Surf XR tour 20 June 2022

Centre for Innovation and the Faculty of Social & Behavioural Sciences

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PRESENTATIONS

Injection App

1

Injection Application

A multi-user Augmented Reality (HoloLens) application that simulates the experience of a real world injection procedure using holograms.

LUMC's medical students use the app to gain practice on performing injections correctly.

Development team:

Adel Qaddoumi
XR Developer

Robert Sokolewicz
Data Scientist &
XR Developer

Project management team:

- Karen Muiden (CFI)
- M. Segers Nier (LUMC)
- Prof.dr. M.C. de Ruiter (LUMC)
- Drs. D. Jansma (LUMC)

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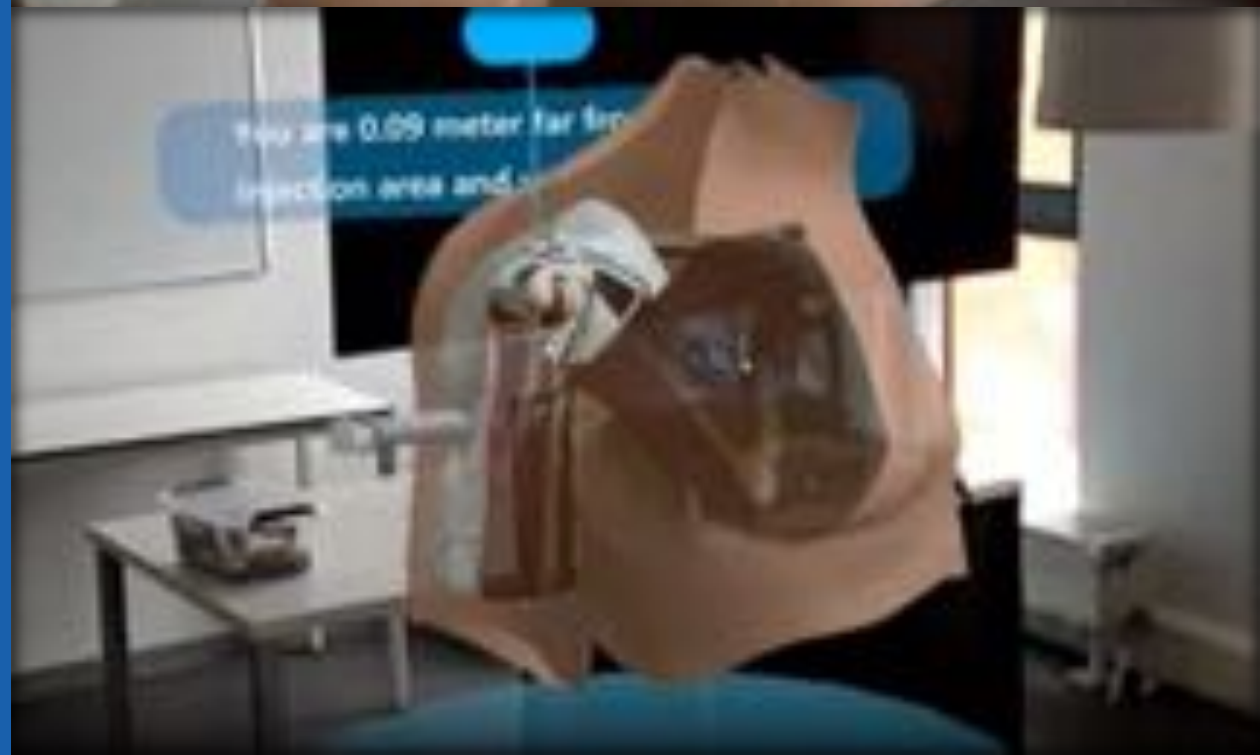
Why?

Medical students graduate without having enough practice using real injections during their studies.

Students perform specific injections on anatomical holograms, and receive feedback on how to improve their technique and accuracy.



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Approach & Tools Used

- Developed for **HoloLens**
- Connects to **multiple** HoloLens's within the same space

- **ARKit** or **ARCore** capable **smartphone** used as a controller *(syringe)* and remote touch screen

- **Unity 3D**, with the following libraries:
  - **ARFoundation** for cross-platform AR development
  - **Vuforia** for Image Tracking *(calibrating the phone with the HoloLens)*
  - **Mixed Reality Toolkit** for user interfaces and interactions
  - **Unity Netcode** for networking

Lessons learnt

Issues:
- HoloLens has no controller and Image Tracking is not accurate enough for injections.
- Deprecated software libraries for HoloLens 1.

Challenges:
- We had to develop unique solutions such as using a smartphone as a controller.
- Users are not familiar with using the HoloLens and onboarding takes time.
- No haptic feedback that doctors rely on to perform injections.

We would do this differenly because/how:
- Think early on how to incorporate the app within a classroom.
- Use a headset with tracked controllers for better accuracy.

Interesting Finds

We wanted to connect the phone to the HoloLens to use its 6 Degrees-of-Freedom tracking system to compensate for the limited Image Tracking accuracy.

We discovered that we gain new capabilities when both devices can communicate with each other and share the same virtual space.

We used the touch screen of the phone to act as a remote control with programmable buttons, sliders, and other user interface elements that the HoloLens usually offers.

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Next steps

Status of the project now:

- The application is fully developed will be integrated in a classroom this September.

Next steps we are taking:

- Evaluate learning effectiveness of using the app.
- Test with Hololens 2 and iPhone with LiDAR.

Explore:

- Interaction methods between a smart phone and smart glasses.
- Find a phone tracking solution that is as accurate as VR controllers.
- Test out haptic feedback using new emerging technologies.

The Royal MetaUniversity

of the Netherlands

2

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MMFG – The Royal MetaUniversity
of the Netherlands

A Massive Multiplayer Forecasting Game on the Metaverse in an academic setting

3 Main questions:

1. Can foresight methodologies prepare us for the virtual future?
2. Can using roleplay, gamification and community platforms guarantee an increase in commitment?
3. Are Universities ready for the Metaverse?

Tanja de Bie
Online Learning expert

Monika Theron
Creative Media Director

Yentl Croese
Learning Experience Designer

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Why play this game?

The Metaverse is likely to become a reality in some form in the next 10 years.

Just like the internet & smartphones the Metaverse will impact the university.

It is important to think of the possibilities and risks the metaverse offers so we can base university strategy on it.

What are potential digital developments? New jobs, risks in ethics, chances in education? What should we embrace, mitigate or avoid?

Created with Adobe Aero: https://www.adobe.com/products/aero.html

How do you play?

Forecasting is a powerful method using the collaborative imagination of the community to look at potential scenario's

We will use this game to imagine the future by creative writing

To increase the predictive value, we have used trend research and extrapolated on digital technology that is already available today to create the setting.

Anybody in the university can join, safely, using a MS Teams environment.

This game is played asynchronous, so always fits your calendar

Gamemasters – *Non-Player-Character (NPC)*
6 days - pilot
Asynchronous play

6 Tasks: *How do these tasks/scenarios affect the player?*

1. *Player = Create a unique character (student, teacher, support staff etc.)*
2. *Introduce yourself to the community (MS teams' environment)*
3. *Explain how you want to use your 5 senses in the metaverse*
4. *Positive/negative foreshadowing (future indication, hint)*
5. *Bombshell*
6. *Choose your ending*

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Pauline Rombach
Rector Magnificus and President of RMU

Rosalie Marcada
Master student of international relations

Non-player-characters (NPC)

Arwen Jansen
Technologist extraordinaire

The Beadle
Guarding the rituals and traditions of academia

Tools used / workflow

MS teams
Premiere Pro
ReadyPlayerMe
Adobe Aero

4 courses completed (Coursera)
Futures Thinking Specialization by Jane McGonigal from the Institute for the Future – Coursera

Wiki
Script
Formdesk
Qualtrics survey – *choose outcome of game based on votes*

Asynchronos approach
Character sheets *(Name, Job title, Job description, Personality, Typical sayings/behaviourisms)*
NPC / PC or IC
Badges
Crypto currencies

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Lessons learnt

Issues we faced were:

- Not clear when to play, what is asynchronous play?
- Platform was not a good fit

Challenges we came across:

- 12 signed up, only 9 actively participated – how do we keep motivating the players?
  - ➢ Reasons: "Time restrictions, the game was more involved than previously anticipated, a lack of energy / big hurdle to catch up."
- Reluctant to using imagination –was this the right audience?
- *A Massive Multiplayer Forecasting Game requires many participants*

We would do this differenly by:

- Using another platform – 7 out of 10 said it was hard to navigate in teams.
- No one played 5 days in a row. Time should be organised differently in order to succeed.

Interesting finds

Do you think that the Metaverse will influence the academic world in future? And Did the game influence your opinion on this?

“I really do think that elements of 'the Metaverse' will disrupt education as we know it. The game did not influence my opinion on this, but it gave more transparency how others are seeing this.”

“My advice would be to acknowledge and invest in exploring the disruptive impact of XR technologies, NFT's web3 and the like, will make on higher education business model as well as the way we teach, learn and do research. Investing in a XR program would be a great first step, to just start exploring systematically the opportunities, risks and infrastructure of immersive technologies for a university.”

5 people like creating a character sheet, 3 somewhat, 2 were neutral and 1 disliked it.

Badges were more effective than crypto currencies.

What is your opinion on the method of using MMFG for exploring strategic policy for Leiden University?

“I think it is an interesting way to get people out of the boxes they think in everyday and think more broadly about policy topics. In this format I think it is good for long term policy planning such as 5 - 10 years out.”

Next steps

Status of the project now:
- Finished pilot
- Processing data

Next steps we are taking:
- Test out new platforms
- Test out new audience
- Find virtual platform to build an academic community *(Horizon, AltSpace, Recroom, VRchat, Mozilla hubs, Decentraland = too commercial)*

Goal:
- Use this method to approach other difficult topics
- Take our findings to policymakers – we can still influence the decissions being made.

3

Project kampVuuR

Project *kampVuuR – een beleving in VR*

- First phase of a PhD trajectory
- VR feasibility study for children and adolescents
- Participation in an interactive VR task & questionnaires about visually induced motion sickness, the VR experience and media use

Nina Krupljanin
PhD candidate

Maarten Struijk Wilbrink
VR developer

Dr. Carlijn Bergwerff
Assistant Professor

Prof. dr. Lenneke Alink
Professor of Forensic Family Studies

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Institute of Education and Child Studies

Why?

First step towards clinical intervention in VR:

- Use mechanisms and test usability
- Examine physiological response
  - visually induced motion sickness
- Detect possible predictors
  - age
  - gender
  - media use

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Tools used

Hardware:

- Oculus (Meta) Quest 2
- Over-ear headphones
- Samsung Galaxy A7 Tablet

Software:

- Unity 3D
- Assets:
  - Asset Store
  - CGTrader

Goals / Results in development

1. Continuous testing
    - GOAL: Build what we imagine we're building
        - ➢ Success: Playtesting (Alphas)

2. Creating Open Source software
    - GOAL: Sharing our work with others
        - ➢ Hurdle: Third party assets (FBX models)
        - ➢ Success: Project folder structure
        - ➢ Ongoing: Encapsulation

Data collection:

- Science Fair for children aged 6 - 12
- Organized by Nationale Wetenschapsagenda

Lessons learnt

Issues faced:

- No wi-fi at the test location (science fair)

  →Not being able to see participant's POV

  →Problems with Qualtrics (informed consent forms)

Challenges:

- Determining what exactly it is that we want/need to do
- Number of interested children at the science fair

Next steps

Project Status:
- On-going data collection

Next steps:
- Literature research for clinical study

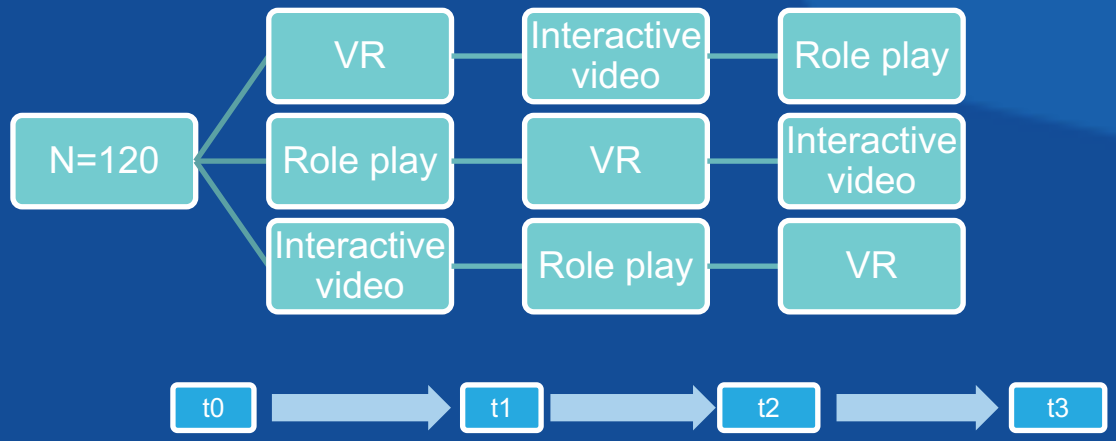
Future Goals:
- VR modules to complement existing trauma treatments

Conversational skills

4

Training complex conversation skills through virtual reality, interactive videos and role play

- Students within the domain of Social Sciences
- Learning to apply conversation skills



Dr. Carlijn Bergwerff
Project leader, main applicant

VR programmers:

Maarten Struijk Wilbrink

Isabella Saccardi

Education and Technology Support:

Rosanne van den Berg

Patris van Boxel

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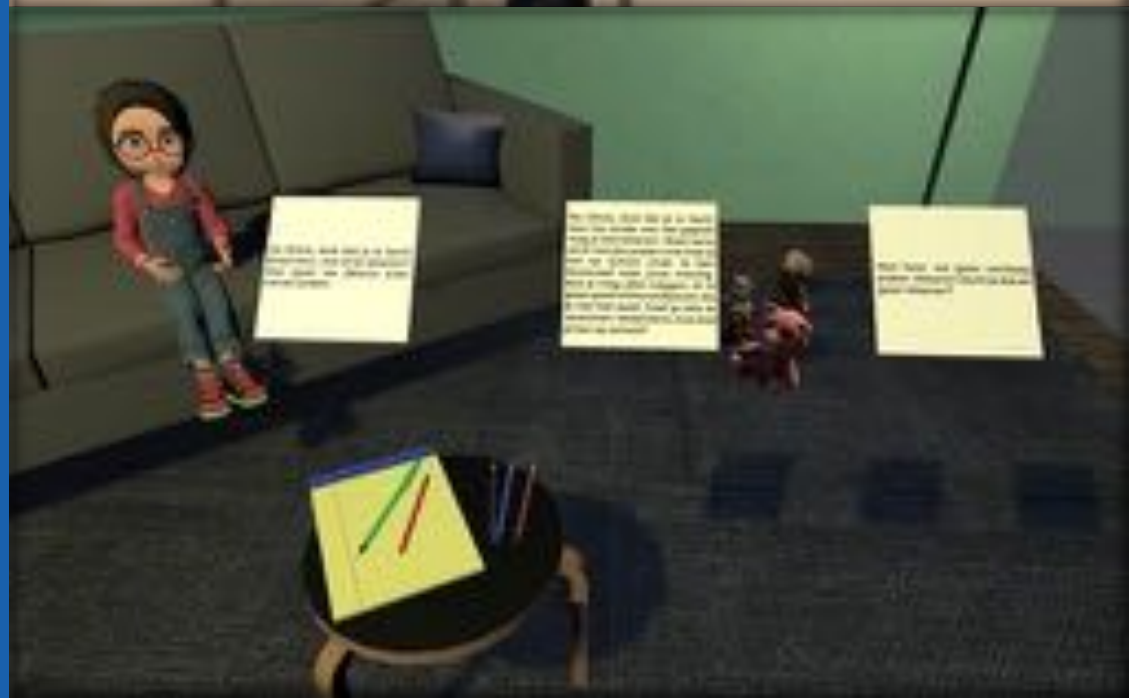
Why?

- Realism
- Reflection
- Repetition
- Direct feedback



Tools used

Oculus Quest 1 & 2

Unity3D
Assets:
Asset Store
CGTrader

Lessons learnt

Issues we faced were:
- Hygiene measures due to Covid-19
- Anxiety in students

Challenges we came across:
- Time constraints
- Limited child characters available

We would do this differently because/how:
- Create more space for practice and use
  - ➢ 2 workgroups instead of 1
- Re-develop scenarios

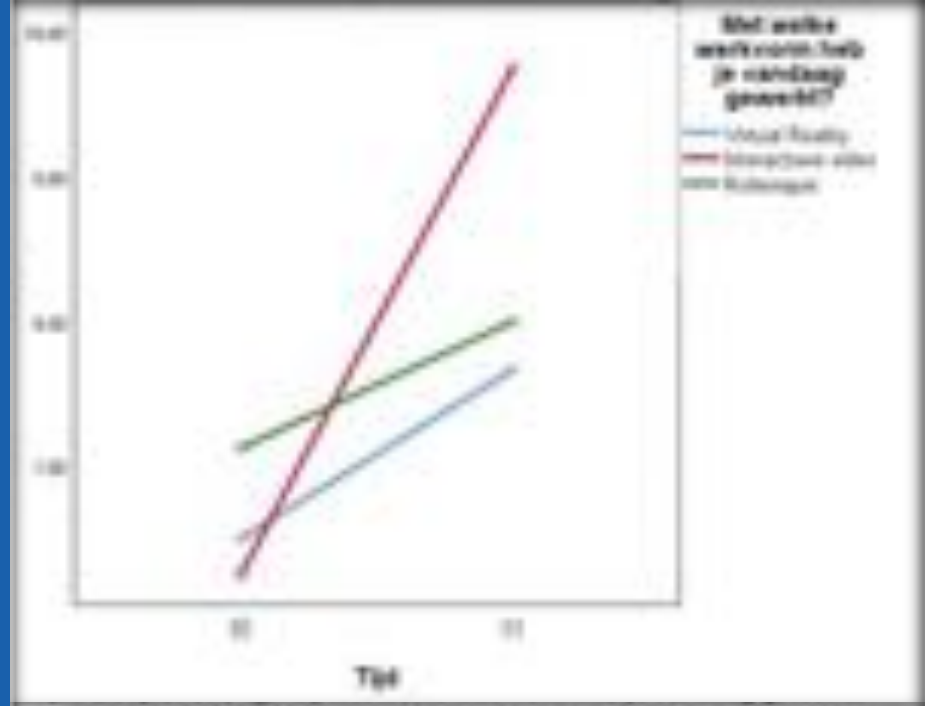
Additional Issues:

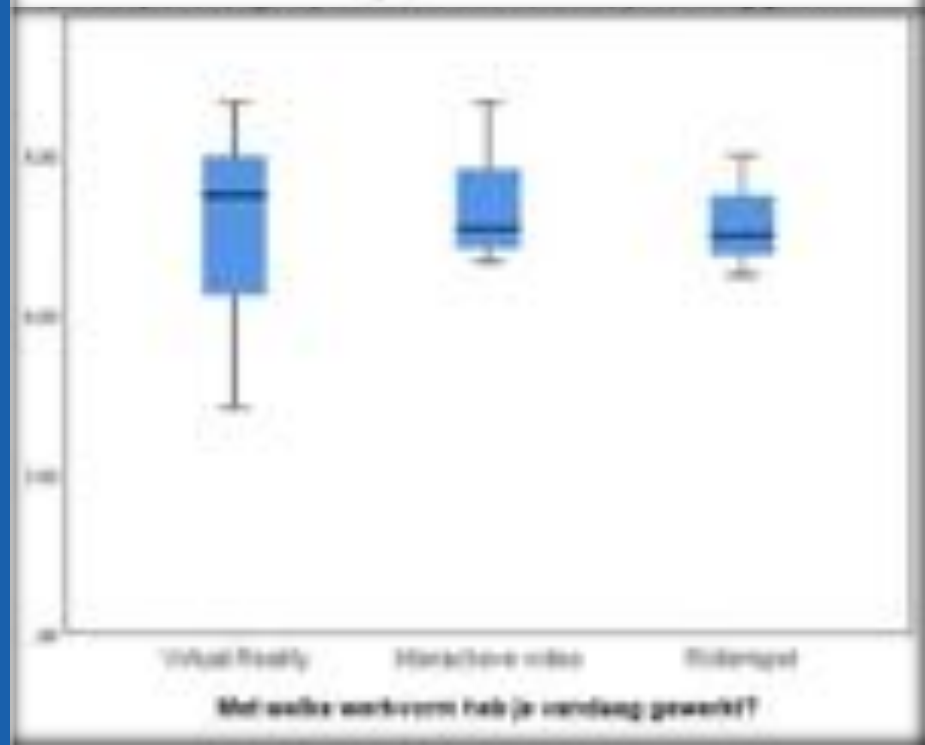
- Unnatural / rigid interactions
- Limited agency

1. Client's voice-line
2. Make up response (out loud)
3. Select one of three pre-set responses
4. Response by client

Interesting findings:

- All teaching methods seem effective
- Creates options to diversify
- Differences in appreciation, regarding:
  - Safety
  - Realism
  - Repetition





Next steps

Status:
- Effectivity examined
- Implemented in the course
- Made available Open Access
  - ➢ Only as final Build

Next steps:
- Study the results
- Publish the results

Goal:
- Further implementation
- Redevelopment

BrainTrain on Tour

5

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BrainTrain ON TOUR

- High school students
- Learning about the brain
- Quizzes and experiments
- Debunking misinformation
- Why are we sensitive for fake-news?

Sterre van Riel
Outreach officer

Nikki Kraanen
Masterstudent
Member outreach team

Eline Boom
Masterstudent
Social media expert

Aska Wahle
Masterstudent
Member outreach team

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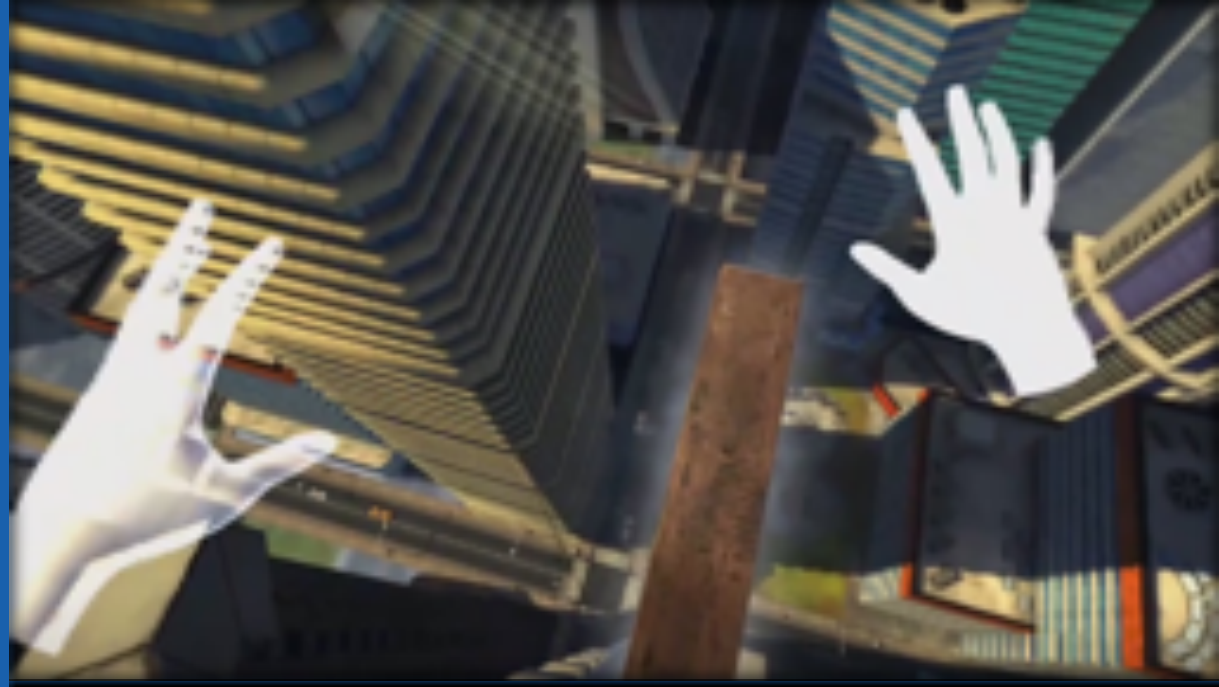
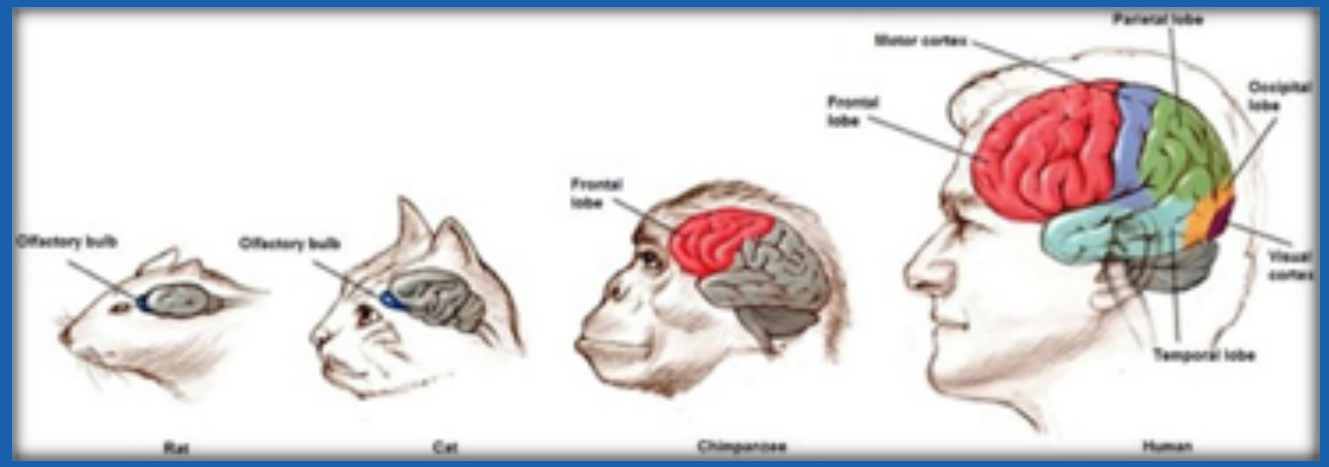
Why?

- Sensitive sensations become real
- Stepping into another world
- Even though they know it's fake, their brain makes it feel real





Tools used

- Build up by other experiments
  - Rubber hand illusion
  - Social experiment
  - Animal brains

- VR-headset and sound
- Ritchie's Plank Experience
- Casting to bigger screen

Lessons learnt

We are in the pre-planning phase → *project is not finished yet*

Challenges we came across:

- Build up time in VR
- Time management other experiments

We would do this differently by:

- First learning more about VR and then make a lesson plan

Next steps

Status of the project now:
- Making a time table
- Pilot

Next steps we are taking:
- Finding schools
- Process new information in project

Goal:
- Teaching children about misinformation
- Making them look more critical to statements in the future

6

Automated driving

Automated Driving:
Safer Responses to Take Over Requests

In Level 3 automated vehicles, drivers must take back control when prompted by a Take Over Request (TOR).
However, there is currently no consensus on the safest way to achieve this.

Francesco Walker
Assistant Professor
Cognitive Psychology

Merlin Radbruch
Master student
Applied Cognitive Psychology

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Will Automated Vehicles ever be safe enough?

https://www.nytimes.com/2016/07/08/automobiles/wheels/makers-of-self-driving-cars-ask-what-to-do-with-human-nature.html

https://www.nytimes.com/2020/08/24/sports/baseball/Dodgers-halfway-season.html

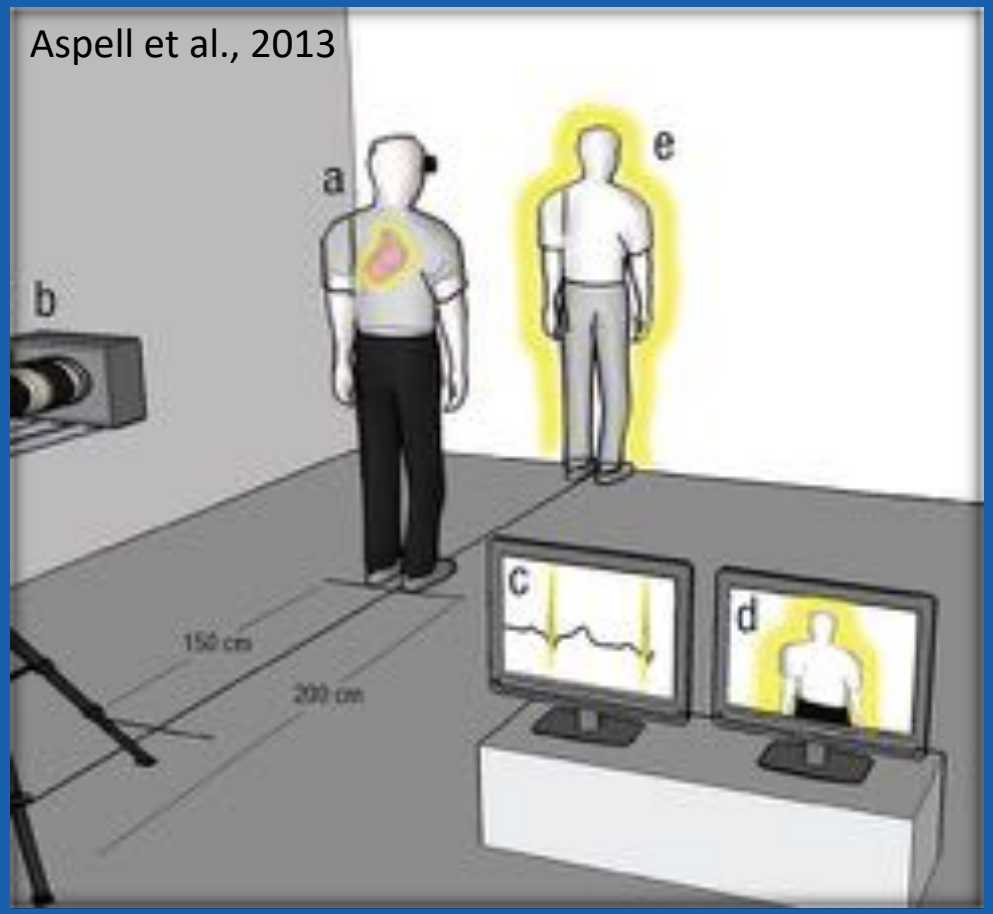
https://www.nrc.nl/nieuws/2021/08/05/legendarische-motorcoureur-valentino-rossi-kondigt-afscheid-aan-a4053812

What are the benefits that can derive from bonding between a human and a vehicle?

https://www.nrc.nl/nieuws/2021/07/04/verstappen-wint-ook-grand-prix-van-oostenrijk-a4049804

Illusion examples

https://news.vanderbilt.edu/2011/10/31/body-mind-schizophrenia/



Aspell, J. E., Heydrich, L., Marillier, G., Lavanchy, T., Herbelin, B., & Blanke, O. (2013). Turning body and self inside out: visualized heartbeats alter bodily self-consciousness and tactile perception. Psychological science, 24(12), 2445-2453.

Could synchronizing the driver’s breathing pattern with visual feedback lead to safer take overs?

Lessons learnt

Challenges we came across:

- Programming the task and VR environment

We would do this differenly because/how:

- Collaborate more with Unity programmers

Safer transfer of control when the driver is “unconsciously” connected to the vehicle

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Next steps

Status of the project now:
- Paper published in AutomotiveUI 2021

Next steps we are taking:
- Follow-up studies
- Get funding for VR support

Goal:
- Test new take-over solutions
- Start new collaborations


Thank you
f.walker@fsw.leidenuniv.nl

VR LEARNING LAB

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https://view.genial.ly/62af5d1b4725e9001ed2422d