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# The Potential of Virtual Reality in Education and Learning: Opportunities and Challenges

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# Outline

- What is VR?
- The potential of VR for learning
- The Metaversity project

**VIRTUAL  
REALITY**



***REPLACING*** YOUR  
ENVIRONMENT WITH  
DIGITAL CONTENT

**AUGMENTED  
REALITY**



***ENHANCING*** YOUR  
ENVIRONMENT WITH  
DIGITAL CONTENT

**MIXED  
REALITY**



***MERGING*** YOUR  
ENVIRONMENT WITH  
DIGITAL CONTENT



**VIRTUAL**

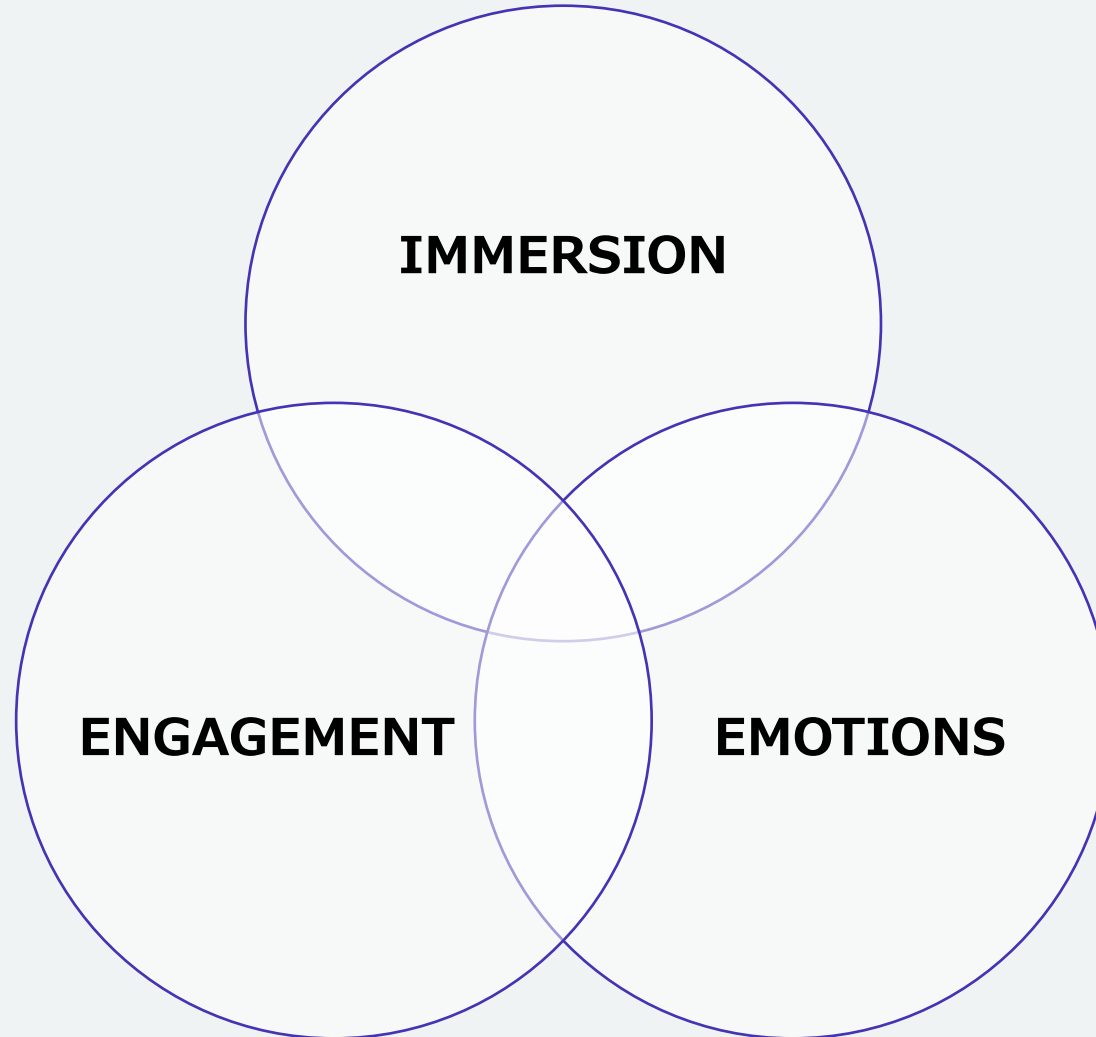
***EXTENDED REALITY CONTINUUM***

**PHYSICAL**





# Key assets of VR for teaching and learning



# IMMERSION

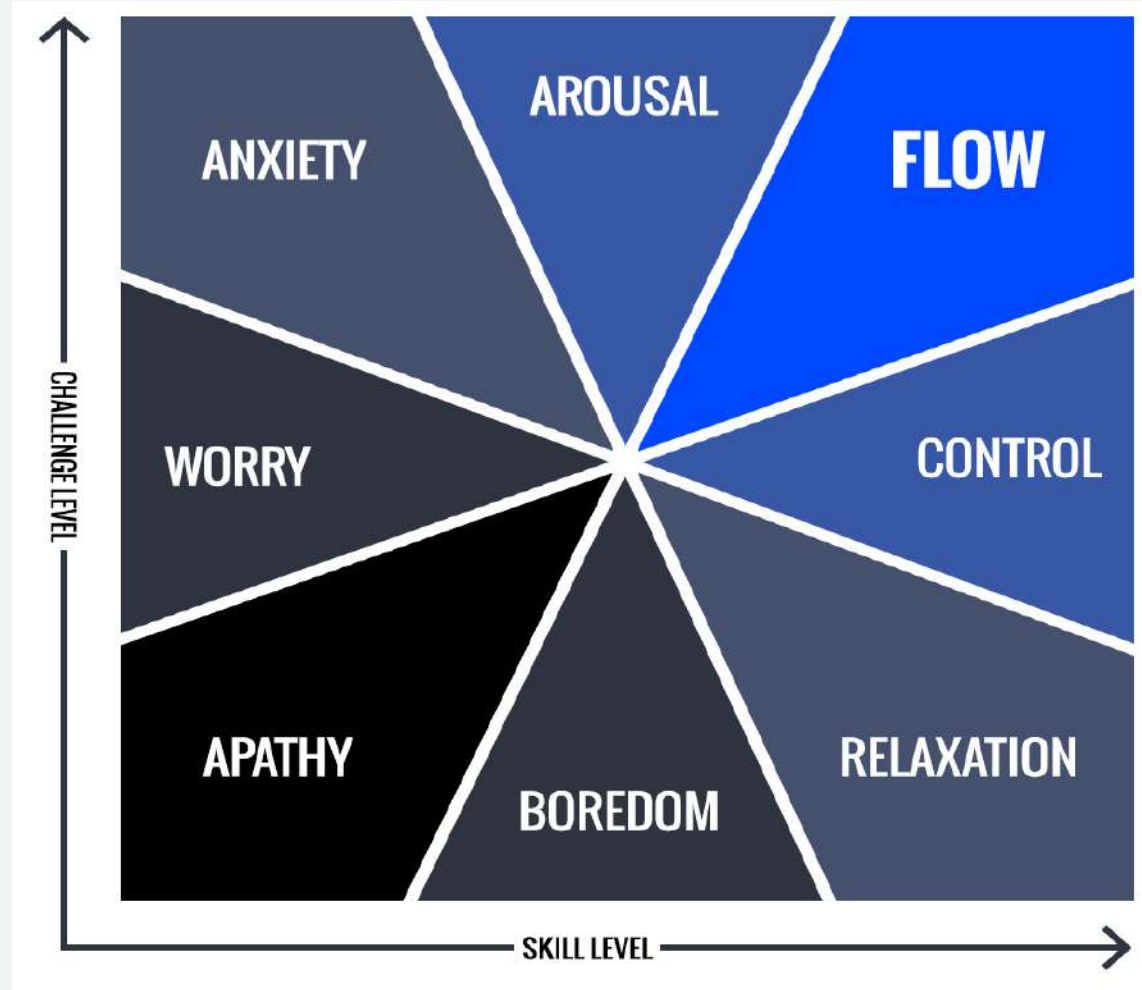
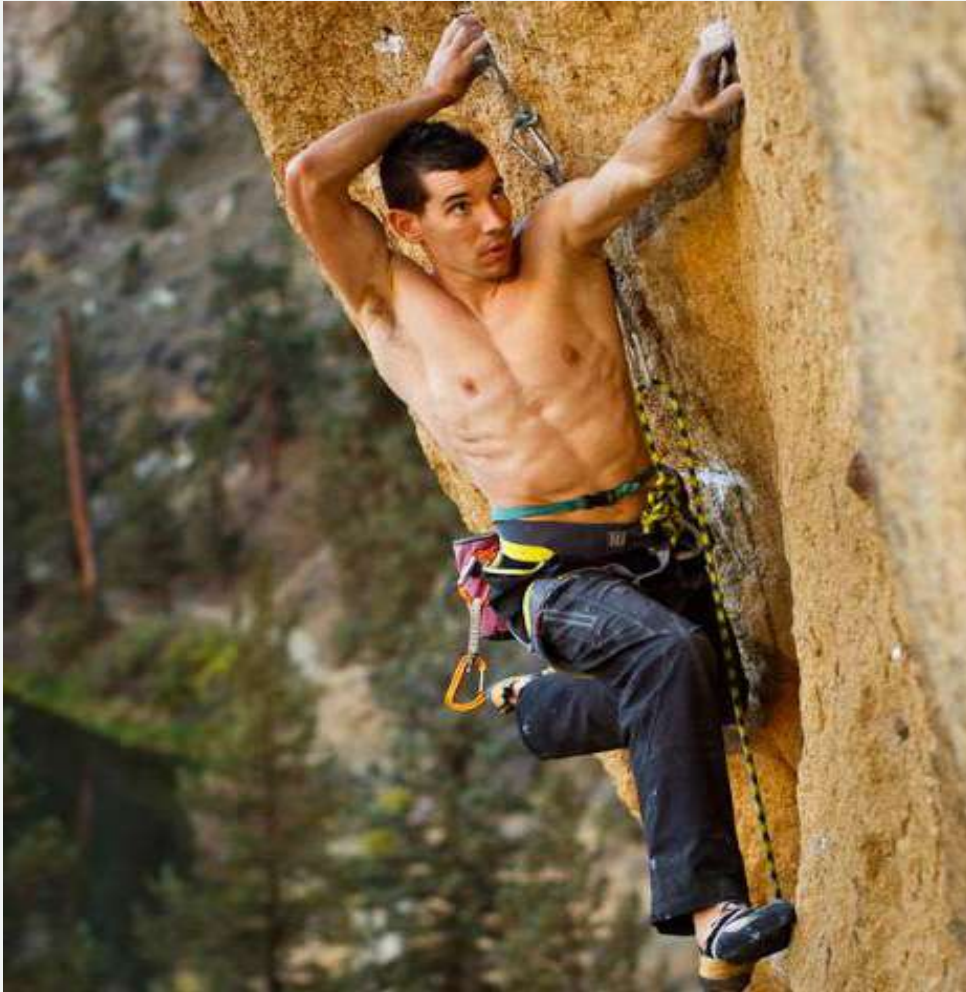
- VR provides a highly immersive experience by creating a simulated environment that surrounds the user
- This immersive nature allows learners to engage with the content more deeply, promoting active learning and improving information retention



*Electrostatic Playground: A multi-user virtual reality physics learning experience (MIT Fluid Interfaces Lab)*



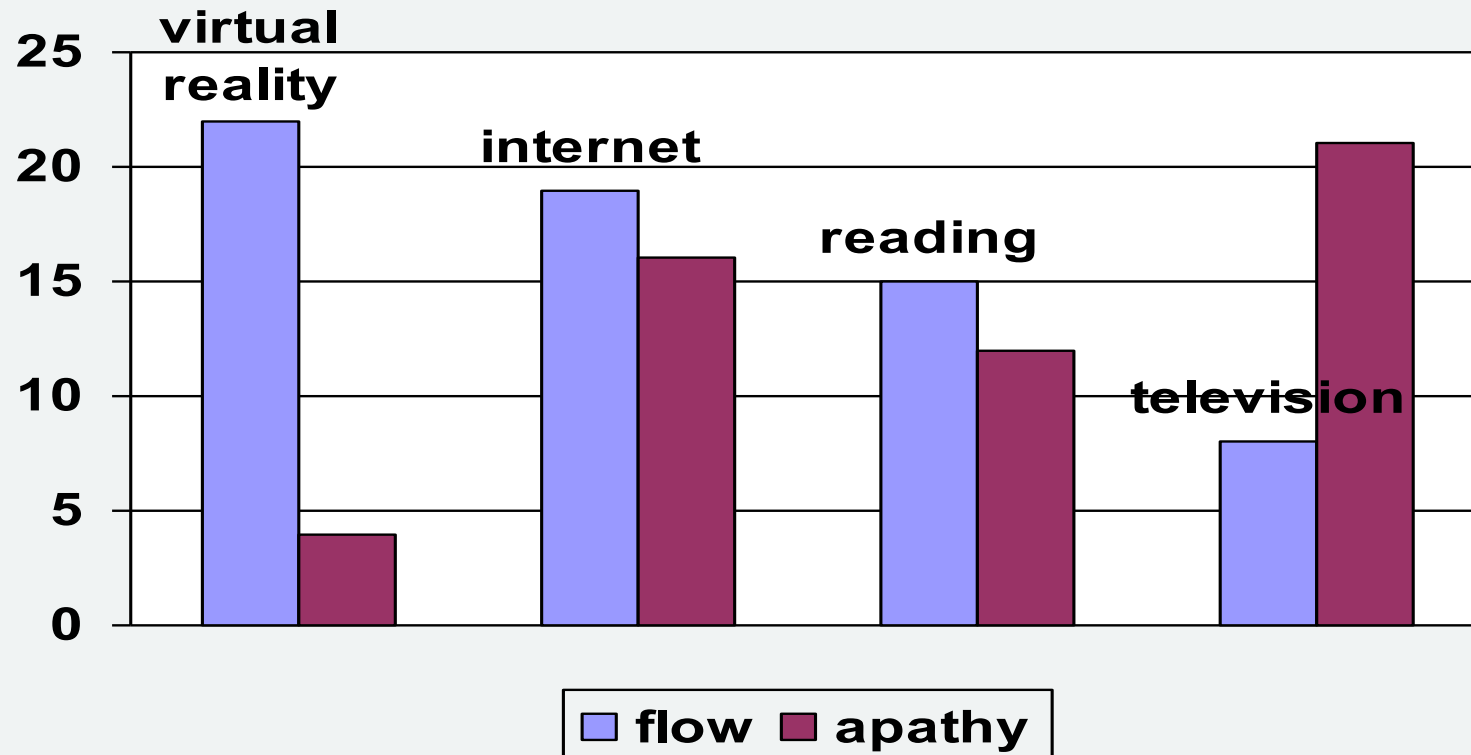
# ENGAGEMENT: FLOW



# VR IS A FLOW TECHNOLOGY

(Gaggioli et al., 2004; 2012)

- Opportunities for action
- Task complexity
- Multimodal feedback
- High control
- Sense of presence





# EMOTIONS: AWE AND WONDER

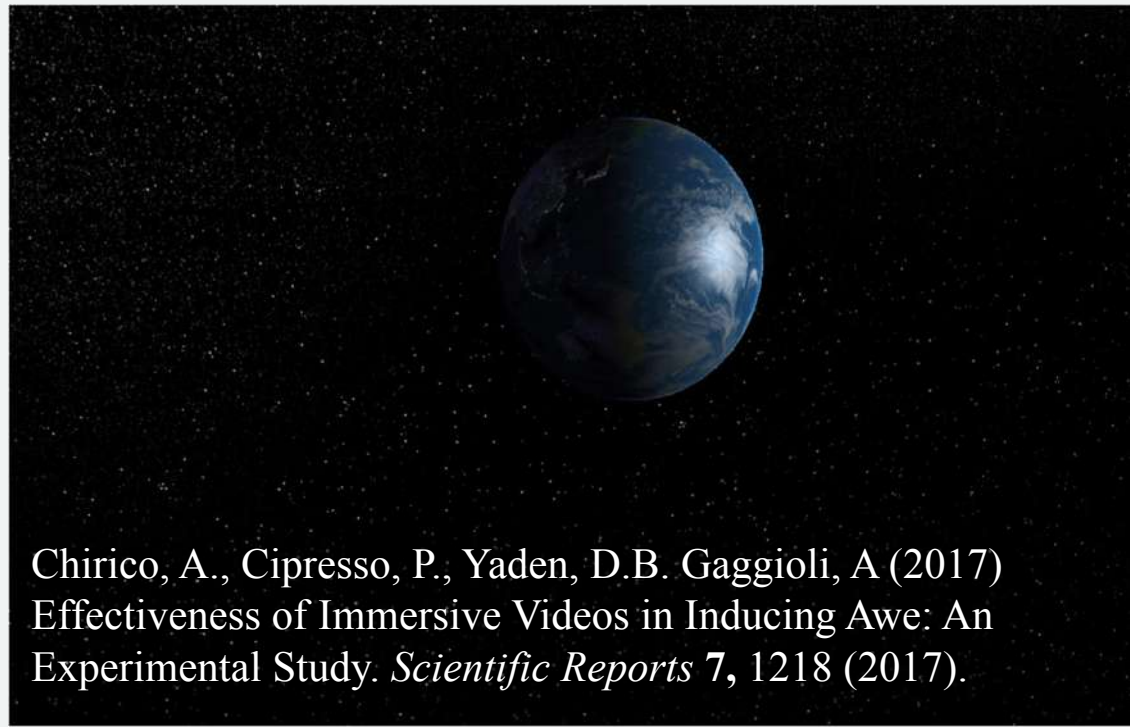
## AWE

*A feeling of wonder experienced when facing something vaster, greater, beyond current understanding*

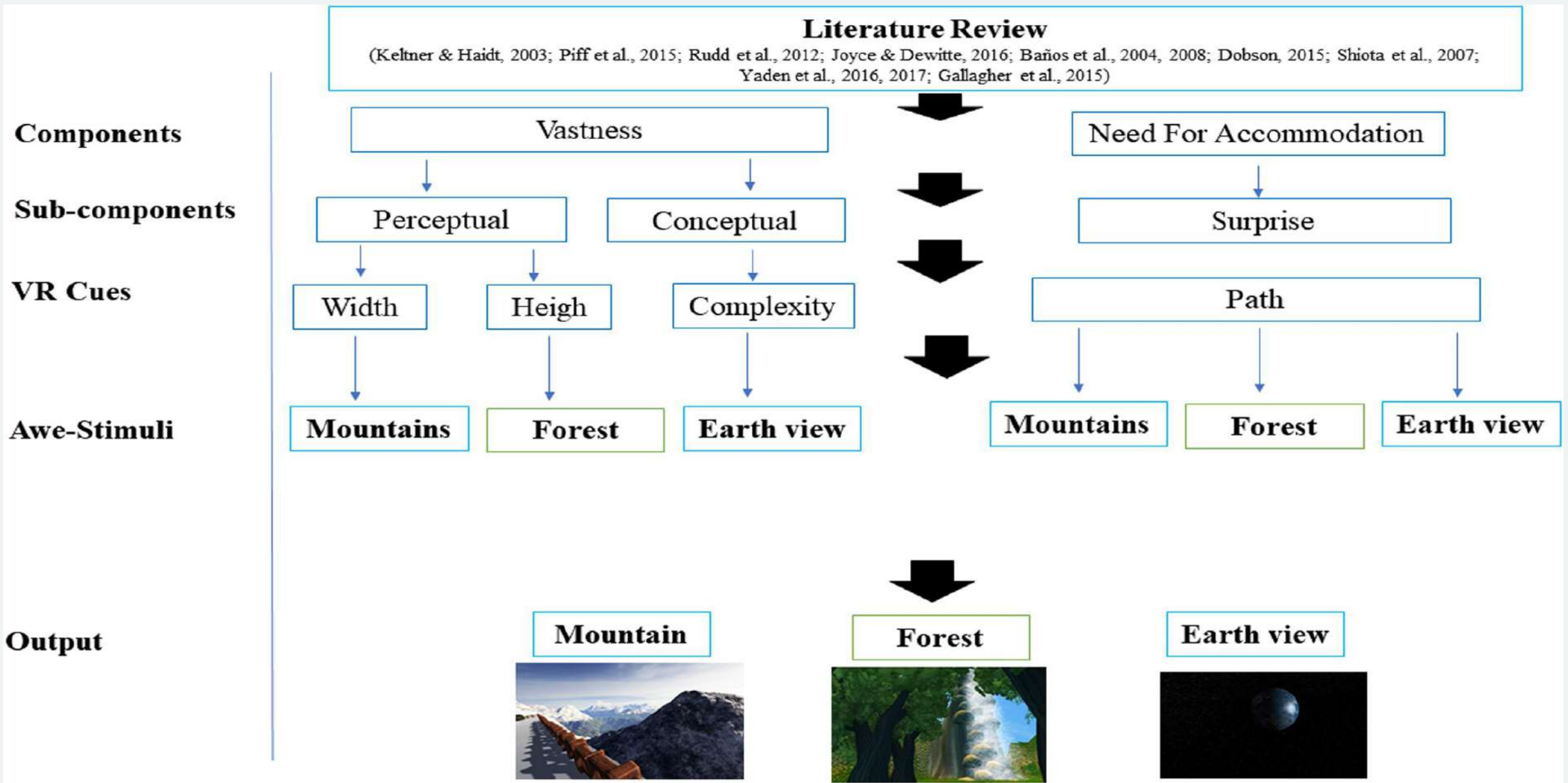
Keltner & Haidt, 2003



# VIRTUAL REALITY AS AWE-INDUCING MEDIUM



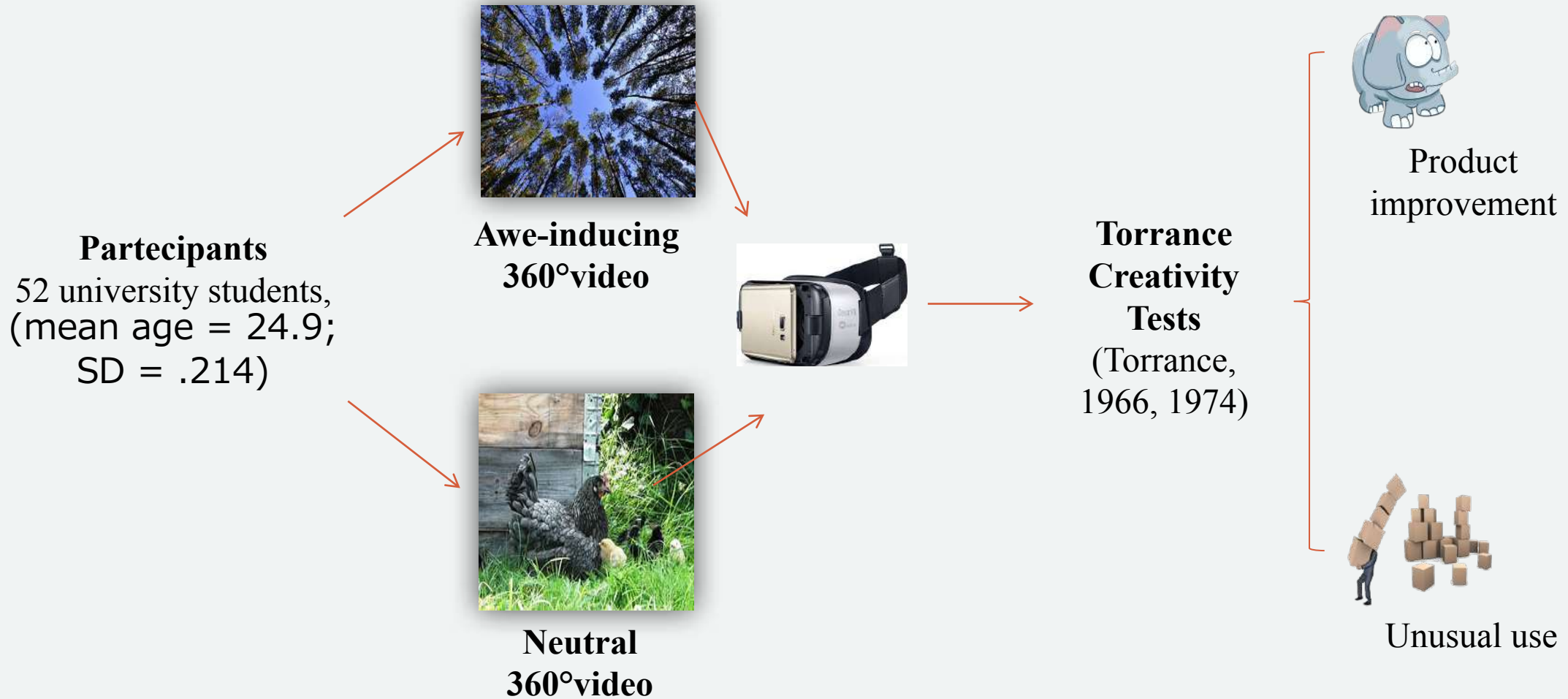
Chirico, A., Cipresso, P., Yaden, D.B. Gaggioli, A (2017)  
Effectiveness of Immersive Videos in Inducing Awe: An  
Experimental Study. *Scientific Reports* 7, 1218 (2017).



Chirico, A., Ferrise, F., Cordella, L., & Gaggioli, A. (2018). Designing Awe in Virtual Reality: An Experimental Study. *Frontiers in psychology*, 8, 2351. <https://doi.org/10.3389/fpsyg.2017.02351>



# VR, AWE AND CREATIVITY



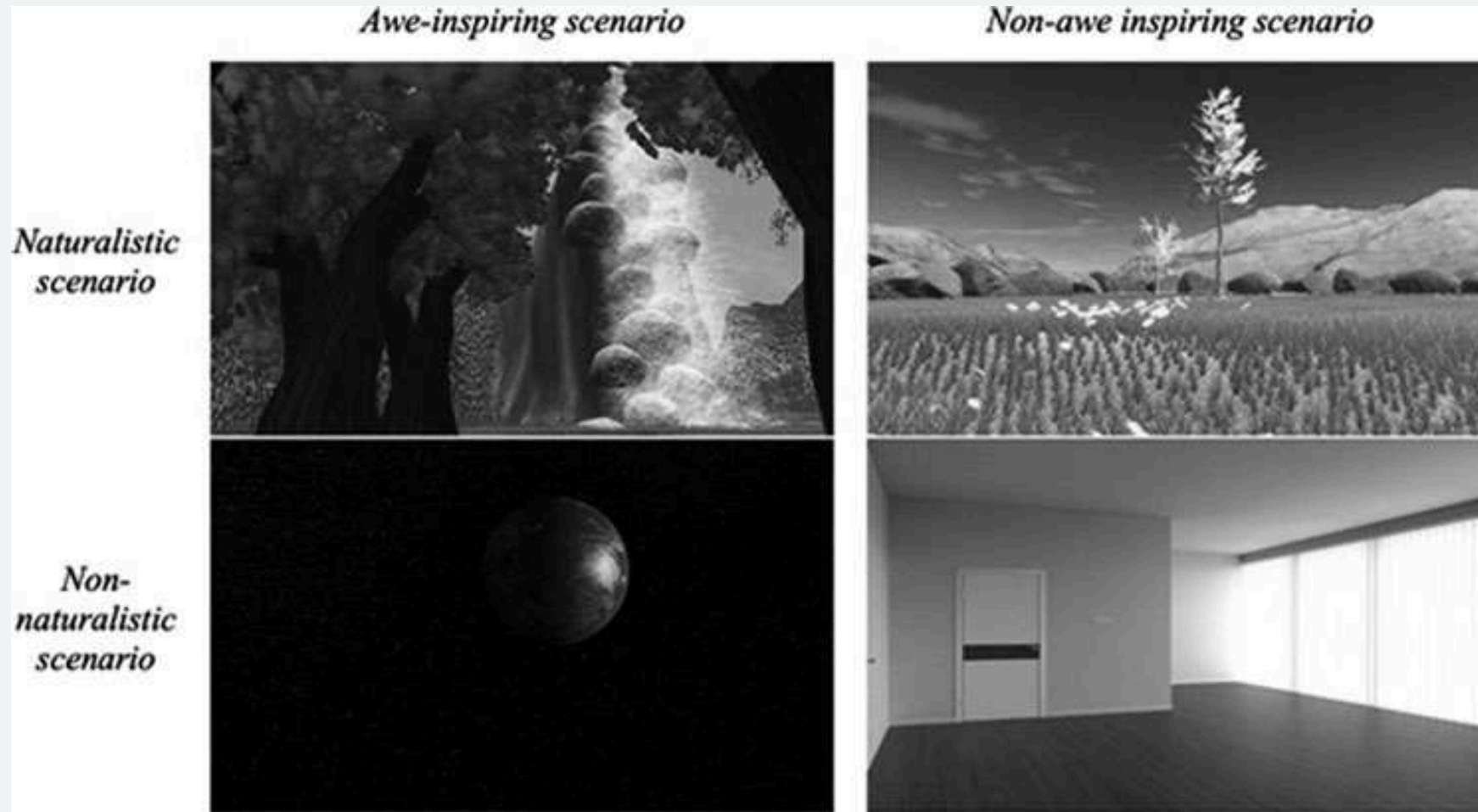


# VR FOR PROMOTING ECOLOGICAL BEHAVIORS 1/2



Chirico, A., Scurati, G.W., Maffi, C., Huang, S., Graziosi, S., Ferrise, F., & Gaggioli, A. (2020). Designing virtual environments for attitudes and behavioral change in plastic consumption: a comparison between concrete and numerical information. *Virtual Reality*, 25, 107-121.

# VR FOR PROMOTING ECOLOGICAL BEHAVIORS 2/2



Chirico, A., Pizzolante, M., Borghesi, F., Bartolotta, S., Sarcinella, E. D., Cipresso, P., & Gaggioli, A. (2023). "Standing Up for Earth Rights": Awe-Inspiring Virtual Nature for Promoting Pro-Environmental Behaviors. *Cyberpsychology, behavior and social networking*, 26(4), 300–308. <https://doi.org/10.1089/cyber.2022.0260>

## VR IN LEARNING AND EDUCATION: CHALLENGES

- Technology maturity
- Ergonomic limitations
- Inclusivity and accessibility
- Content







# Metaversity Project @UCSC

1. Explore potential of virtual technologies in higher education using a “design thinking” methodology
2. Strong focus on inclusivity and accessibility
3. Evidence-based approach driven by “experiential workshops” and lab experiments involving professors and students
4. "Metaversity Hubs" for immersive teaching and learning experimentation and collaboration.