Teaching Science With Immersive Virtual Reality

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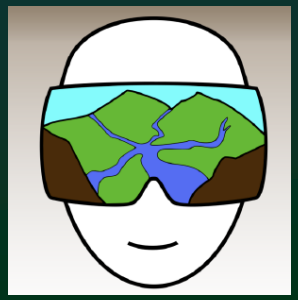
What is immersive VR (iVR)?

Interactive computer-generated experience that takes place within a simulated environment using VR headsets to generate realistic images and sounds and hand-held controllers that allow interactivity to simulate a user's physical presence in a three-dimensional, virtual environment

NOT *desktop VR* that you do with a computer screen

NOT *augmented reality (AR)* that you do with a mobile device



Affordances and Value of VR

- ➔ **Immersion and Presence**
- ➔ **No distractions**
- ➔ **Active (not passive) experience**
- ➔ **Immediate learner engagement**
- ➔ **Examine science phenomena at multiple levels (micro – macro)**

Common specs:

Non-tethered;

3 Degrees of Freedom.

Google cardboard
free ~ $25 (phone-based)

Samsung Gear VR
$99 ~ 129 (discontinued)

Oculus Go
$149 ~ 249

Some iVR Classroom Examples

➔ **Stanford University** (Virtual Human Interaction Lab)
- Ocean Acidification Experience
- Culturally relevant science in VR environments study (elementary age with Google cardboard)

Cardboard compatible apps

➔ **Google Expeditions** ▸
- Virtual field trips with Google cardboard

➔ **NASA SLS VR Experience** ▸ for use with Oculus Rift

➔ **Mission ISS** ▸ for use with Oculus *Gear VR* ▸
Oculus *GO* ▸
Oculus *Quest* ▸
Oculus *Rift (S)* ▸

Note: *click the* ▶ *for linked experiences.*

What are your experiences with Immersive VR for learning?

Jonah’s presentation

How do you see using this with science teachers and their students?

Al and Rich's presentations

Implementation Considerations

- ➔ Do existing iVR applications align to your science curriculum?
- ➔ Age appropriateness for headset type
- ➔ Classroom management issues
- ➔ VR motion sickness for some users; desktop VR version available?
- ➔ I want to create my own iVR experience. What do I need to know?

Questions and Discussion

This presentation and Al's presentation available at:

https://eli.lehigh.edu/publications/research