Can Virtual Reality (VR) be Used to Train Spatial Perception?

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Goal
Understand whether short-term VR training improves spatial skills and, if so, to what extent.

Timeline
- **Summer 2021-** complete VR module, create pre- and post-tests for the Fall
- **Fall 2021-** test on Juniata students

Background and Motivation
- Research shows that students who do not preform well with spatial tasks are less likely to stay in the STEM fields, so having an easy way to improve these skills could retain more people in the STEM fields.[10]
- According to past research, spatial skills and perception can be improved through training.[7]
- Different people have different levels of spatial abilities.[2]
- Training using video games, pen and paper tasks, and many other mediums have been tested to help build these spatial skills.[6,7]
- Virtual reality is becoming less expensive and more accessible to the everyday person so it could be used by students in schools, colleges, and beyond.

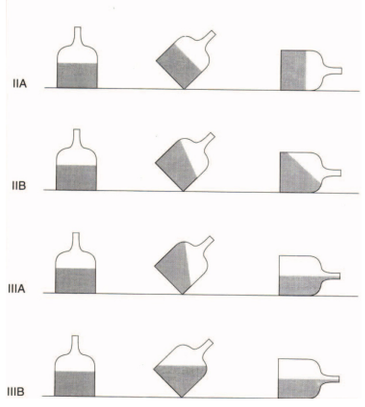
Testing Outline
- Various Juniata students and classes (not just geology)
- Control group
- Experimental group

1. Pre-test
2. Training
3. Post-test

Pre-test
- Spatial skills
- Prior knowledge test
- Social desirability test

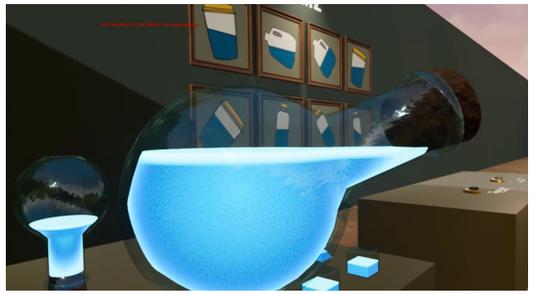
Training
- Control Group: pen and paper spatial training
- Experimental Group: VR Module

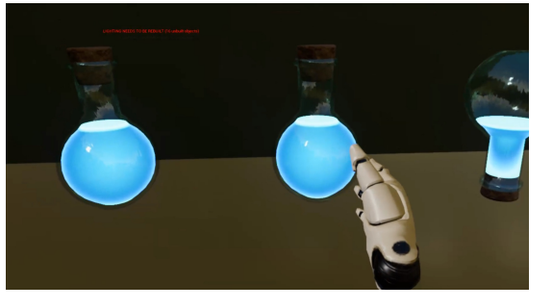
Post Test
- Spatial skills test (see chart below)
- Demographic survey



Taken from Vasta and Liben (1996), this figure shows some of the different stages of the Water Level Test (WLT) as proposed by Piaget and Inhelder.

Task	Spatial Skill	Source
Mental Rotation	Mental Rotation	8
Water Level	Spatial Perception	4,9
Three Mountains	Perspective Taking and Spatial Visualization	4
Mental Cutting	Spatial Visualization	4
Object Perspective Taking	Perspective Taking	3,1
Hidden Figures	Disembedding	Educational Testing Services (ETS)





Screenshots from VR software that is under development by K. Johanesen and C.J. Green. These pictures show some of the ways this software can be used.

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