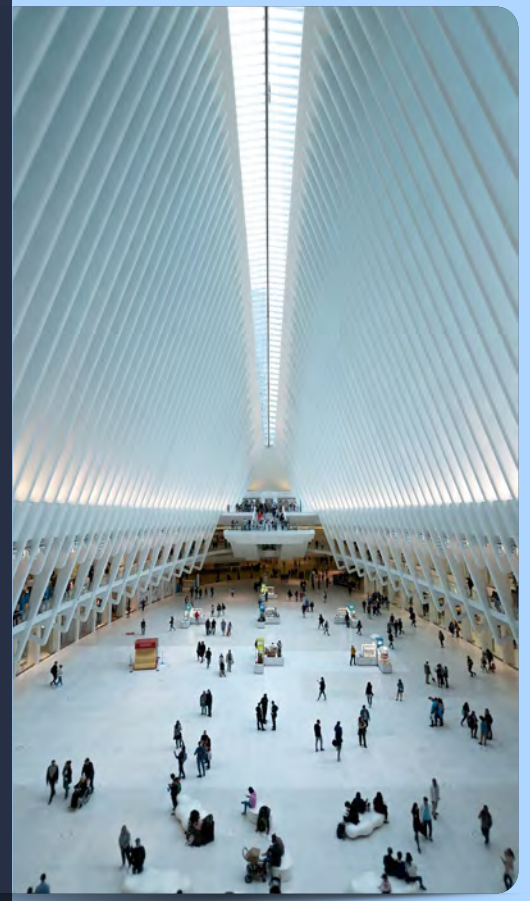
The Vision of Virtual Reality:

A Perspective through Eye Tracking to inform Wayfinding design

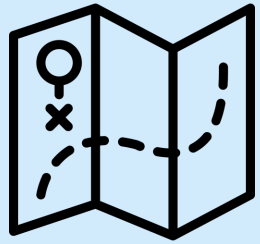
Simona Bojceska

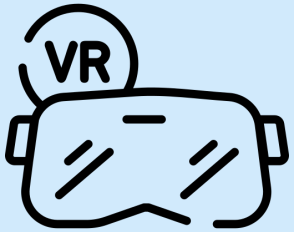


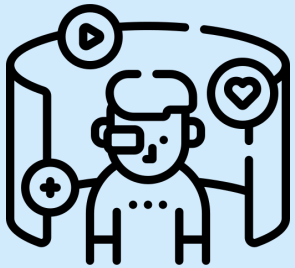
Wayfinding

Virtual Reality

Eye tracking







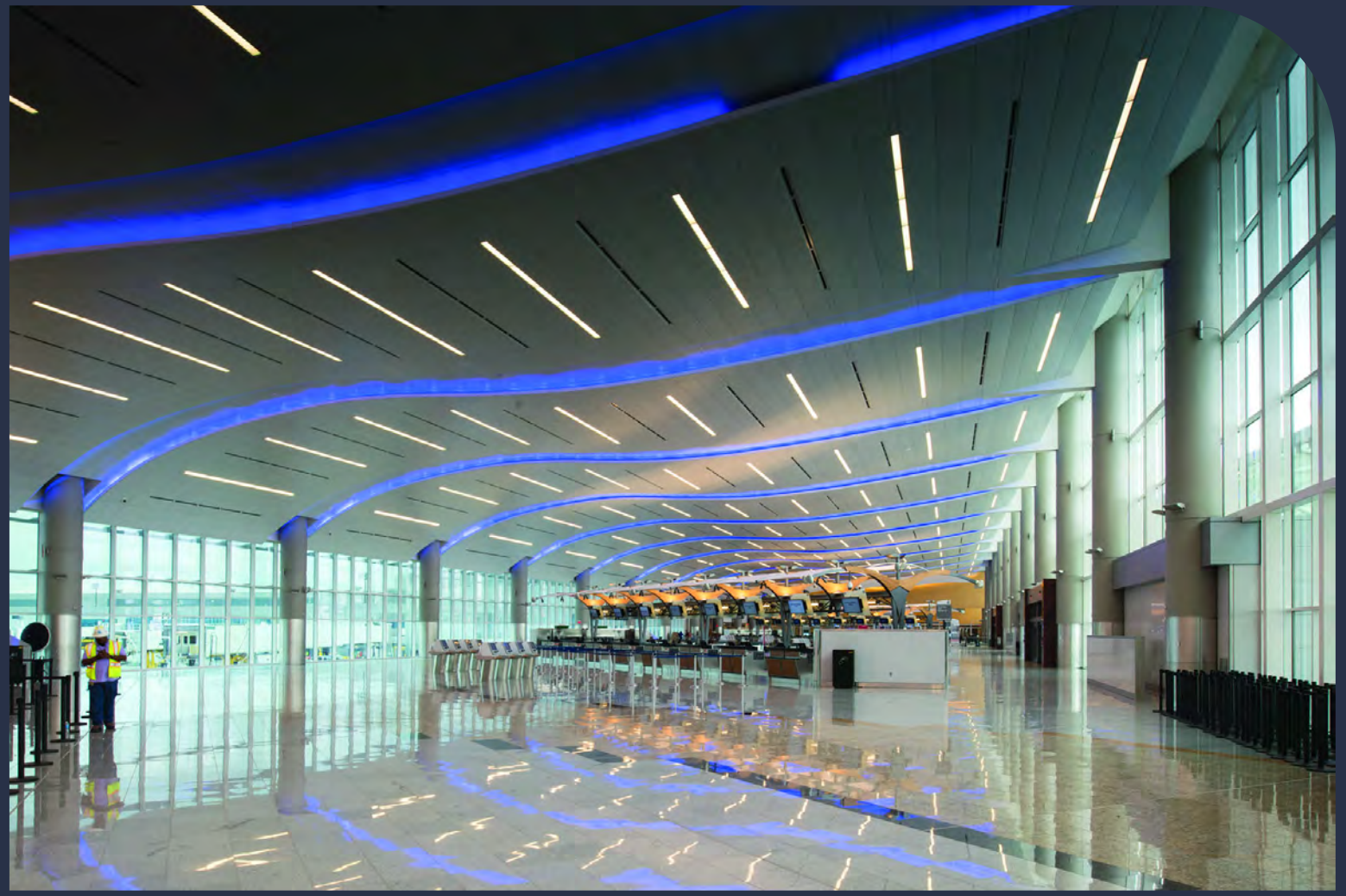
The Principles

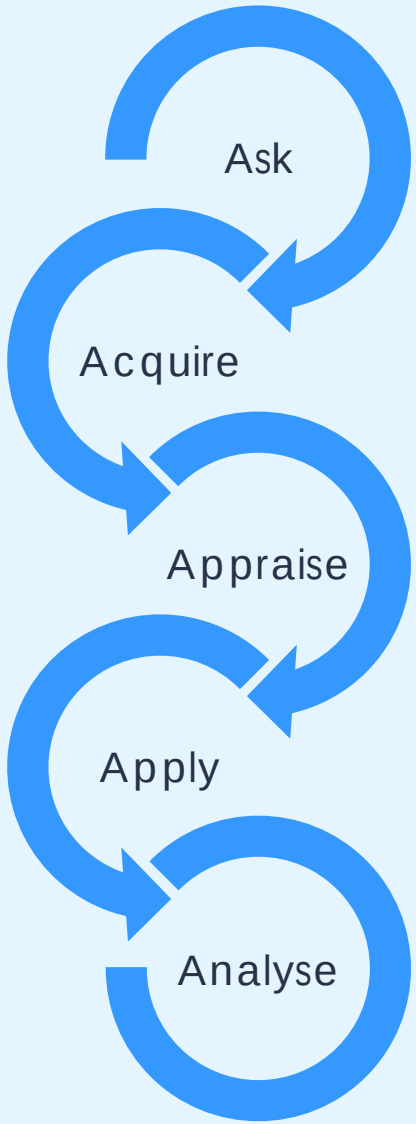
Previous

Next

Wayfinding

- Path planning
- Decision-making
- Choice of navigation points





Evidence based practice

... decision-making framework that builds on the conscientious, explicit, and judicious use of the best available evidence from research and practice. EBP therefore involves collecting the available evidence from multiple sources, critically evaluating it, applying it to their specific context, and assessing outcomes.

Criado-Perez et al. 2019

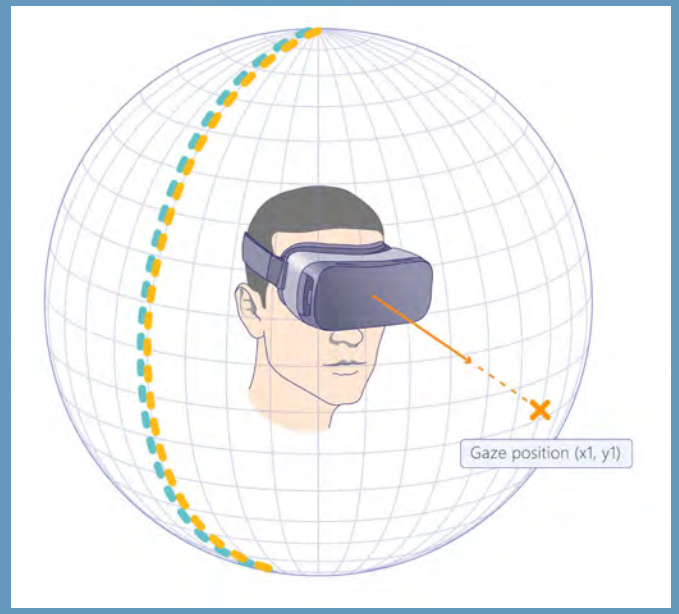
Previous
Next

- VR user immersion
- Real time eye movement data
- VR development technology

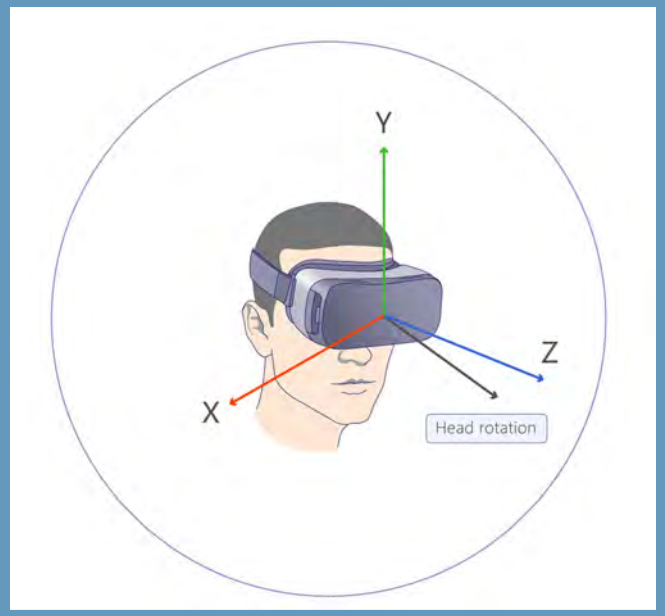
Eye tracking

- **Eye movement type:**
  - **Fixation:** the maintaining of the visual gaze on a single location
  - **Saccade:** rapid, ballistic movements of the eyes that abruptly change the point of fixation

- **Gaze direction:** coordinates of where the person is looking



- **Head rotation:** quaternion coordinates (x, y, z, w) format



Project Aims

- Analyse the utility of eye tracking (ET) in virtual reality (VR) environments
- Assess the effectiveness of ET to inform navigation positioning decisions

Air travel passenger

Distraction

01

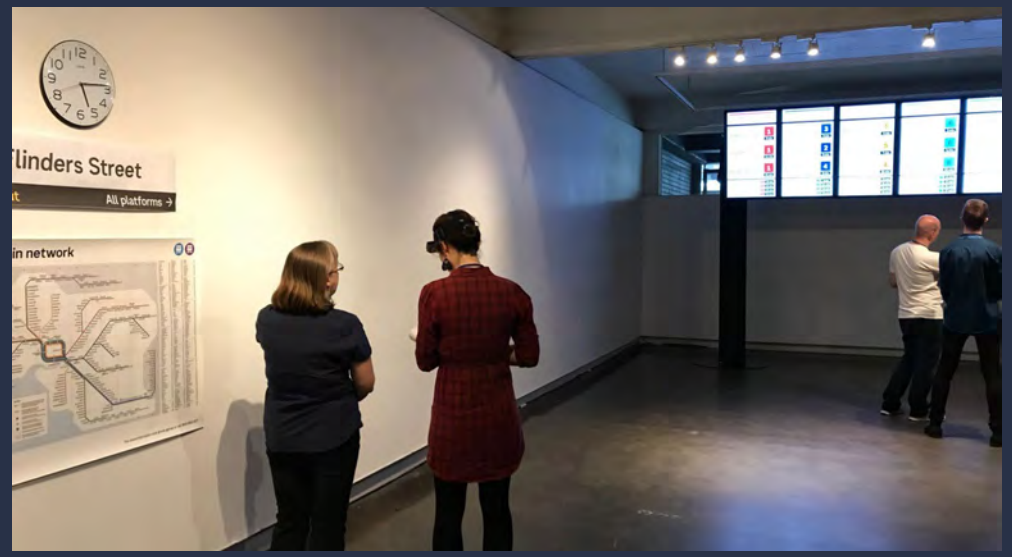
Passenger evacuation

Panic

02

Transport user testing conducted in a warehouse where participants wear eye tracking goggles

Simulated warehouse environment



03

User observing space through VR headset

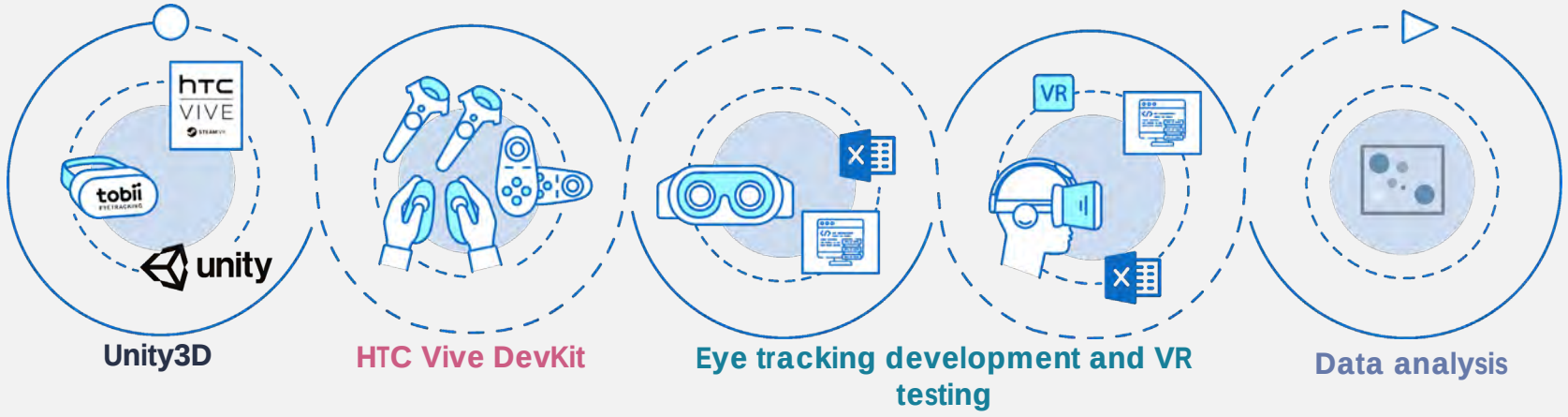
Virtual architecture visualisation

04

- Share the vision when people can still have a say
- Predict user behaviour when wayfinding

Project development

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12
Design VR environment				Test VR			Perform VR experiment	Analyse information	Further research recommendations		



User profiles

- 22 year old
- No previous VR experience
- Tested VR with no signage
- Activity completed in **30 seconds**

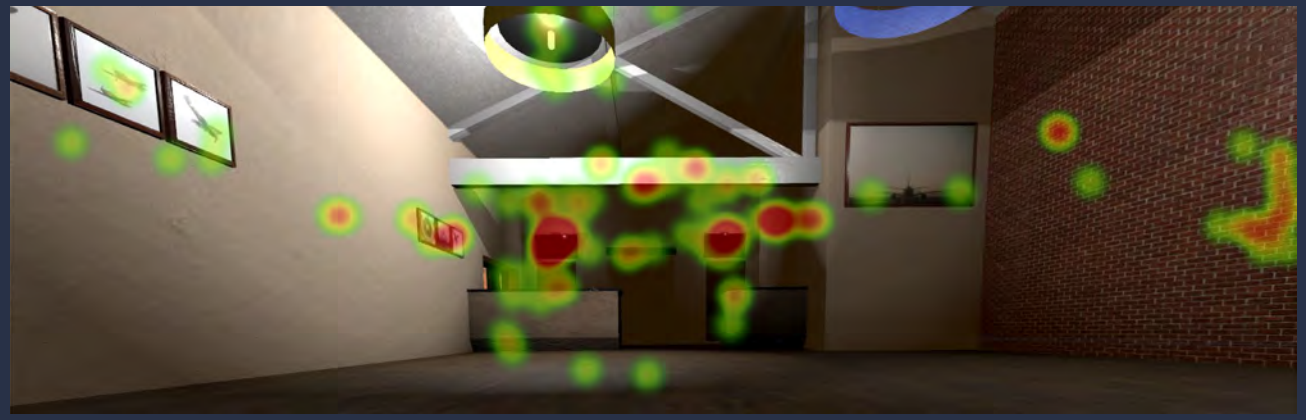
- 50 year old
- No previous VR experience
- Tested VR with signage
- Activity completed in **24 seconds**

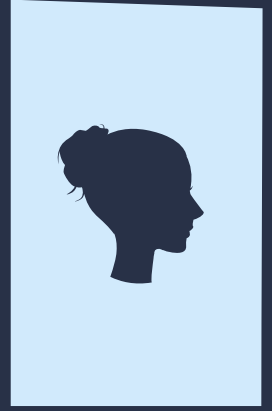
The data

Heatmap – Check in area

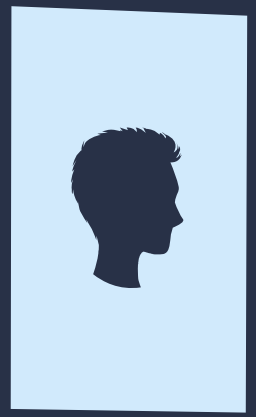
Number of fixations
and duration

High Low





Participant A
No signage



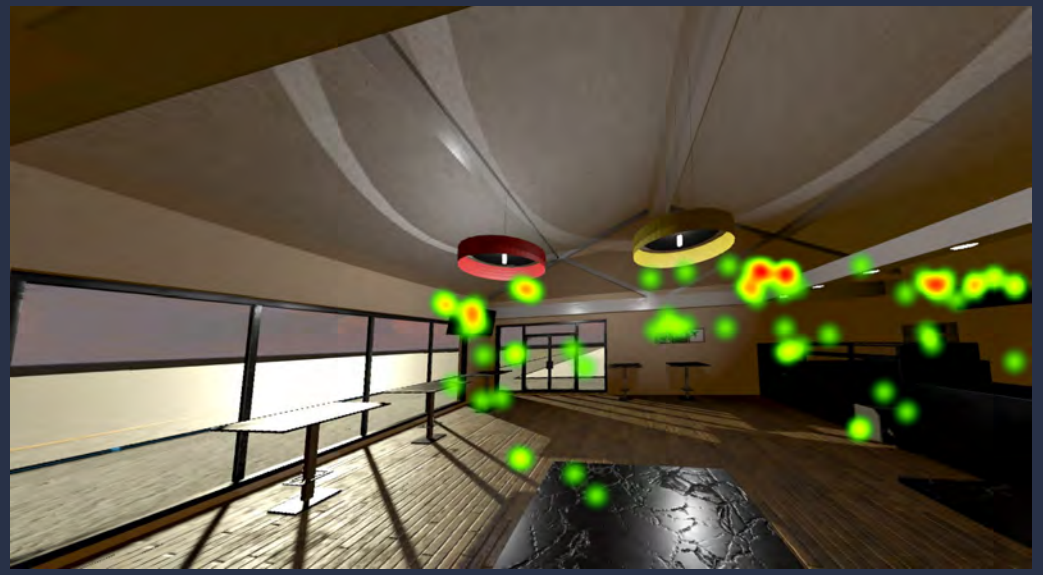
Participant B
With signage

The data

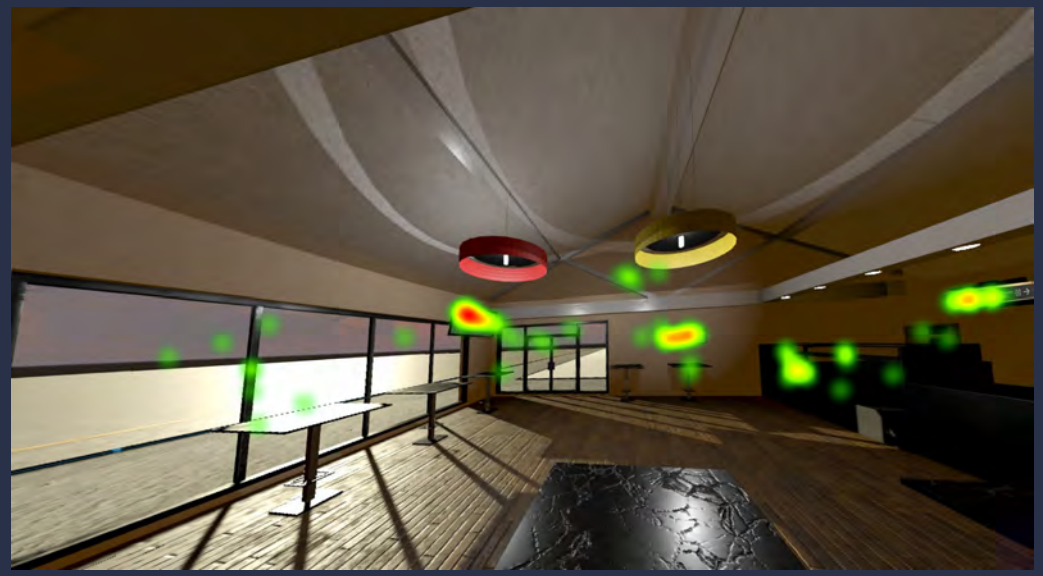
Heatmap

Number of fixations and duration

High Low



Participant A
No signage



Participant B
With signage

The data

Heatmap

Number of fixations and duration

High Low

Participant A
No signage

Participant B
With signage

Limitations

- VR environment tested
- Sound, crowds and distracting aspects
- People’s behaviours are different
- Demographic selection
- Knowledge of technology

Future research potential

- Multiple iterations – action research approach
- Patterns of user behavior
- Method validation – testing in real vs virtual environments
- Test on any public transport environment
- Spatial navigation research – signage positioning and type


BVN
REAL
Thank you!