**Abstract**

Computer-based simulations for science learning can be used to promote procedural knowledge for carrying out lab procedures as well as conceptual knowledge for understanding and explaining the demonstration.

An advantage of allowing students to observe otherwise unobservable phenomena, reduce the time demand of experiments, and provide adaptive guidance in a virtual world that provides a high sense of physical, environmental, and social presence.

**Background**

the cognitive theory of multimedia learning CTML (Mayer, 2009) suggests that there are three types of cognitive processing that can occur during multimedia instruction: extraneous processing–cognitive processing that does not support the instructional goal, caused by poor instructional design or distractions during learning; essential processing–cognitive processing required to mentally represent the essential material, caused by the complexity of the material for the learner; and generative processing–cognitive processing aimed at making sense of the material, caused by the learner's motivation to exert effort.

**Goals/Hypothesis**

N/A

**Participants**

N/A

**Methodology**

There is some evidence from previous studies to suggest that EEG has potential as a valid and objective measure of mental workload

**Results**

conclude that students learned more when the material was presented via a PC than via immersive VR.

VR group produced significantly higher ratings of presence than the PC group

Students were overloaded an average of 48.78% of the time, indicating that the science lab simulation was a difficult learning task for most students.

**Conclusion**

The major empirical contribution of this study is the finding that students felt a greater sense of presence when they used the high immersion VR science lab simulation involving a head-mounted display, but they actually learned less as compared to the low-immersion version of the simulation on a desktop computer. However, the results differ from newer research that has found that high-immersion VRE's lead to more learning.

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**Limitations**

N/A

**Relevance**

VR as it still has the potential to be a viable educational platform if instructional designers take a learner-centered approach which focuses on how the technology fosters knowledge acquisition. This will be imperative to understand and discuss in the design portion of the study. The design of VR educational content must be developed from the start with the understanding of how this platform can support the given learning objectives.

**Reference:**

Makransky, G., Terkildsen, T. S., & Mayer, R. E. (2019). Adding immersive virtual reality to a science lab simulation causes more presence but less learning. *Learning and Instruction*, *60*, 225–236. <https://doi.org/10.1016/j.learninstruc.2017.12.007>