Experiential Learning for Science & Math

“This is literally the ‘Magic School Bus’ for my classroom!”
– biology teacher, Cobb County GA

Trusted by 570,000+ students & teachers

Backed by learning science research at Stanford University

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What makes VR so compelling?
**PRESENCE**: a measurable construct in social psychology

Ref: Jeremy Bailenson / Stanford VR Lab
VR is ‘consensual hallucination’ – William Gibson

But it is much more than its current form factor: VR can be perceived as a *continuum*.

<table>
<thead>
<tr>
<th>Interactivity</th>
<th>Perceptual Immersion</th>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
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<tr>
<td></td>
<td>Mobile VR &amp; 360</td>
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<tr>
<td></td>
<td>Desktop VR &amp; CAVEs</td>
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<tr>
<td></td>
<td>Immersive VR accessed via HMDs</td>
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Perceptual Immersion vs Interactivity matrix to classify Virtual Learning Environments (VLEs)
Key research insights on learning outcomes...

Findings on immersive VR delivered via HMDs largely show conflicting findings. This may suggest a disconnect in collaboration across expertise, and a lack of collaboration with teachers.

Prior work did not make an effort to distinguish learning with VR of tasks that involve ‘procedure’ versus tasks that are ‘declarative’.

Individual differences are not considered in prior work.
Desktop VLEs: Findings

Curriculum design and lesson plan development is critical.

The pedagogy and learning science theory integration is what pushes the technology beyond the initial novelty effect.

Design-based research (DBR) methods were employed in many studies that showed positive outcomes associated with the use of VR. ^^^ Chris Dede’s work on River City and other MUVEs
Mobile VR & 3DoF: Is it useful?

Still the most affordable and accessible form of HMD-rendered VR available today.

shown to cause motion sickness and nausea if used for long periods, can be very gimmicky

inquiry-driven learning is a major outcome

360 content: need to unpack the underlying set of principles of learning in VR from a design standpoint
Taking VR outside the Lab
Atlanta, GA (2018-present)
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Programs in India 2016-Present
Findings from rigorous learning science research

N=121, recent control experiment findings summary (Cobb County, GA)

18.6%  
Increase in self-efficacy and confidence towards learning science, especially prominent among underserved youth

24%  
Increase in critical thinking skills

At least one grade-point  
Increase in knowledge-retention, specifically for procedural tasks and spatial reasoning tasks
And a decade of peer-reviewed work on learning with VR

10%+
Learning retention when using VR vs. computer or tablet.
*Krokos et al. (2018)*

11-16%+
Understanding, evaluation, and problem solving.
*Chau et al. (2013)*

40%+
More retention of information about spatial and temporal relationships compared to traditional methods.
*Novotný et al. (2013)*

Bottom line: VR outperforms literally every other digital tool out there today, particularly for the bottom 25% percentile of students.
Implementation is important: here’s how we think about it

**Technology**
affordable, portable, kid-safe, plug-n-play, remote manage, all handled by us

**Content**
massive catalog, ready-2-deploy worksheets & lesson plans, aligned with standards

**Implementation**
only 20 min/session, student-driven, group work, in or out of class

**Training**
in-person PD workshop & certificate, 9-5 support, pedagogically aligned
What’s next?

With research...

Developing a full VR curriculum

- infrastructure considerations
- standards alignment
- ‘novelty’ effect, need for long-term studies
- student authoring in VR, and providing more learner agency

gold standard for an immersive VR experience is to cause behavior change and not stay limited to belief change
What’s next?

With Inspirit

Running long-term school programs

Build coverage across all science & math topics

Grow the family!

Work with us!
“I like to think that all technology, right from the invention of paper and the act of writing on paper, has been developed with a goal to expand how we can communicate and express ideas, thoughts, and feelings.”

— Peter Lee, MSR