VIRTUAL REALITY, LEARNING AND BEHAVIOR MODIFICATION: DO COGNITIVE DIFFERENCES MATTER?

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Background

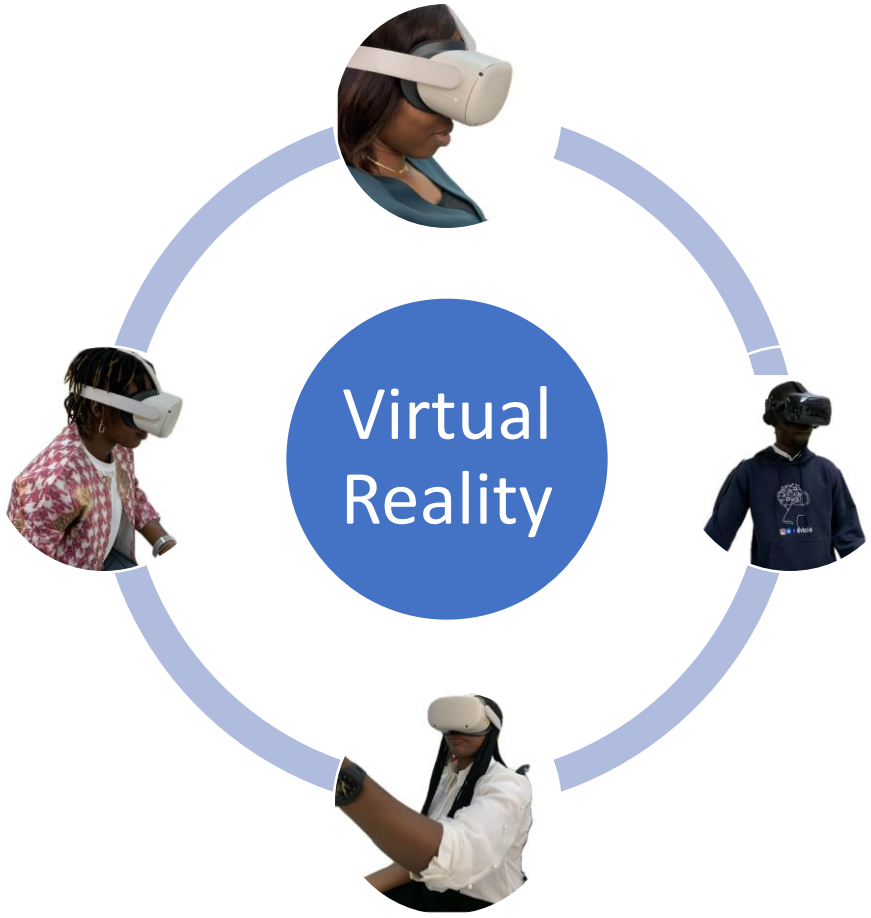
The effectiveness of Virtual reality (VR) has been established across multiple sectors, including health, education, business, military, etc.

Effective for staff training (PwC, 2019), anxiety management (Hermans et al., 2023), Child labour (Xu, 2022; Carus, 2023)

Particularly, VR is crucial for learning and behaviour modification.

This study examined the importance of considering individual differences in cognition when designing and adopt VR solutions for educational purposes

What is VR?



- “an artificial environment with sensory information contents that allows a natural expression of behaviours” (Felsberg et al. (2019).
- “a stimulating interactive environment created through three-dimensional computer graphics that allows users to explore and interact with it.” (Shen et al. 2018)

- Some of the key added values of VR are;
  - Immersion and
  - Space Transition

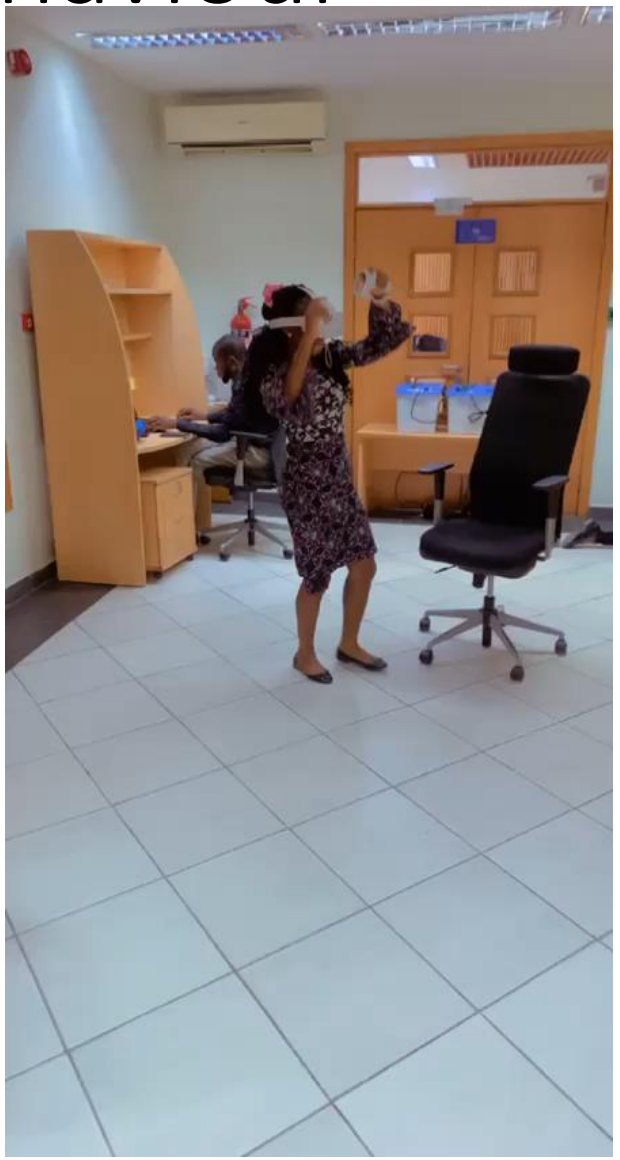
Virtual reality helps you do dangerous things safely and expensive things cheaply.

Benefits of VR in Education

- Enhanced Visualization
- Improved Education Quality
- Collaborative learning
- Global outreach
- Better appraisal
- Improved research

Virtual Reality for Learning and Behaviour Modifications

- To create desirable effects in learning and behaviour change, virtual reality interacts with the mind, cognition and perception of users.
- Allows users to make mistakes and correct them in real-time
- Create real-life consequences without any potential hazard. E.g., car crash
- Allow users to experience the positive and negative consequences of a process
- Generates feedback and emotional regulation.



VR and Cognitive Differences

- Every individual has unique cognitive abilities
- How individuals interact with VR, process and use the knowledge gained depends on individual cognition and cognitive abilities.
- VR may affect people differently based on; (Weiner & Sanchez, 2020; Velev & Zlateva, 2017)
  - Reaction time
  - Mental processing
  - Spatial recognition (Awareness)
  - Task performance
  - Gender
- VR can however improve cognition when they are so designed (Aran et al. 2019)

Considering Cognitive differences in the Design, Development or Use of VR Solutions

- User differences in cognitive, sensory and physical capabilities is a serious consideration
- These considerations are crucial to help users with disabilities feel empowered
- Poor designs may transport users to an emotionally altered state and trigger the wrong reactions

- VR solutions must be
  - Simple
  - Easy to use (space coordination/ navigation)
  - Instruction enabled
  - Designed for specific users/ needs

When games are too difficult users may feel incompetent. Incompetence may also yield frustration and other undesirable outcomes in users (Lindner et al., 2020). E.g., phobia, feelings of powerlessness, poor self-concept and a decision never to use VR ((Tabbaaa et al., 2020).

Conclusion

- Virtual reality solutions are important technological developments that have the capacity to drive learning and behaviour modification toward delivering solutions in business, healthcare, architecture, entertainment and almost all areas of human engagement.

- Nonetheless, crucial attention must be paid to the development and design of virtual reality to deliver the desired outcomes.

Thank you