

# Introduction (part 2)

Notes for the SIT-DP module: **Developing Immersive Applications**

Created by: Chek Tien TAN



# Prefecture Notes:

## 1. evaluation - first approach

- ✓ what we build is primarily for users, not us
- ✓ test-driven development to evaluate our products

## 2. Immersive system

- ✓ differences in designing for immersion vs other user requirements
- ✓ can be generically thought as part of any app
  - how immersive do you want this app?
  - is a to-do list more immersive than a calendar

WHAT is immersion  
HOW to measure it

### immersion as system properties

- specifications of hardware like oculus quest
  - like hardware
  - system requirements

### immersion as user experience

- ✓ ongoing academic pursuit
- ✓ "human computer interaction" — HCI
  - ↳ 3 constructs: presence  
flow  
cybersickness

presence : "the feeling of being there"

- ↳ physical: feel like actually being there
- ↳ social: being around virtual being
  - ↳ people with openness and extroversion experience ↑ presence.

IPQ questionnaire → spatial  
→ involvement  
→ realness

flow: "in the zone" or just extremely immersed positively

→ used in games too! in the flow, zoned

1. clear goals
2. challenge that matches skill
3. complete concentration
4. loss of self-consciousness
5. sense of control *total control*
6. effortlessness *no effort in constantly going*
7. transformation of time
8. autotelic experience *- motivated intrinsically to do it and not extrinsically like money*

measured with questionnaire like flow state scale 2  
flow short scale

cybersickness - negative experience

nausea, disorientation, etc.

gold standard measure questionnaire is <sup>SSQ</sup> "simulated sickness questionnaire"

others exist like <sup>VRSSQ</sup> virtual reality sickness questionnaire

<sup>CSQ</sup> cyber-sickness questionnaire

vestibular system is what conflicts and causes our cybersickness

visual vestibular system

affordances - know how to operate things intuitively

many VR stuff does not operate how it should in real life

qualitative

- observations, surveys, think-aloud

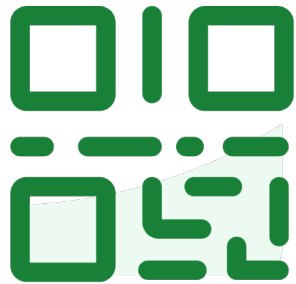
quantitative

- ✓ telemetry, psychophysiology

SCR/EMG questionnaire Mirza-Babaei

**slido**

Please download and install the  
Slido app on all computers you use



**Join at [slido.com](https://slido.com)  
#dia-week02-intro2**

① Start presenting to display the joining instructions on this slide.

# Recap

- differentiate AR, VR, MR and XR
- describe the historical evolution of immersive technologies

slido

Please download and install the  
Slido app on all computers you use



**VR was invented in the 21st  
Century (2001 - 2100)**

- True

- False

① Start presenting to display the poll results on this slide.

slido

Please download and install the  
Slido app on all computers you use



## Which device sparked the current (21st Century) rise of VR?

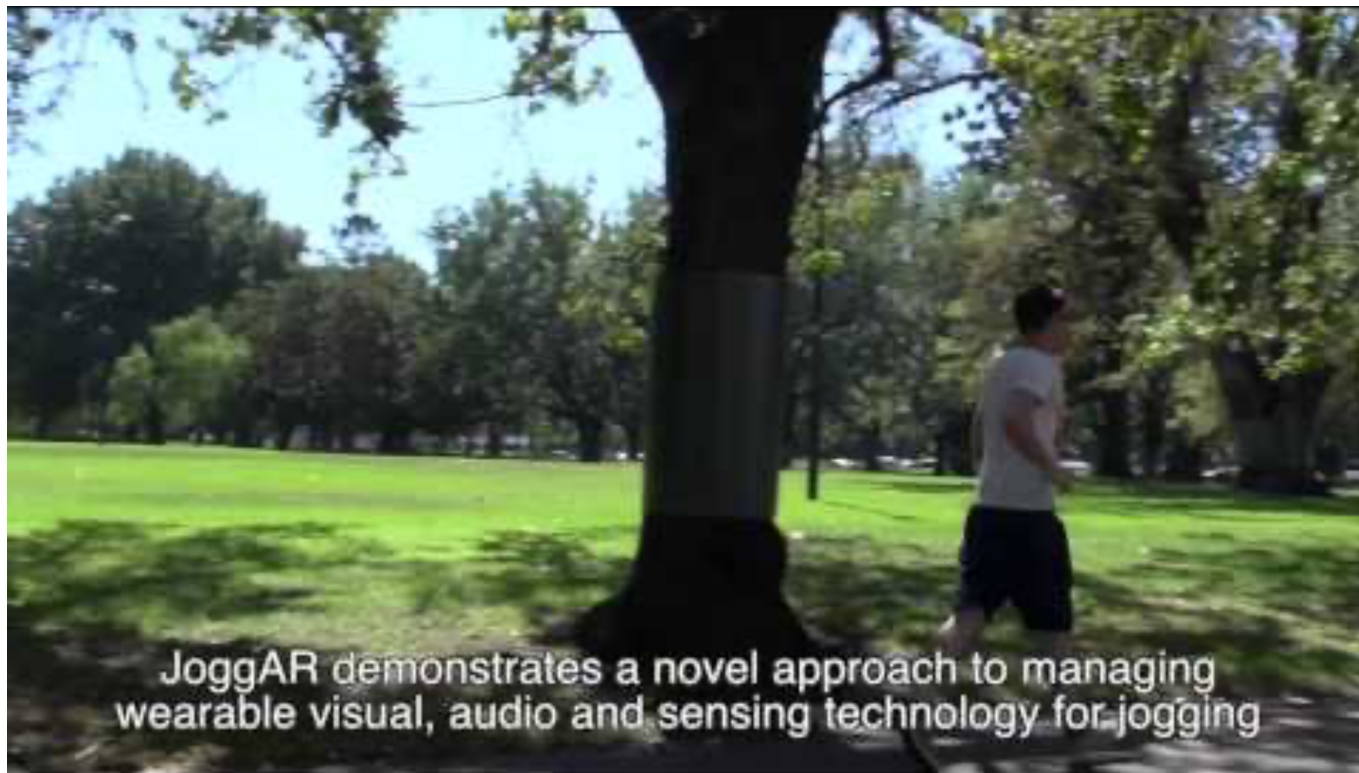
- Sega VR
- Oculus Rift DK1
- Google Cardboard
- Oculus Quest

① Start presenting to display the poll results on this slide.

- Meta Quest 2



# What type of experience is this?



JoggAR demonstrates a novel approach to managing wearable visual, audio and sensing technology for jogging

<https://youtu.be/d3wx3VGtFjo>

slido

Please download and install the Slido app on all computers you use



AR

MR = glorified AR: glorification of the objects in the real world,

if objects in the virtual world can sense the real world, then it's MR — spatial understanding

(the hurdle has no sense — simply grounded. if it moves around placing itself behind trees, then is MR)



# What type of experience is this?

• AR

• MR

• VR

① Start presenting to display the poll results on this slide.

# What type of experience is this?



<https://youtu.be/d3wx3VGtFjo>

slido

Please download and install the  
Slido app on all computers you use



**What type of experience is this?**

• AR

• VR

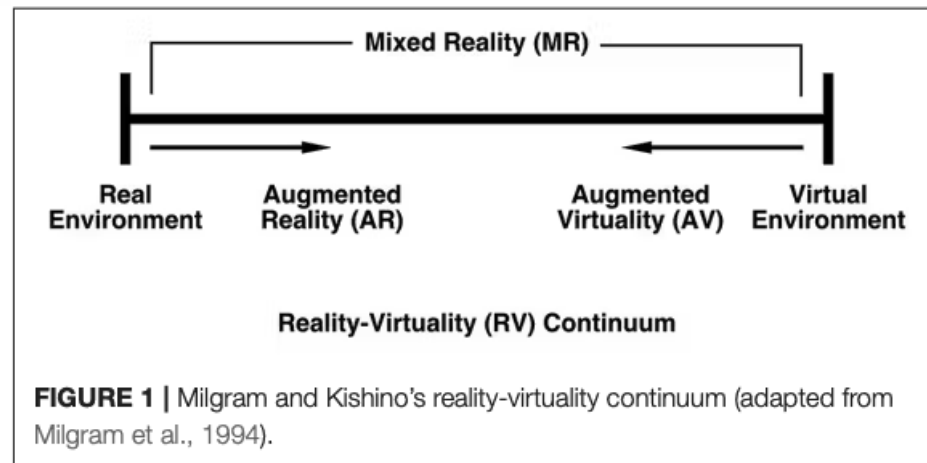
• MR

① Start presenting to display the poll results on this slide.

# Milgram-Kishino's RV Continuum

- not the immersification continuum...
- originally meant for display technologies

<https://doi.org/10.1117/12.197321>



# Dimensions of RV Continuum

*extent of world knowledge*

- EWK is how much system understands the real world

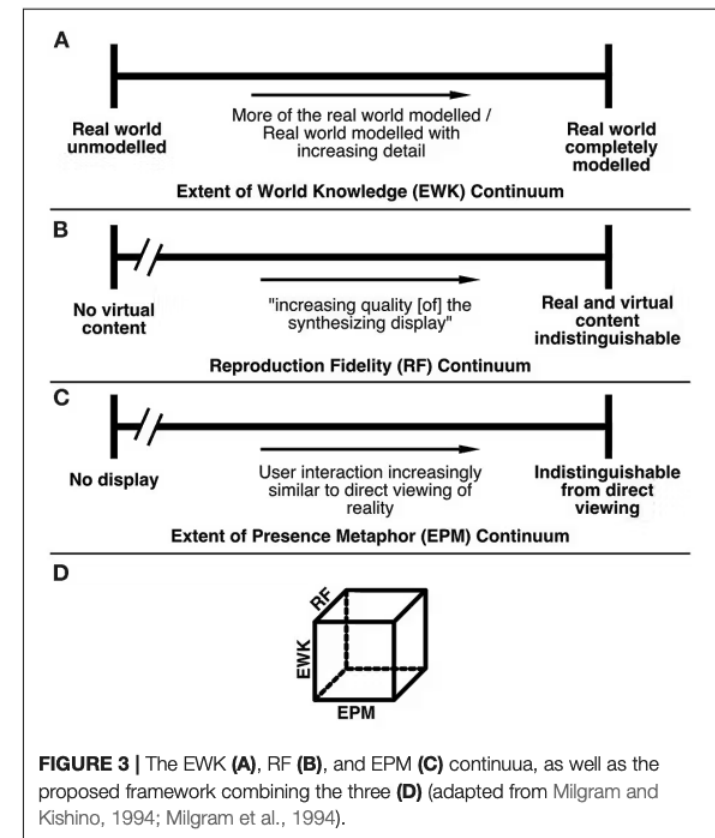
*realistic fidelity*

- RF is how realistic the assets are

*extent of presence metaphor*

- EPM is how interaction affords realism

<https://doi.org/10.1117/12.197321>



slido

Please download and install the Slido app on all computers you use



## Where should Pokemon GO be placed on the RV Continuum?



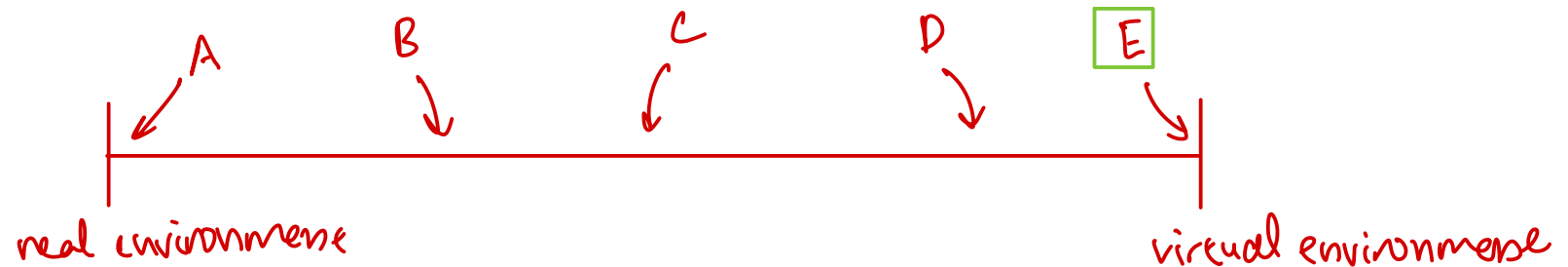
① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



**Where should Beat Saber be placed on the RV Continuum?**



① Start presenting to display the poll results on this slide.

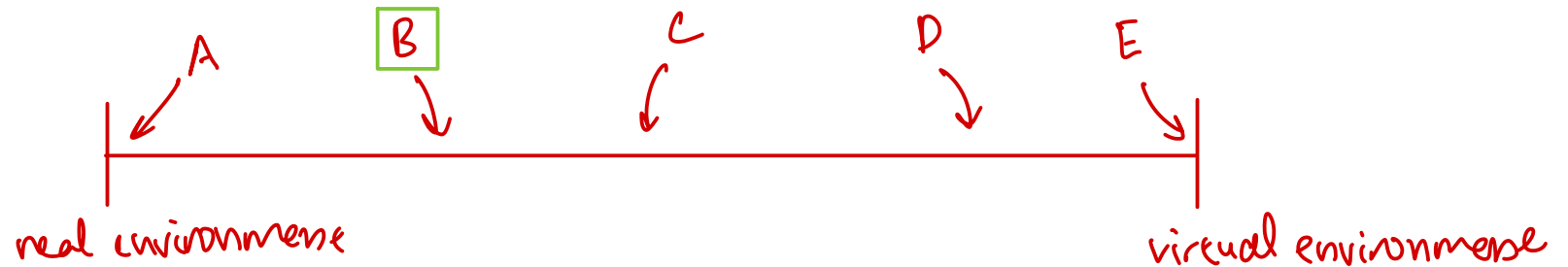


slido

Please download and install the Slido app on all computers you use



## Where should Strava be placed on the RV Continuum?



① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



Why is Strava not considered to be near the extreme end of "Real Environment" in the RV spectrum?

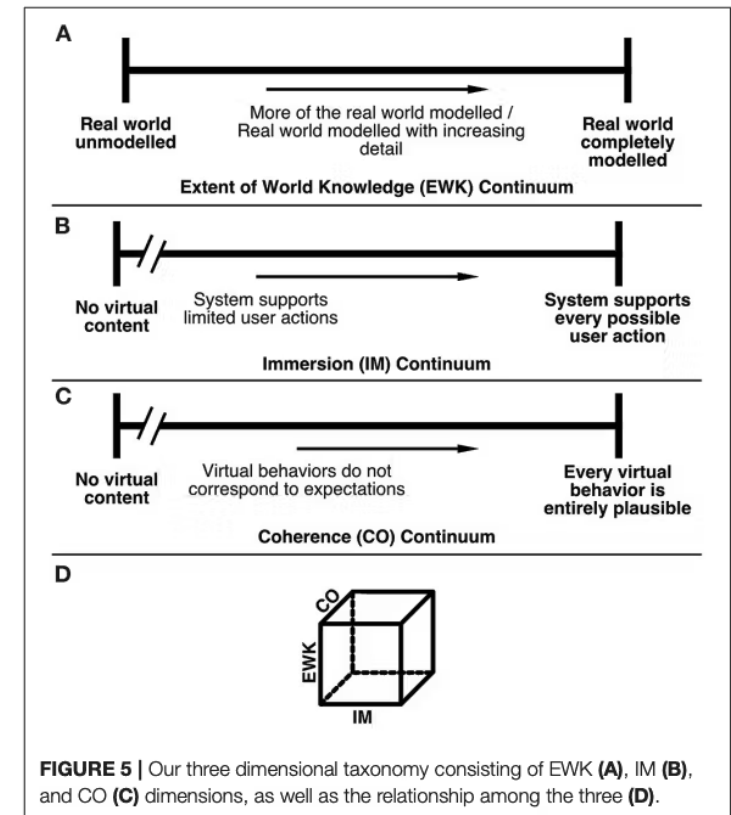
- it has some <sup>knows about real world</sup> "extent of world knowledge"
- it has some <sup>assets are realism</sup> "reproduction fidelity"
- it has some <sup>interaction affords realism</sup> "extent of presence metaphor"

① Start presenting to display the poll results on this slide.

# Revisiting the RV Continuum

- combined the RF and EPM into IM (our THE article came before this 😊) <sup>reproduction fidelity extent of presence metaphor</sup> <sub>immersion</sub>
- added CO to represent the user <sup>coherence</sup>
- note that this but one academic paper
- common perception of MR is different

<https://doi.org/10.3389/frvir.2021.647997>



slido

Please download and install the Slido app on all computers you use



## What is the common public perception of the difference between AR and MR?

- They are the same
- AR refers to blending virtual objects over the real-world
- Virtual entities in MR can interact with real-world objects

① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



"The 3D models are extremely high quality."

What dimension of the RV continuum is this referring to?

- Extent of World Knowledge *knows about the world*
- Reproduction Fidelity *assets' realism*
- Extent of World Presence Metaphor *user interaction affording realism*
- Coherence *believable virtual behaviors*

① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



"The 3D virtual dogs are able to jump onto the real table seen through the camera."

What dimension of the RV continuum is this referring to?

- <sup>knows about the world</sup> Extent of World Knowledge
- <sup>assets' realism</sup> Reproduction Fidelity
- <sup>user interaction affording realism</sup> Extent of World Presence Metaphor
- <sup>believable virtual behaviors</sup> Coherence

① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



"The stereo optics provide a perception of depth through an LCD display."

What dimension of the RV continuum is this referring to?

- <sup>knows about the world</sup>Extent of World Knowledge
- <sup>assets' realism</sup>Reproduction Fidelity
- <sup>user interaction affording realism</sup>Extent of World Presence Metaphor
- <sup>believable virtual behaviors</sup>Coherence

① Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use



"For a moment I believed that I was actually 1000ft above ground."

What dimension of the RV continuum is this referring to?

- <sup>knows about the world</sup> Extent of World Knowledge
- <sup>aspects' realism</sup> Reproduction Fidelity
- <sup>user interaction affording realism</sup> Extent of World Presence Metaphor
- <sup>believable virtual behaviors</sup> Coherence

① Start presenting to display the poll results on this slide.