passengers can **see the capacity of a carriage at a distance**.



*Updated Gate Layout*



# Final Design

# Final Design

Through iteration, we arrived at a final design that sufficiently meets the user needs outlined in the design brief.

**Richmond**  
via Central



**3 mins**

**Stops at**

Emu Plains  
Penrith  
Kingswood  
Werrington  
St Marys  
Mount Druitt

**T9 Epping**  
Via Strathfield

**10 mins**

**T2 City Circle**

**21 mins**

**T7 Wyong**  
via Strathfield

**47 mins**

## Addressing Physical Safety

Our final design implements a transparent barrier on train station platforms to prevent travellers from falling onto the tracks and injuring themselves, letting users feel **safer**. This was inspired by Sydney Metro's glass barriers. By fostering the perception of safety amongst student travellers, the Smart Gate will make travelling by train more appealing to this demographic (Delbosca and Curriea, 2012).

## Facilitates User Confidence

Similar to existing Sydney trains indicator boards, screens located along the platform display the arrival time and route of upcoming train services. Service information is displayed **directly next to the platform** to reduce possible confusion. This **navigation data** helps students feel confident that the train they are boarding is the correct one.

# Final Design



## Improving User Comfort and Personal Space

Screens located along the platform provide information about the level of crowding on each carriage of the next train service to stop at the platform. Inspired by parking lot sensors, the screens implement a colour system to indicate the level of crowding.

A downward facing light is attached to the gates colour coded in a similar manner allowing for users to easily identify less busy carriages at a distance, **even when not in direct line of sight** of the screen.

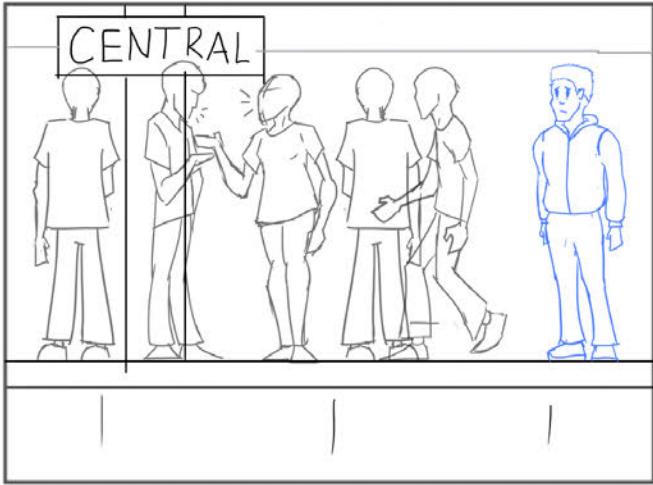
These features allow travellers to spread out on trains. Hence, this design **maximises the personal space** available to every passenger and reduces the dissatisfaction associated with crowding on public transport (Haywood, Koning and Monchambert, 2017). The increase in personal space also means that problems related to **carrying luggage** through tight spaces are reduced (Cucu, Crisan and Stoica, 2019).

**Passengers don't have to worry** about bumping into other travellers and are more likely to enter a carriage with seats. Hence, they are more likely to have a **comfortable** train trip.

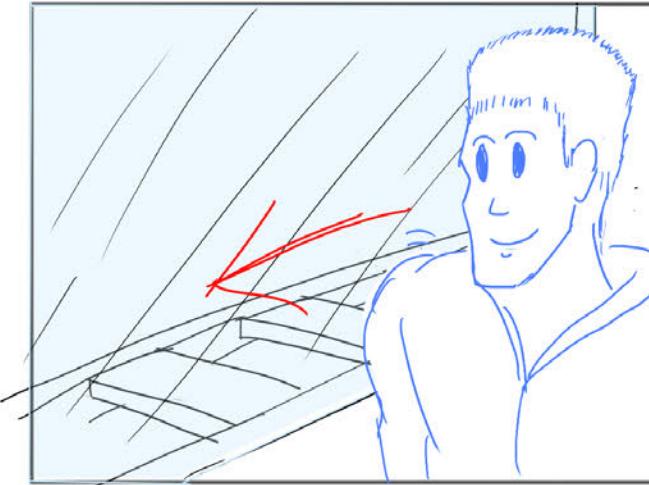
# Final Design

## Storyboard

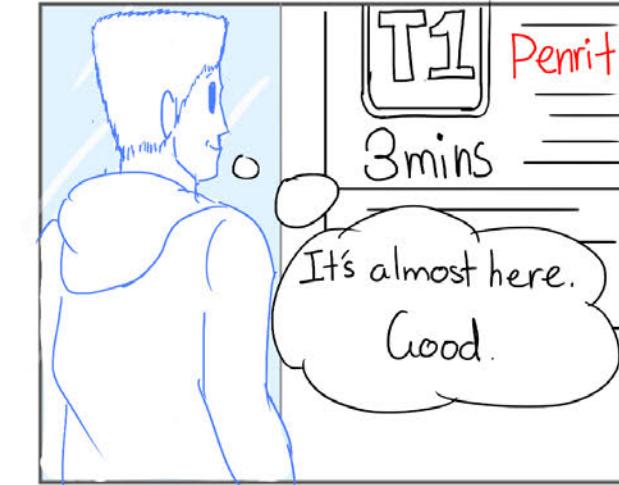
To illustrate how the Smart Gate benefits students, we created **Storyboard** depicting one of our personas interacting with the product.



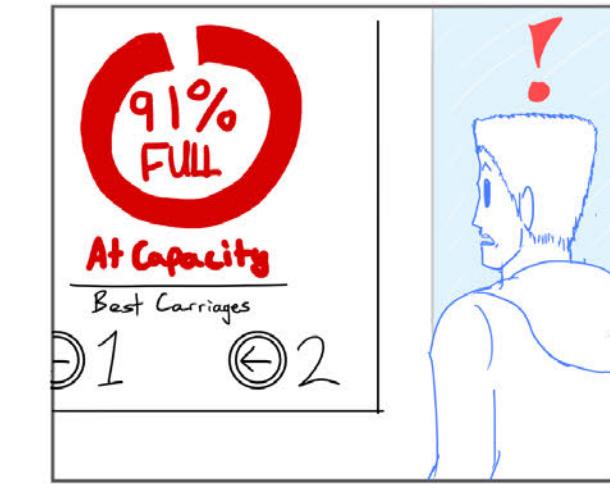
1 Harold arrives at the train platform after a big night out. He is physically drained, but also anxious. The business of the platform gets on his nerves.



2 As he navigates along the platform, Harold is pleasantly surprised by the glass barrier between the platform and the tracks. He feels a little safer, knowing he won't fall.



3 Harold spots the name of his local station on a smart gate screen. He then continues walking down the platform.



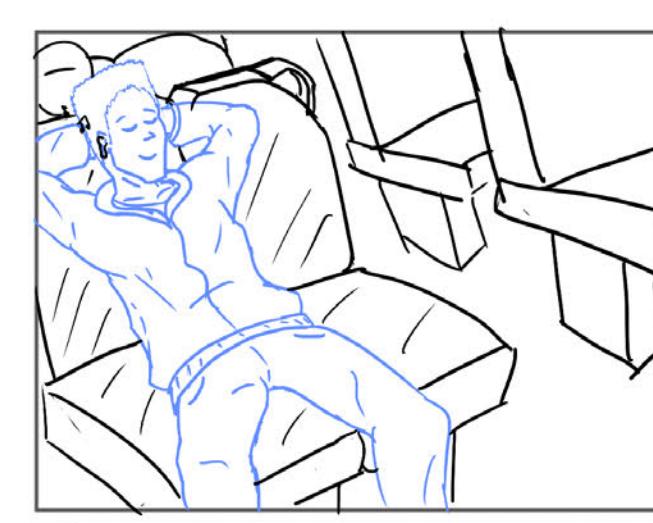
4 Harold stops at a carriage capacity screen. He realises he is standing where the busier part of the train would be.



5 Harold follows the directions on screen and moves further down the platform. He is now at a sliding glass door corresponding to a less crowded carriage. He stands and waits.



6 Harold steps onto the train once it arrives. To his surprise, he doesn't have to walk around standing travellers and there are actually a few seats available.



7 Harold sits on an un-occupied 2-seater. He leans back in his seat and enjoys his personal space. During his trip, he is able to relax and listen to music.

# Conclusion

By following a human-centred design process, we arrived at a highly usable product that meets the user needs specified in the design brief. However, the Smart Gate design is not perfect and there are still opportunities for improvement.



## Possible Design Futures ⏱

- Methods of preventing screen glare e.g., blocking sunlight with a cover or using a new display technology.
- Revising the use of colour in our design to make screens more accessible to people with a colour vision deficiency.
- Increase the height of the screen, possibly placing it directly above the gate.

## Strengths ✓

- The physical barrier prevents users from falling onto the tracks greatly reducing the number of injuries.
- The barrier may also make users feel safer knowing that they cannot physically fall onto the tracks.
- The coloured light projected onto the ground allows users to know how busy a carriage is even if they are not in direct line of sight of the display.
- Multiple “Next Service” screens along a platform help travellers quickly determine if they are on the correct platform

## Weaknesses ✗

- ← The digital display may be difficult to view in sunny areas of the platform due to glare.
- ← Could be inaccessible for people with colour blindness (*specifically red and green*)
- ← Users might have trouble viewing service information at gates if people are standing in front of the display

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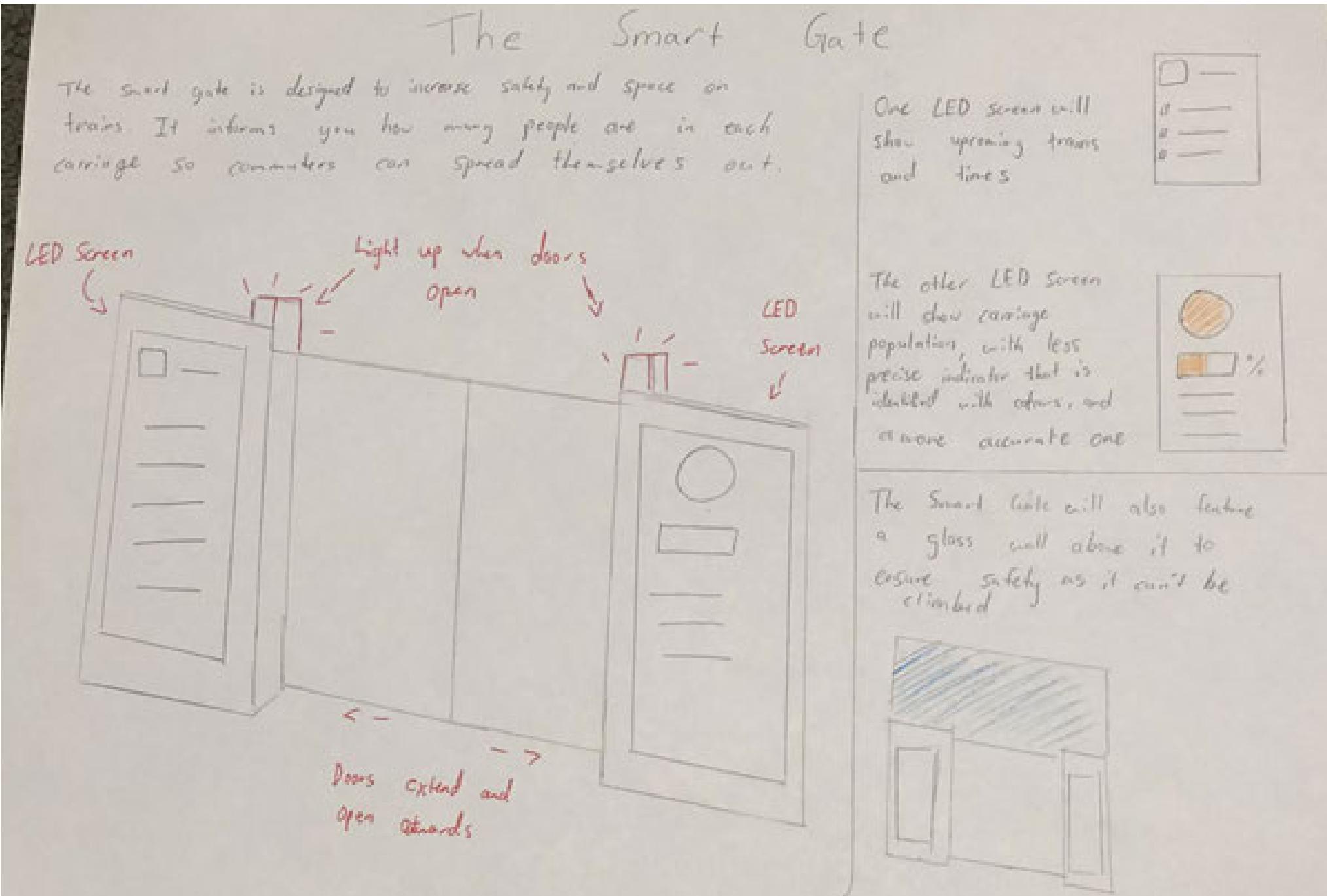
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Friend Stock (n.d.). *Joyful Male using Tablet* [Image]. [https://as2.ftcdn.net/v2/jpg/04/84/16/73/1000\\_F\\_484167303\\_Om4nF0sUO1QPFVPC3uHiLgD6ndB6urq1.jpg](https://as2.ftcdn.net/v2/jpg/04/84/16/73/1000_F_484167303_Om4nF0sUO1QPFVPC3uHiLgD6ndB6urq1.jpg)

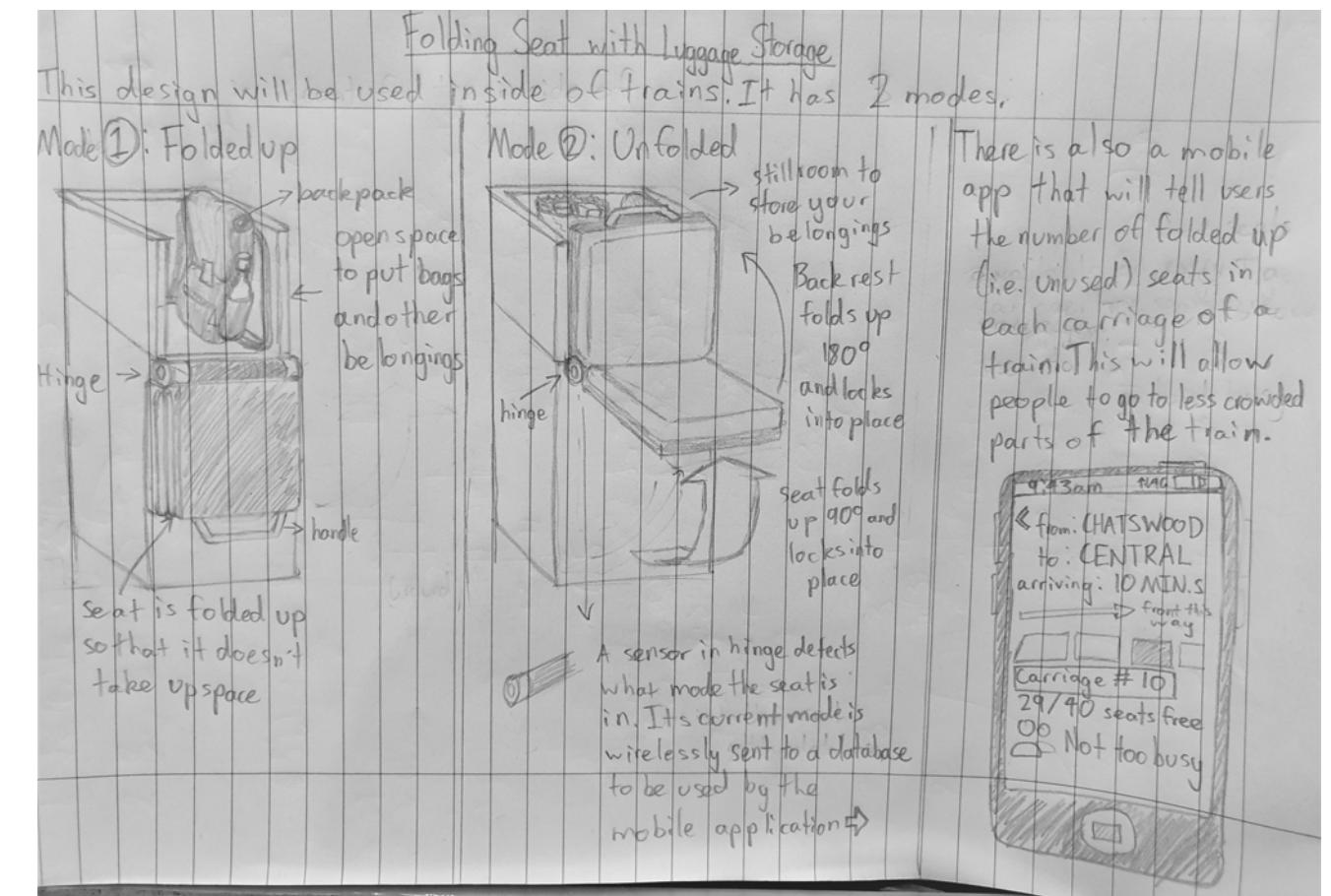
King, R., Churchill, E. F., & Tan, C. (2017). Designing with data: Improving the user experience with A/B testing. " O'Reilly Media, Inc.".

# Appendix A - Ideation

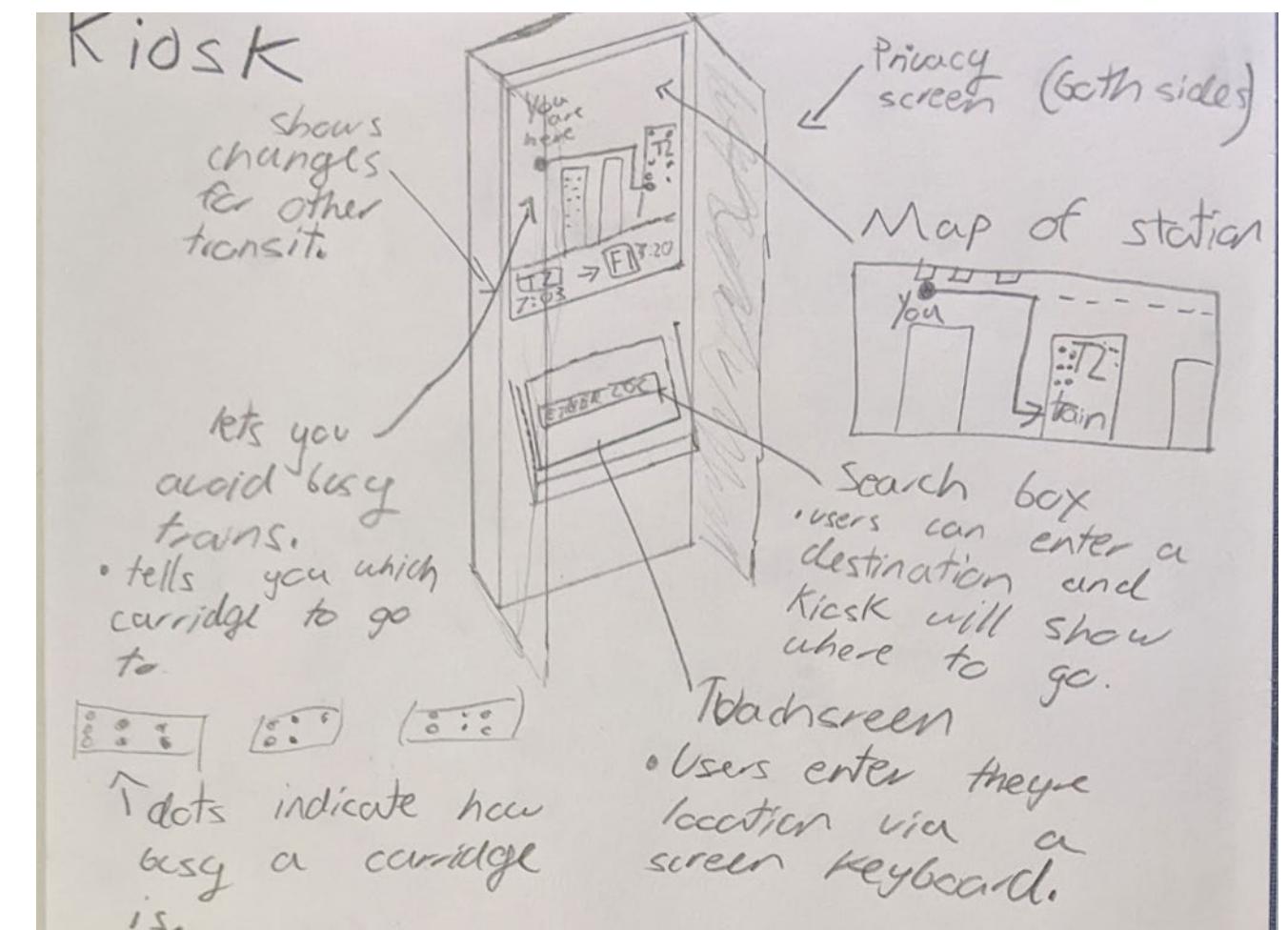
## Sketches



**The "Smart Gate"**



**Folding Chair with luggage storage**

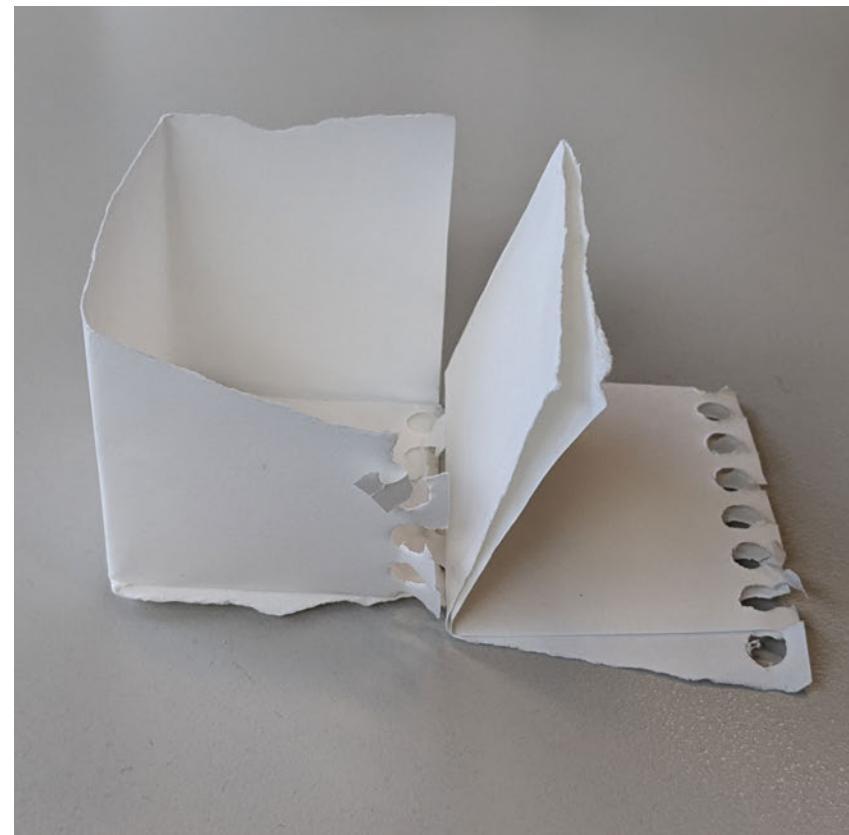


**Interactive Navigation directory / Kiosk**

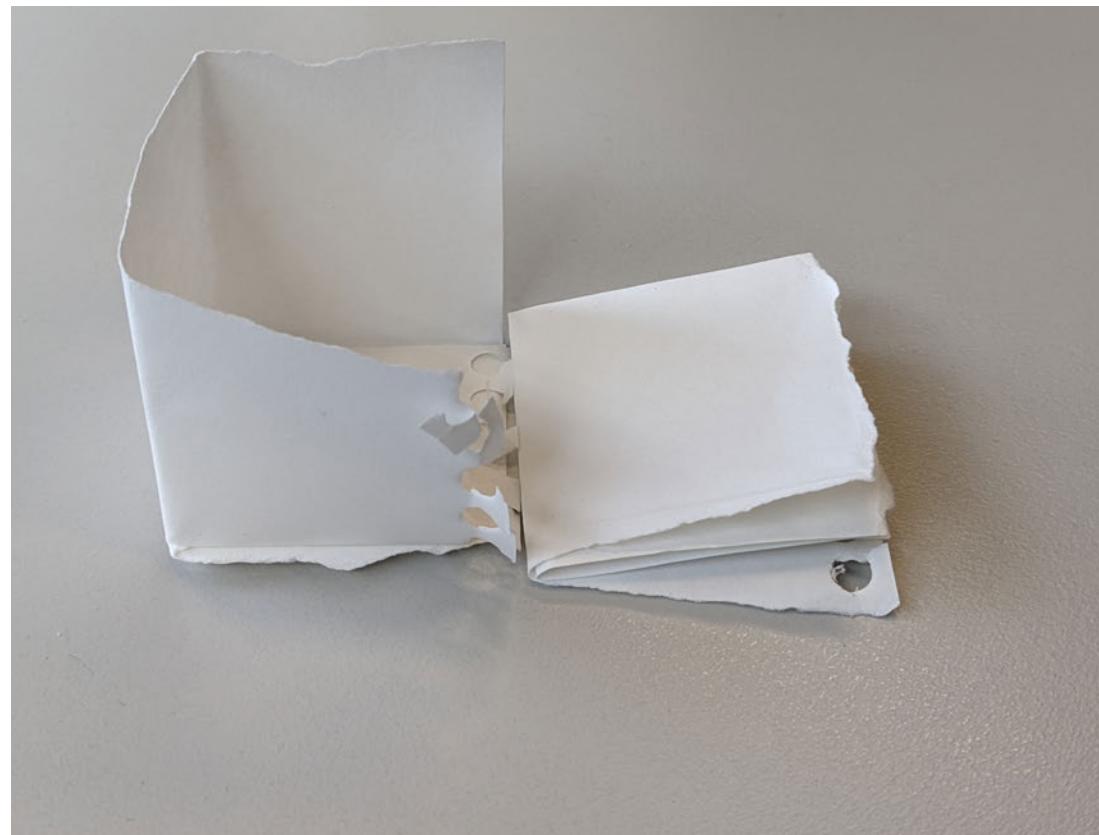
# Appendix A - Ideation

## Low Fidelity Paper Prototypes

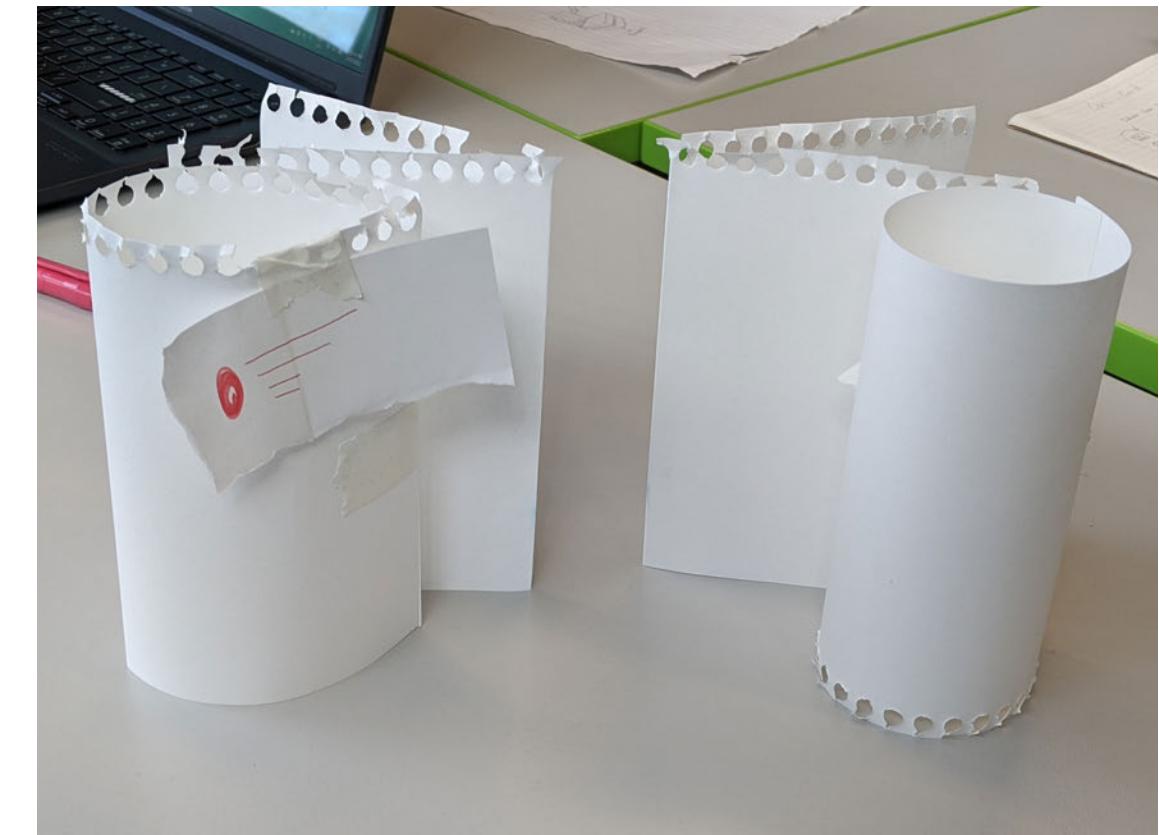
These prototypes were created during early brainstorming sessions. Team members created these to communicate ideas with the rest of the team.



Smart Seat Folding Design  
(closed)



Smart Seat Folding Design  
(opened)



Gate

# Appendix A - Ideation

## Informal Feedback Surveys

Some surveys were distributed to peers and university students to get feedback on the 3 initial idea sketches.

The design:

This design will be used inside of trains. It has 2 modes.

Mode 1: Folded up  
backrest opens space to put bags and other belongings  
Hinge →  
Seat is folded up so that it doesn't take up space

Mode 2: Unfolded  
Without to open your belongings Backrest folds up 90° and locks into place  
seat folds up 40° and locks into place

A sensor in every seat which reads the seats in. It's currently made in wireless to a database to be used by the mobile application

Folding Seat with Luggage Storage

There is also a mobile app that will tell users the number of folded up (i.e. unused) seats in each carriage of a train. This will allow people to go to less crowded parts of the train.

Description (optional)

Safety

Description (optional)

This design provides safety from environmental hazards on trains and train stations \*

-3

-2

-1

0

1

2

3

What do you think of the design? (For context, we are trying to make Sydney trains more efficient, comfortable and safe) \*

Long answer text

Is there anything you would change about it?

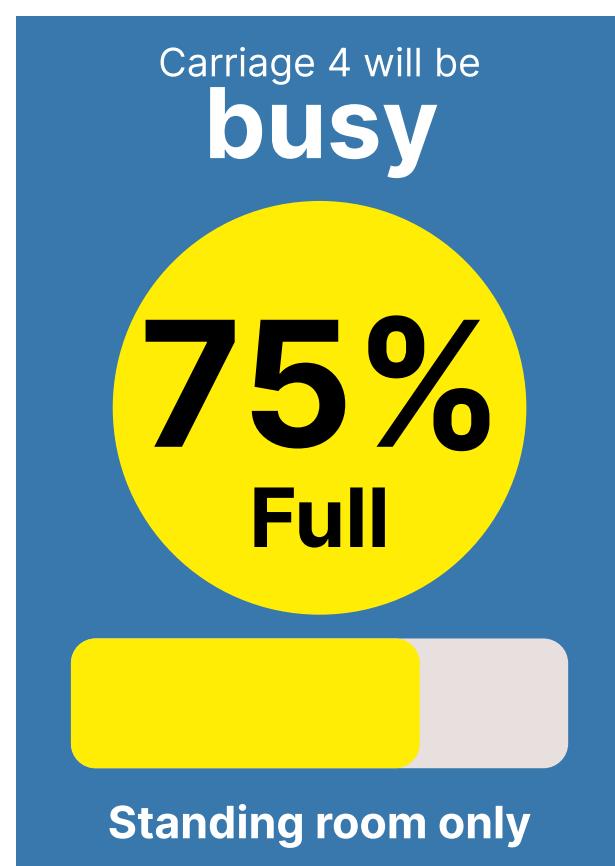
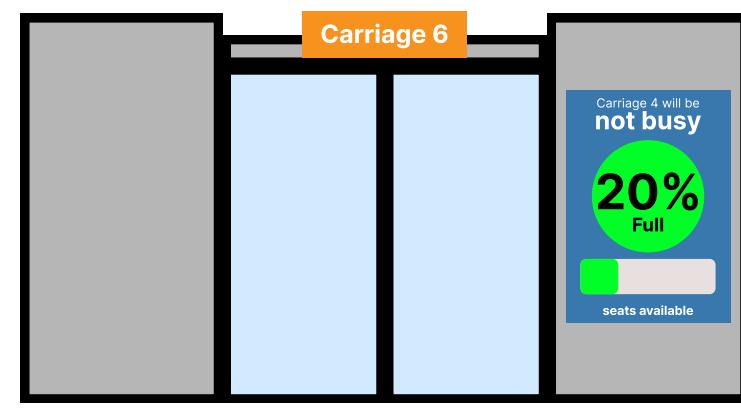
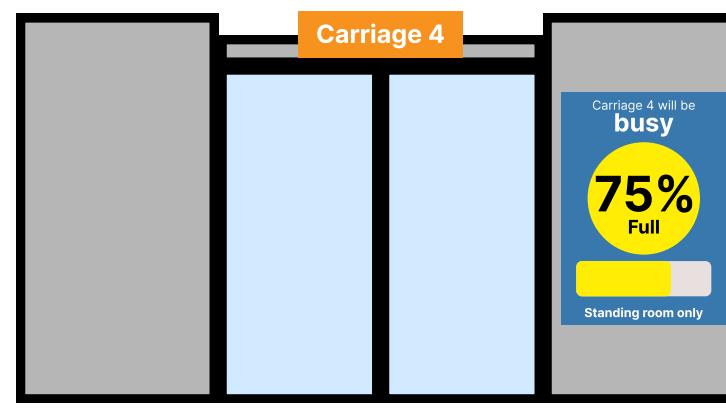
Long answer text

# Appendix B - Decision Matrix

Criteria	Average Grading (Score between -3 and 3)		
Idea	Information / Navigation Kiosk	Seat	Smart Platform Gate
Does this increase space on the train?	1	1	0.3
Does this provide safety from environmental hazards	0.5	0.625	0.6
Does this make the experience more Comfortable?	2	1.125	1.6
Does this make luggage storage easier?	0.25	2.125	0
Does this improve access to information?	2	1.25	3
Does this make navigating the train system easier?	2.5	0.875	3
Does this increase safety from other people?	0.25	0.75	2
Does this make navigating the train system faster/ more efficient?	0.25	0.875	2

	Infomation Kiosk	Folding Storage Seat	Smart Platform Gate
Does this increase space on the train?	1	1	0.3
Does this provide safety from environmental hazards	0.5	0.625	0.6
Does this make the experience more Comfortable?	2	1.125	1.6
Does this make luggage storage easier?	0.25	2.125	0
Does this improve access to information?	2	1.25	3
Does this make navigating the train system easier?	2.5	0.875	3
Does this increase safety from other people?	0.25	0.75	2
Does this make navigating the train system faster/ more efficient?	0.25	0.875	2
Total	8.75	8.625	12.5

# Appendix C - Prototypes



The next train service is:



Upcoming Services:

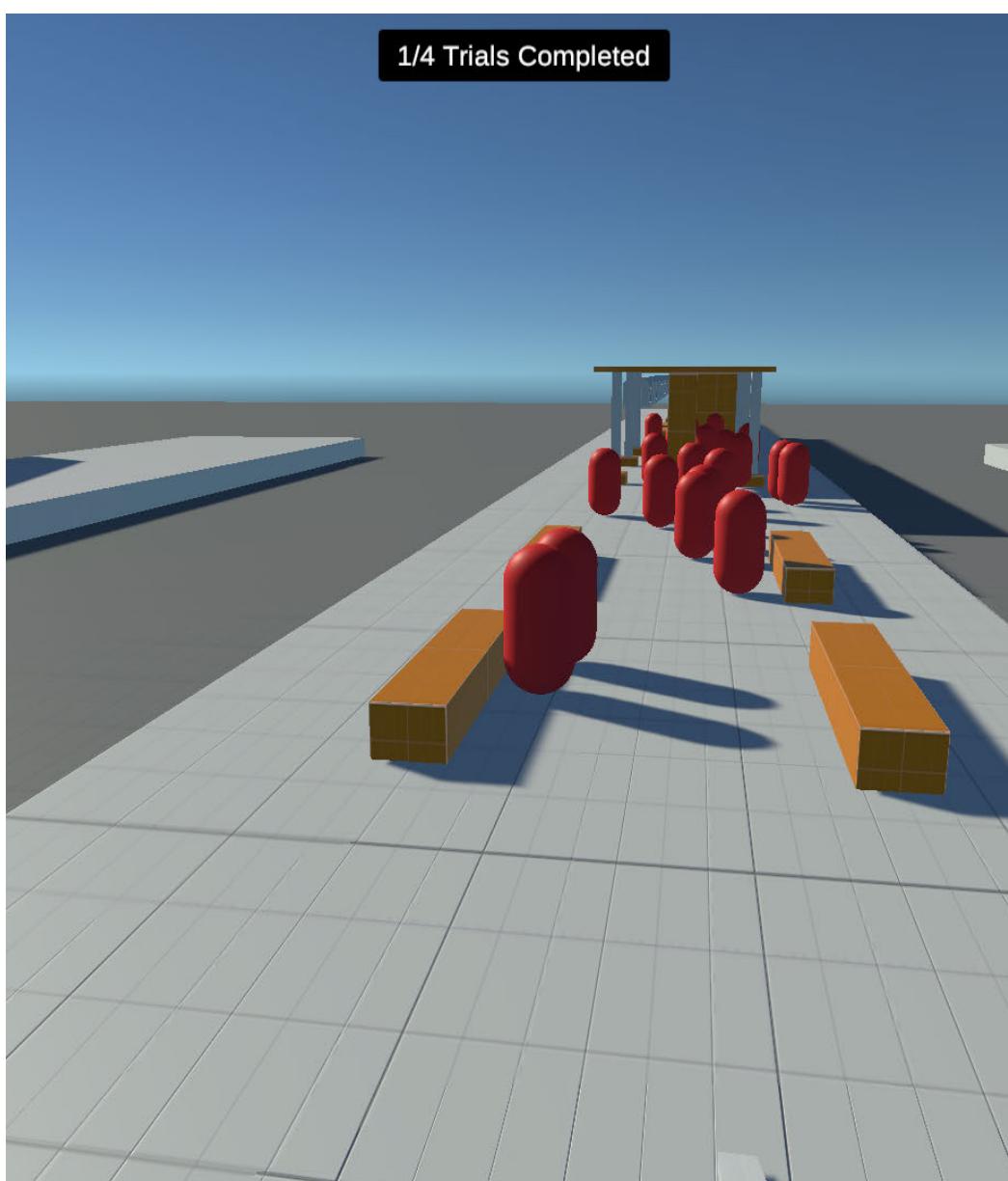
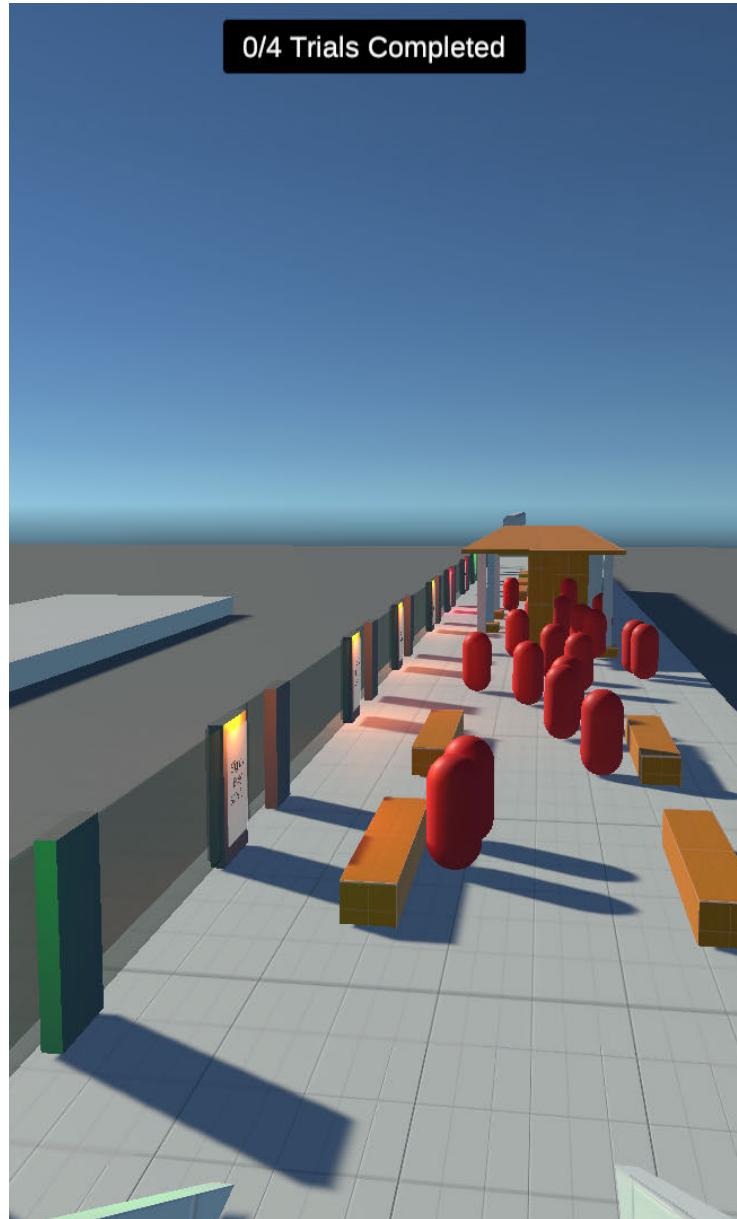
T9	Epping via Strathfield	10 mins
T2	City Circle	21 mins
T7	Wyong via Strathfield	47 mins

Carriage Capacity UI Screen

Next Service UI Screen

# Appendix C - Prototypes

## Unity Simulation



[External Link](#)

# Appendix D - Usability Testing Forms

## Carriage Capacity Screen Test Form

Smart Gate Capacity UI Test

Sign in to Google to save your progress. Learn more

Test 1

We will be timing each of these tests

Which carriage will have more space?

Carriage 4 will be **busy**  
75% Full  
Standing room only

Carriage 4 will be **not busy**  
20% Full  
seats available

**A**      **B**

A  
 B

Back    Next    Clear form

Smart Gate Capacity UI Test

Sign in to Google to save your progress. Learn more

Test 2

We will be timing each of these tests

Which carriage will have more space?

Carriage 4 will be **busy**  
75% Full  
Standing room only

Carriage 4 will be **busy**  
64% Full  
seats available

**A**      **B**

A  
 B

Back    Next    Clear form

Smart Gate Capacity UI Test

Sign in to Google to save your progress. Learn more

Finishing Up

That's the end of the tests. We have a few more questions.

What did you think of the product?

Your answer

Is there anything you'd change about it?

Your answer

"I found the capacity screen easy to use"

1    2    3    4    5

Strongly Disagree                    Strongly Agree

"I would use this capacity screen frequently"

1    2    3    4    5

Strongly Disagree                    Strongly Agree

Thank you

Back    Submit    Clear form

External Link

# Appendix E - Usability Testing Results

## “Next Train” Screen Usability Test Results

### Next Train Service UI

Had 3 different UI's, one for each task

Task(s) (Enter a brief description for each task)	Success 0 = Not completed 1 = Completed with difficulty or help 2 = Easily completed	Time to complete	# of Errors	Notes/Observati ons (Note why the user was successful or not successful, e.g. wrong pathways, confusing page layout, navigation issues, terminology)
<b>UI #1</b> Can you find how long until the next T9 service will arrive on the platform?	2  The next train service is: 	6.04 seconds	0	User needed time to get used to the layout, was initially reading the entire UI
<b>UI #2</b> Can you find how long until the next T7 service will arrive on the platform?	2  The next train service is: 	3.42 seconds	0	The user was now used to the UI and found the service faster
<b>UI #3</b> Can you now stand at this distance (2m) and tell me what the last destination of the next service is?	1  The next train service is: 	14.22 seconds	0	User was unable to read the text from a distance,  Suggested putting the final destination (eg, wyong via strathfield) at the top of the UI

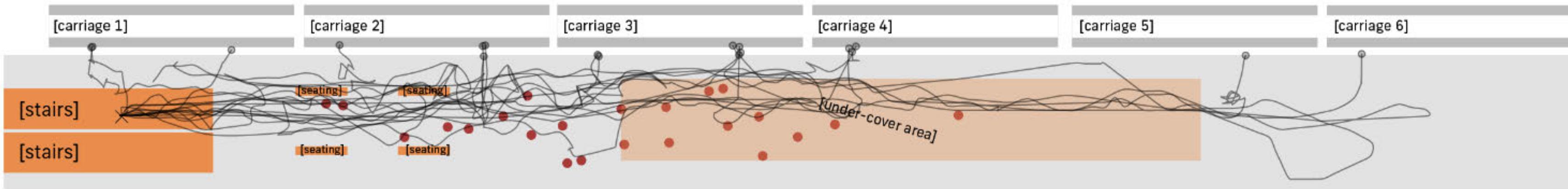
Task(s) (Enter a brief description for each task)	Success 0 = Not completed 1 = Completed with difficulty or help 2 = Easily completed	Time to complete	# of Errors	Notes/Observati ons (Note why the user was successful or not successful, e.g. wrong pathways, confusing page layout, navigation issues, terminology)
<b>UI #1</b> Can you find how long until the next T9 service will arrive on the platform?	2  The next train service is: 	7.08 seconds	0	User found navigating the layout easy  “Its kinda simple, i don't think anything really needs to be changed”
<b>UI #2</b> Can you find how long until the next T7 service will arrive on the platform?	2  The next train service is: 	4.25 seconds	0	User located the destination faster as they were aware of the layout
<b>UI #3</b> Can you now stand at this distance (2m) and tell me what the last destination of the next service is?	2  The next train service is: 	5.43 seconds	0	The user leaned forward to look closer, said that the text size was small, but knew where it was from previous readings

# Appendix E - Usability Testing Results

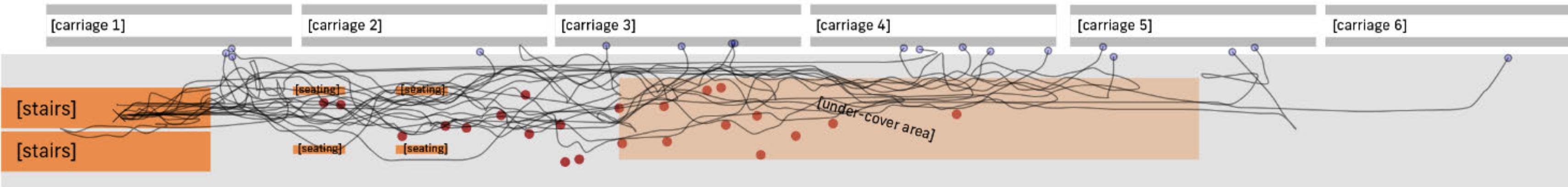
## Capacity Screen UI Results

Task(s) (Enter a brief description for each task)	Success 0 = Not completed 1 = Completed with difficulty or help 2 = Easily completed	Time to complete	# of Errors	Notes/Observations (Note why the user was successful or not successful, e.g. wrong pathways, confusing page layout, navigation issues, terminology)
#1:  Which one is more spacious?	1	21s (ish)	0	+ Carriage numbers are hard to read?
	2	3s	0	* Definitely useful. Crowded carriages annoying * Don't need anything else
#3:  11	1	25s	0	+ Typo + useful, clear UI, + Standing v sitting Good + Have to scan whole platform + Have to decide quickly what train
	2	12s	0	#4:  11 + arrives + Effortless

# Appendix E - Iteraction Testing Results



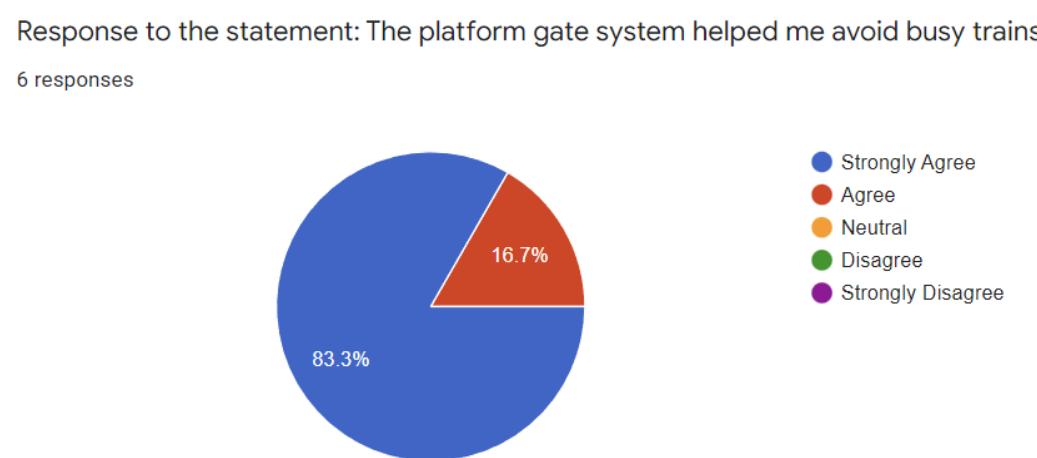
Participant movement at platforms with gate system



Participant movement at platforms without gate system

## Observations from collected player data

Participants using the gate system had to walk up and down the platform in order to find a suitable carriage while to compare, during tests with the gate system participants were able to quickly identify a suitable carriage at a distance and wait there.



## Feedback from surveying after expereince prototype

“Didnt realise that the colours ment less people so I went all the way up and down- not going to lie you should have have just colours in shades instead of giving percentages. Have it slowly fade to red- but is was good.

“Having the gate system meant I didn't have to move as much and could focus on getting on rather than waiting to find a suitable place to board.”

# Appendix F - Personas

Personas		Structure guide		Personas		Structure guide		Personas		Structure guide										
<b>Profile image:</b> Sketch or photo 	<b>Persona type</b> <b>Name</b> John Smith <b>Occupation</b> University Student, also works casually at a small Café. <b>Age</b> 23 <b>Gender</b> Male	<b>Profile image:</b> Sketch or photo 	<b>Persona type</b> <b>Name</b> Harold Johnson <b>Occupation</b> First year Uni Student <b>Age</b> 18 <b>Gender</b> Male	<b>Profile image:</b> Sketch or photo 	<b>Persona type</b> <b>Name</b> Joanne Haroldson <b>Occupation</b> Third year Uni Student on work placement <b>Age</b> 24 <b>Gender</b> Female	<b>Backstory:</b> Brief description of life story <p>John Smith is a 23 yr old University Student and works casually at a small Café in the city. He lives in a share house with other students in Campsie. Originally from Melbourne, John moved interstate to study. He studies the bachelor of Social Sciences at UNSW full-time. His job income helps him pay for rent and food. Due to his job and university work, John has a very busy schedule and has very little time for himself.</p>	<b>Backstory:</b> Brief description of life story <p>Harold Johnson is a full-time 18yr old University Student who lives in Sydney and studies business at the University of Sydney. John lives with his parents and plans to move out next semester.</p>	<b>Backstory:</b> Brief description of life story <p>Joanne Haroldson is a 24 year old University Student and is an intern for the marketing team of an online shopping company. She is described as a very organised person and spends money sparingly as she is saving up to move closer to the city.</p>	<b>Motivations:</b> Why does the persona need to use the product/service? <p>John uses public transport to travel to uni and work. He finds that using public transport to travel is cheaper and faster, as driving during peak hours of day and night often takes longer with the large amount of traffic. John uses an Opal concession card to save money when he travels.</p>	<b>Motivations:</b> Why does the persona need to use the product/service? <p>Harold spends 2 hours a day on the train every 3 days to get to his classes. He prefers taking the train because he gets motion sick on buses.  Harold also often uses Sydney Trains to get home after a big night out, but sometimes feel unsafe when taking the train this late.</p>	<b>Motivations:</b> Why does the persona need to use the product/service? <p>Joanne uses public transport to travel to and from university and work. She often plans her trips ahead of time, leaves plenty of extra travel time and frequently checks her phone during her commute to ensure that there won't be any delays when she transfers train lines.</p>	<b>Frustrations:</b> What makes the persona feel frustrated or annoyed about the product/service? <p>John gets frustrated when he's late to work because his train got delayed. John also intensely dislikes busy trains.</p>	<b>Frustrations:</b> What makes the persona feel frustrated or annoyed about the product/service? <p>Harold always takes a train to University but often feels uncomfortable riding in busy carriages, sometimes he arrives early and leaves late just so he can avoid peak-hour.</p>	<b>Frustrations:</b> What makes the persona feel frustrated or annoyed about the product/service? <p>Joanne feels unsafe on public transport as she often travels during peak hour which is usually crowded and makes her feel uncomfortable due to the lack of personal space. Joanne doesn't see any alternatives to travelling at a time other than peak hour as she feels unsafe travelling late at night</p>	<b>Ideal experience / goals / aspirations / feelings:</b> <p>John wants his commute to be timely and comfortable. He has many obligations and cannot afford to be wasting time on transit delays. John's job is demanding and he wants to relax and recover on his commute.</p>	<b>Quote:</b> Sum up the persona's experience <p>"I shouldn't have to worry about my commute. I've got enough on my mind"</p>	<b>Ideal experience / goals / aspirations / feelings:</b> <p>Harold wants to feel safe while taking trains and be able to feel comfortable / avoid busy trains.</p>	<b>Quote:</b> Sum up the persona's experience <p>"I want to feel comfortable while taking the train, even when busy"</p>	<b>Ideal experience / goals / aspirations / feelings:</b> <p>Joanne wants to be able to travel in way that makes her feel safe. She is fine with delays as she feels she is well prepared for them.</p>	<b>Quote:</b> Sum up the persona's experience <p>"The crowds trigger my anxiety, if driving was cheaper I would, but I guess I'll deal with it"</p>

# Appendix G - Final Design

## Capacity Screen Variants

Carriage 4 will be  
**very busy**



**At capacity**

**Best Carriages**



Carriage 3 will be  
**busy**



**Few Seats Available**

**Best Carriages**



Carriage 1 will be  
**not busy**



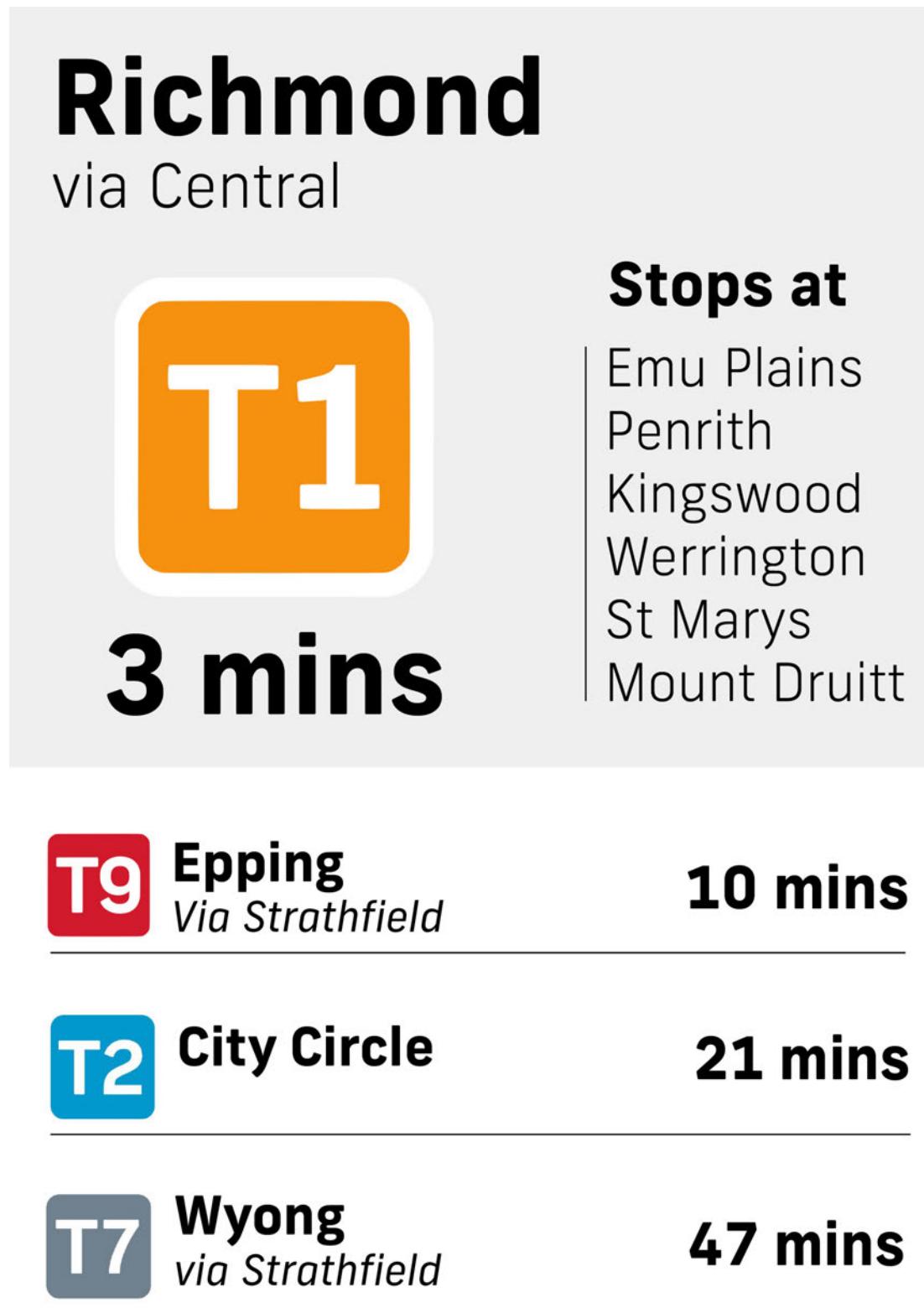
**Seats Available**

**Least Busy Carriage**



# Appendix G - Final Design

“Next Train” Screen



3D Render

