

# XR Technology

## From novelty to practice

By Koos de Beer



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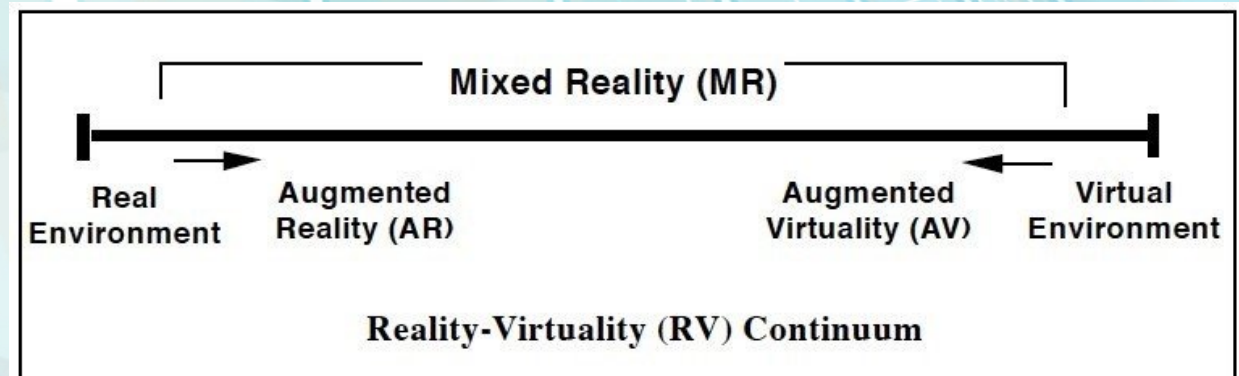
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# XR and Immersive technologies

- XR is extended reality which is the umbrella term for all the “reality technologies”
  - Augmented Reality
  - Virtual Reality
  - Mixed Reality
- This focuses on the display and interaction technologies
- MR Continuum and why it is important





# Metaverse, Web 3.0 and all the other buzzwords

- What is the Metaverse?
- What is Web 3.0?
- Characteristics of the metaverse

# Metaverse characteristics

- Social VR space
- Representation of self
- Ownership
- Decentralized authority
- Interoperable
- Massively scaled
- Real-time rendered
- 3D virtual worlds
- Synchronous
- Persistent
- Unlimited number of users
- Individual sense of presence
- Continuity of data

# The novelty of XR

- First time experience is always WOW
- Learning how the device work (mouse + keyboard vs hands and controllers)
- Learning curve
  - The interaction paradigms
  - The way the specific application works
  - The learning outcomes of the application
- The novelty of the technology can stand in the way of the usefulness of the technology

# Novelty is good

- Novelty is really good to get people talking about technology
- Awareness of the technology
- Awareness of the limitations of the technology
- How can I use it in my context
- Play with the technology
  - Demo applications
  - Games
  - Even just in the “desktop” of the devices

# Dangers of novelty

- Novelty is really good to get people talking about technology
- People jump on the technology without understanding the pros and cons of it
- Large sums of money is spent on something because its “cool”
- Is the application/technology the right fit for the problem it tries to solve
- XR is a solution looking for a problem to solve

# Moving from novelty to practice

## **Exposure**

- Like with the computer, it needs to become common to use it
- Exposure to the technology early on
- (school -> university -> workplace)
- When you embark on XR strategy, get to know the technology first (don't buy 10 buy 1)



# Moving from novelty to practice

## **Expertise**

- Make use of XR specialists or technology ambassadors in your institutions
- Start small with a proof of concept and then scale it from there
- Target your intervention

# Moving from novelty to practice

## Challenges

- Select the right problem to solve
- Don't be scared of R&D
- BUT don't be scared of using of the shelf
- Ad hoc development is expensive but sometimes needed
- We are early in the technology, don't be in a hurry to implement

# Moving from novelty to practice

## Challenges

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# Case studies

## Examples from University of Pretoria

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- Support Design VR
- Checklist trainer
- Department of Taxation – 360 Video
- MagnifyUP – PATT and Scenario
- Jaw Thrust
- Malaria Intervention



# Support Design VR game

- Tethered VR application
- Utilises the HTC Vive Pro VR headset and a powerful computer
- Full room scale tracking
- Simulated mine tunnels with randomised geotechnical features
- Training in a virtual museum with short controlled exposure to tunnels to teach the student how to spot the features.
- See the video for more detail -> <https://youtu.be/jYUIMzj8lcE>



# Checklist trainer

- Mobile VR application
- Uses a checklist for a Mobile Manufacturing Unit from a mine
- Students explore the vehicle and complete the checklist
- Each attempt by a student randomises the state of the checklist items
- See the video for more detail -> <https://youtu.be/V77j8mFOAFs>



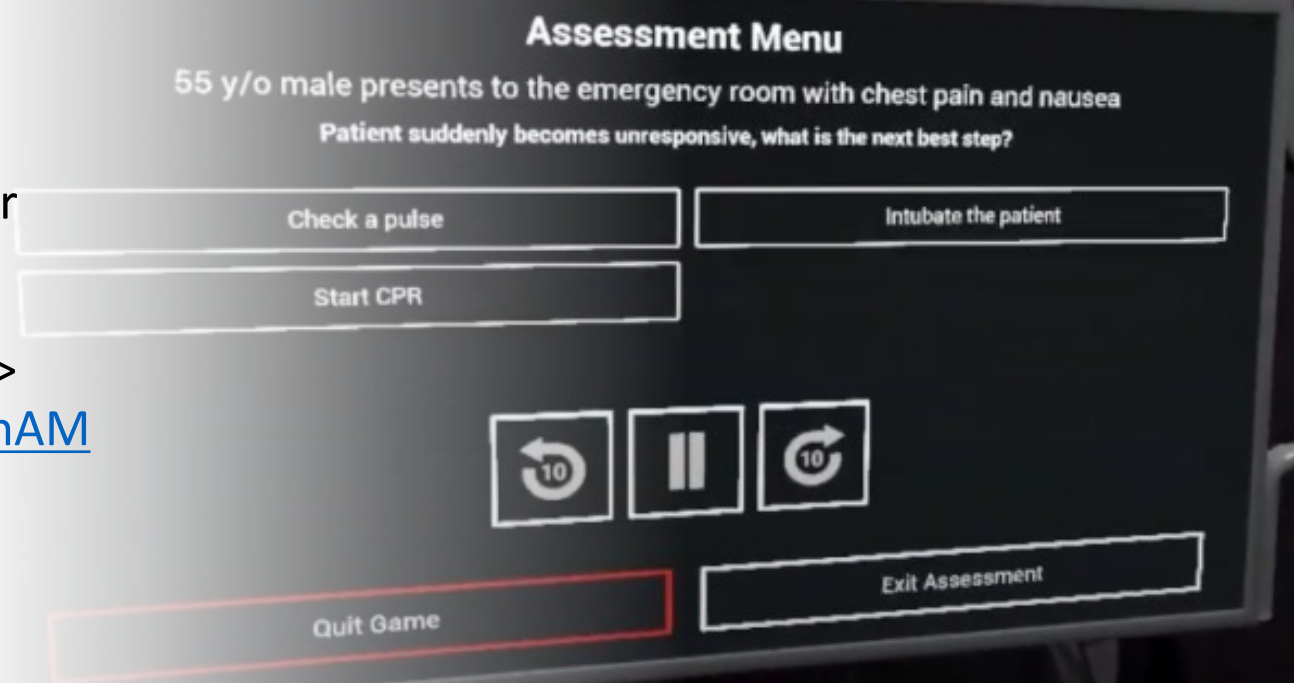
# Department of Taxation

- Over 1000 students per class
- Cost of even the cheap mobile headsets too high
- Space?
- Use 360 videos in their teaching
- Students can watch videos with their phones put inside a mobile VR headset
- Over 400 units at R150 – R 250 per unit
- A few lending units (phones)



# MagnifyUP – Scenario training

- Web based system with VR interface and assessment application
- Oculus Quest 2
- Completely mobile
- Stream content from a server
- Utilises hand tracking
- For full system explanation -> <https://youtu.be/GwPoX4athAM>





# Jaw Thrust

Start

Place hands in correct  
position on patient's face

- Mobile VR application
- Utilises hand tracking
- Teaches the execution of the Jaw thrust procedure
- Hand placement
- Finger placement
- Movement of fingers and hand
- See the video for more details -> <https://youtu.be/3qRQLhoU2M4>

# Malaria Prevention

- Mobile VR application
- Simulated environment with areas where malaria prevention can be implemented
- Simplified environment
- Standard point and click interaction
- Sound as a feedback mechanism





# Practicality of XR

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- Target “easy wins” where you know XR will work
- Start small but design with scale in mind
- Solve a specific problem, no large scale solutions
- Do a proof of concept
- Engage with XR specialist and technology ambassadors
- Find the individuals interested in the technology in your institutions and support them

Thank you

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