Can Virtual Experiences Create Real Learning?

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What we do

But we are here to talk about VR and learning

Experimental research

Invasion

Henry

Applied Research

- A practical examination of real life work
- Maintain less control over the experience
- Highly applicable to actual educators
- They become the voice of their own work
- Better accessibility for other educators

How our work with VR got started

It was actually a teacher's idea:

- What if I had my kids start designing in Unity for VR?
- Would they learn new things?
- Would it be valuable?

What we learned turned out to be very valuable

The study has since expanded

This year, we are running a study in 20 schools: elementary, middle & high school

In addition, we are learning about how people are applying VR from an additional 20 partner schools

Participants select their own hardware and content

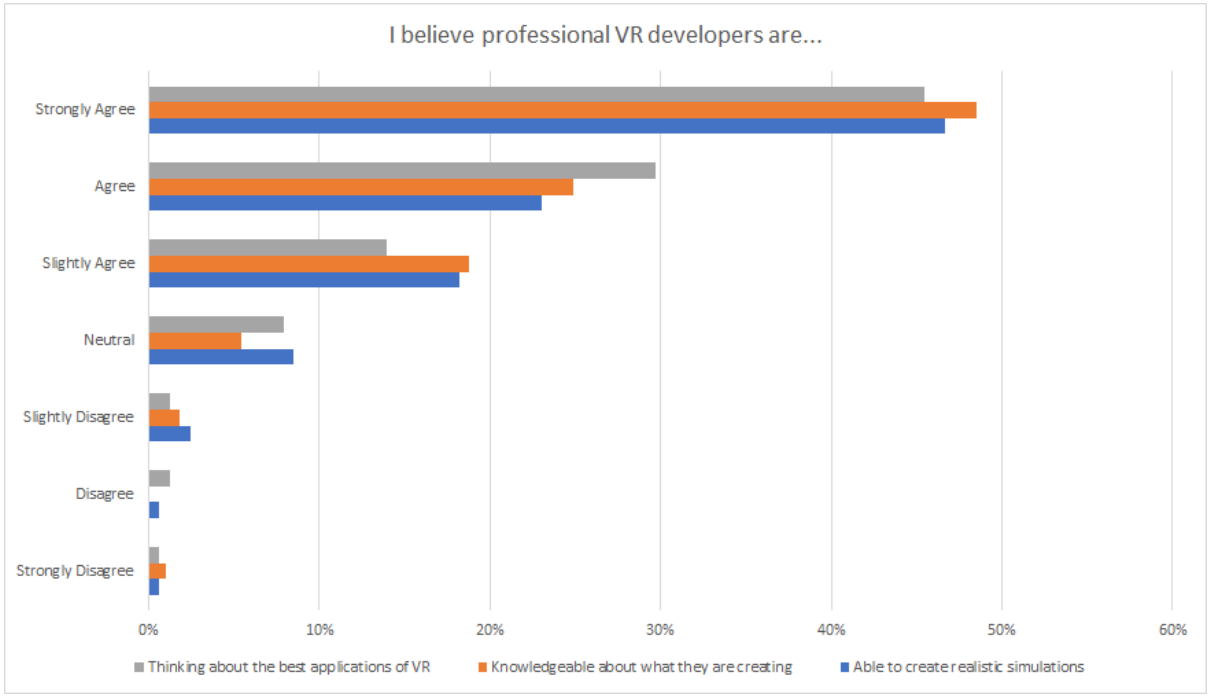
Our goals shift as we learn more

2015-2016	2016-2017
Implementation	Perspective taking
Management	What breaks immersion
What teachers hoped to do	How VR content creates value

Whatever you do...

“Please, just don’t ruin VR when you bring it into school.” – Middle school student

Students have a lot of trust in developers



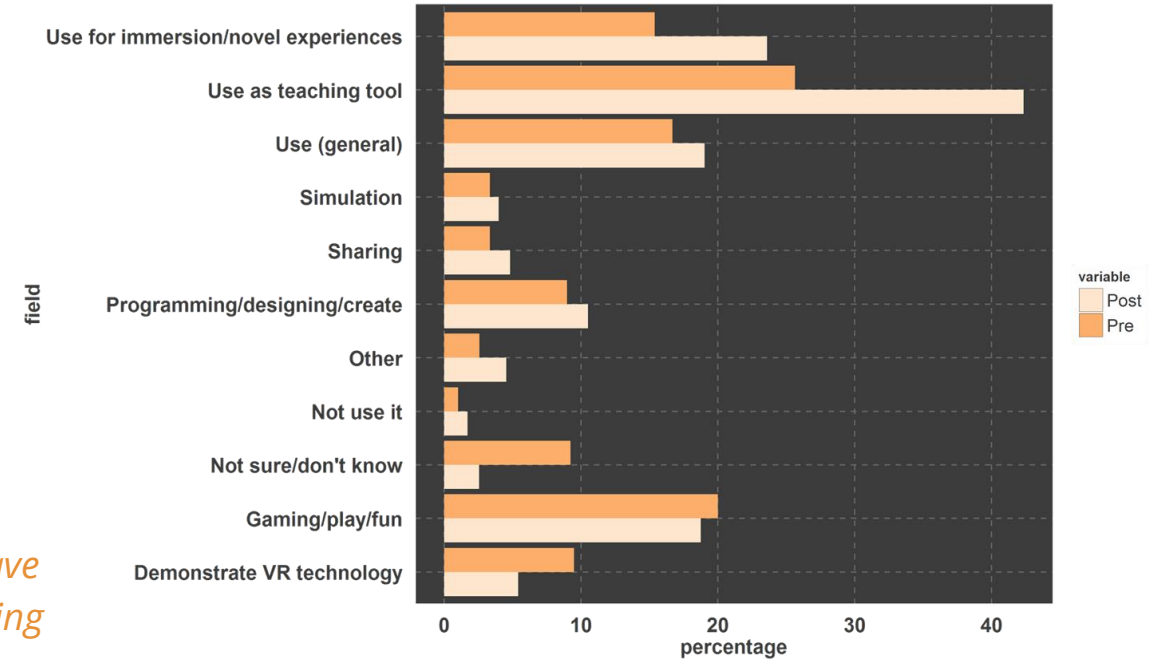
Students almost unanimously agree with all 3 statements

This trust in devs allows for meaningful engagement, but can exacerbate inaccurate content

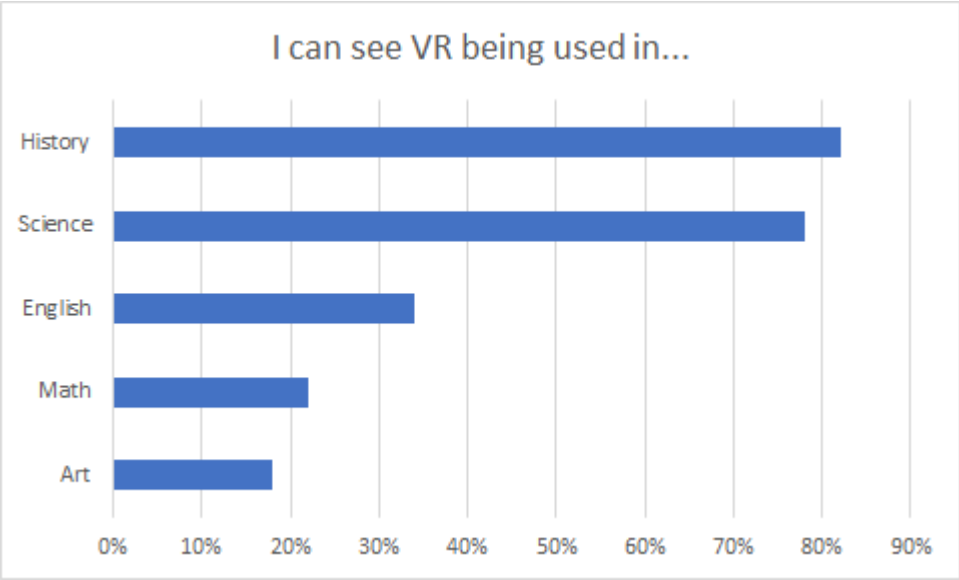
Kids' ideas for how VR could be used

After experiencing VR in the classroom, more students believed they would learn more from lessons that included this tech, and more students wanted immersive novel experiences in VR.

"I first thought that the world wasn't ready for this. But seeing what VR is doing and the impact that it could have in the education system seems amazing and I think the world is ready for it."



History was the highest rated subject for perceived usefulness of VR



"I think VR content can do this because with the addition of experiences related to history or the future, people can feel as if they are experiencing something from a different time or place, and if the content is realistic enough, they can understand what it would be like to live during that time."

"If the setting is realistic enough, the user will be taken to a different time/place"

Middle School Students

Students talked a lot about content design and engagement

I hope that it can put you in a spot that maybe would be to far, dangerous or in a different time period to go on an actual field trip but VR can not replace a real experience However using VR for these experiences would be amazing and make classes, especially history more engaging.

-- High School Student

Time and pacing

Class periods are short, and VR is a limited asset

Time is one of the key factors that breaks immersion in a classroom setting

If kids can’t get to where you need them to be, they are going to waste time on things that might not be significant

Meaningful interactions

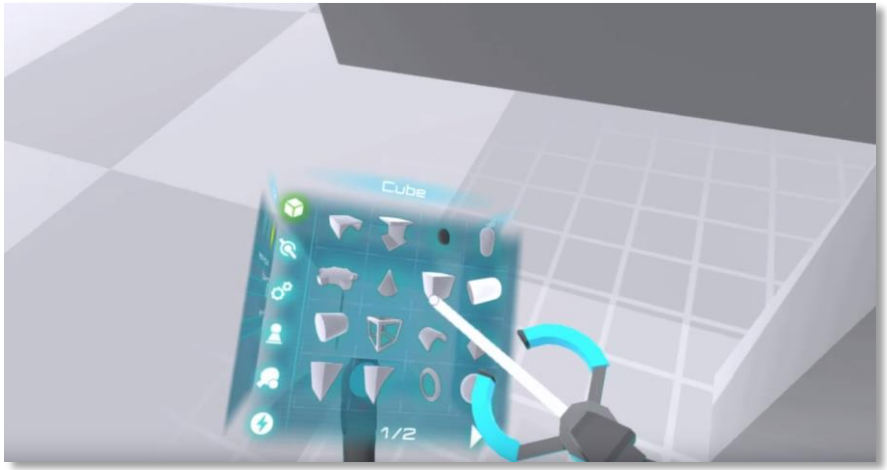
How is one spending their time in VR?

“Why pick it up if I can’t read it?”

The Price of Freedom

Intuitive Controls

Time to learn controls can be a significant barrier for content looking to enter the average classroom

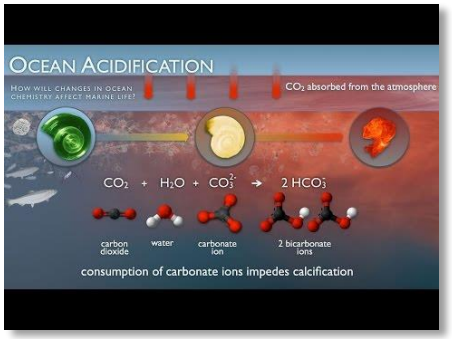


ModBox

Furthermore, going in front of their peers to “try” VR with non-intuitive controls is anxiety producing and it can be a major detterent to kids even trying VR in the first place.

Beware the moving diagram

Moving, on rails, through something that isn't any different than what you'd watch on a screen does not fully capture what VR is capable of.



A nice looking diagram

The Stanford Ocean Acidification Experience goes beyond a diagram and really uses virtual interaction well

Cognitive Load

Limited amount of working memory is constrained by sensory info

Processing things simultaneously can limit our ability to engage

VR can remove some unnecessary mental processing

Intrinsic vs. Extraneous

Cognitive Load

Key things to consider with design:

- The amount of control the user has over pacing
- Expertise reversal effect
    - Advanced learners cannot ignore redundant information
    - They will try to connect it to what they already know
    - This exerts irrelevant load and can actually cause them to make more errors
- When animations move too quickly, a learner cannot transfer info into long-term memory before the next piece of info comes in

Height and other kid related problems

“I cannot reach the pot!”

Job Simulator

The power of wonder

No need to over-answer or over-explain

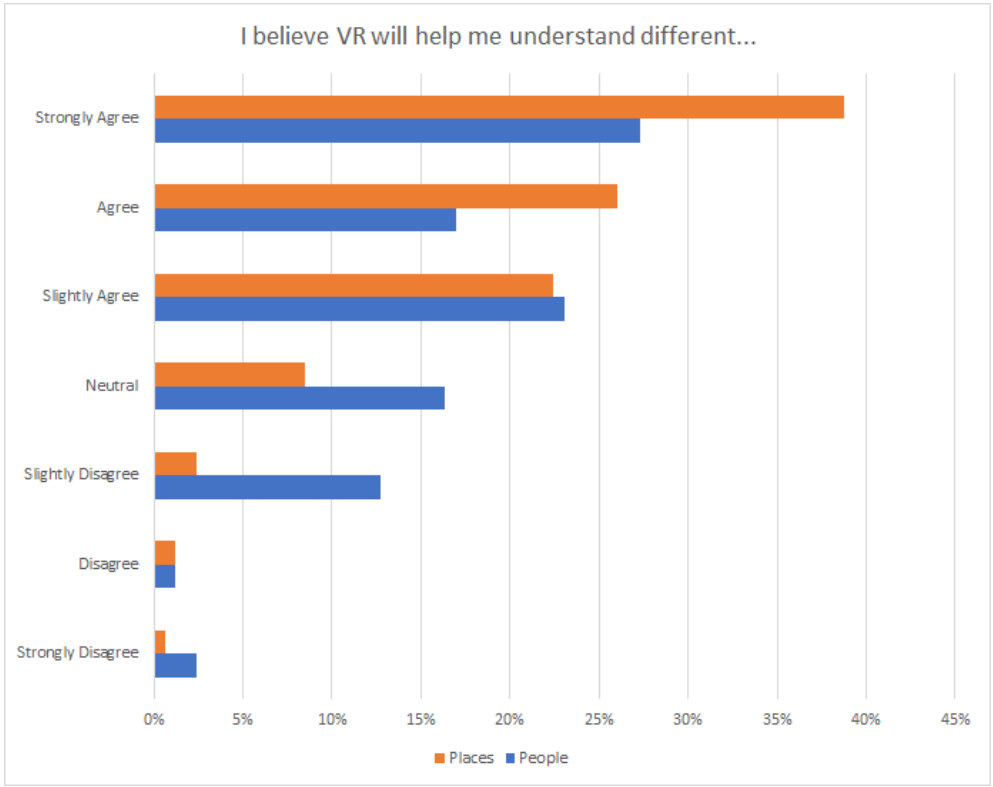
Universe Sandbox

Opportunities for more than one kid at a time

What if everyone doesn't have to have a headset?

Keep Talking and Nobody Explodes

Different places are easier to understand than different people



- Students almost unanimously agree with all 3 statements
- In total, 86% agreed VR can help understand different places vs. 67% for people
- Concept of understanding empathy is more difficult than something static like a place or event
- However, empathy development is very important to teachers:

"I really want them to know what it is like to be in someone else's shoes, to really help them experience a real-life situation"

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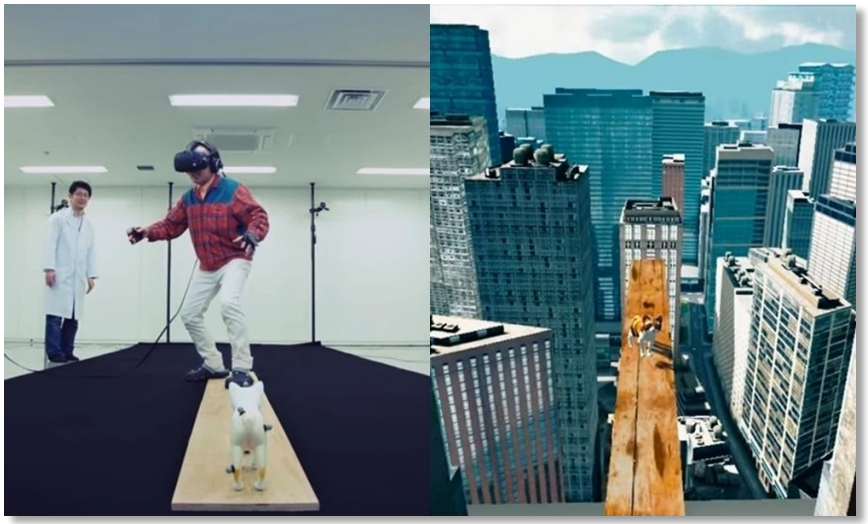
Physiological impact



Project I Can

Public Speaking Simulator

Psychological impact of VR content

A Chair in a Room

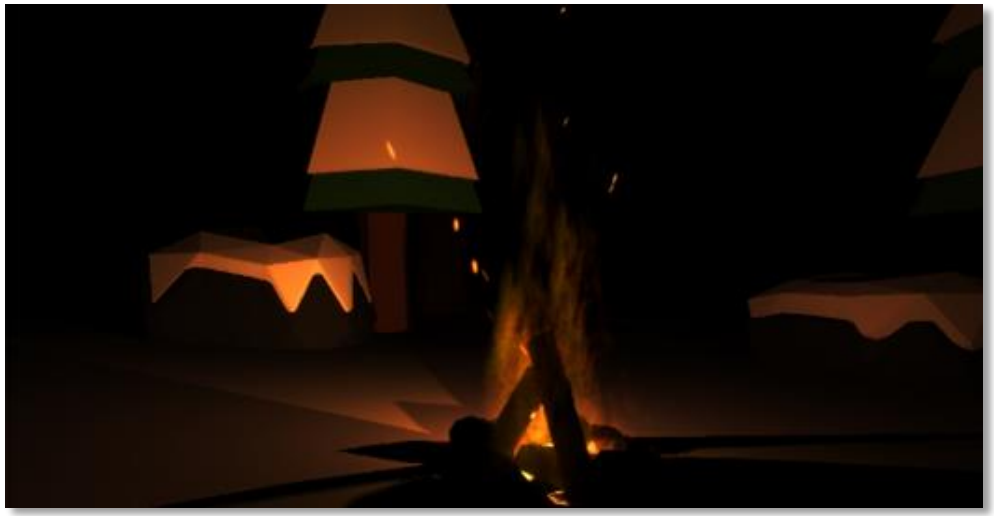
Omission of sensory stimulation

Can be extremely powerful...perhaps even more so than the addition of a lot of stimuli

Project Syria

The incredible impact of audio

For immersive purposes and cueing



What breaks immersion in school settings?

Time

Cord

Sounds

Boundaries

Touch

Glitches

Content people in our study really seem to like

Tilt Brush

Hands down, one of the most popular, even among people who are not in “art”

Tilt Brush

People enjoy having an experience that is just NOT possible in real life; there is quite literally nothing like creating in Tilt Brush in the real world, and that resonates with folks.

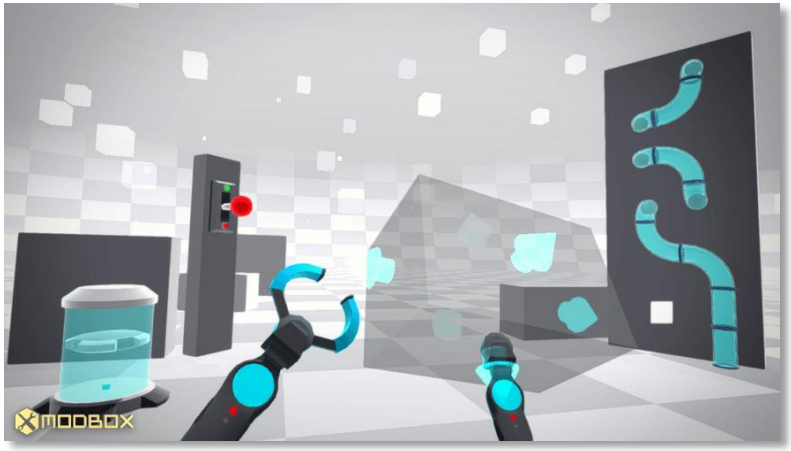
Tilt Brush...again

Another fascinating aspect of this experience is that it resonates with kids for whom many things don’t resonate

ModBox

The allure of creating and prototyping a game in VR

Does not require the same knowledge of programming skill to make something work



The Blu

Why people seem to love it…

- It is something people know enough about to make it seem real...but most people can’t see this in real life
- The sense of size and scale
- Minimal interactivity

Job Simulator

A big hit with kids, especially!

- Kids as young as 6 would come up and request it, cause they already knew about it
- Kids really like pretending to be in different workplaces that they can play around in (think Children's Museum)

Ideas in VR that are of interest to students

Other in-VR creation tools

- Even non-computer science students want to create and individualize

Social VR

- Wanting to interact with peers in interesting ways

Really thinking through movement and getting rid of silly 2D things

- “Why have a 2D menu in a 3D space?”

Things that are inherently dangerous

- Volcanoes, volcanoes, volcanoes

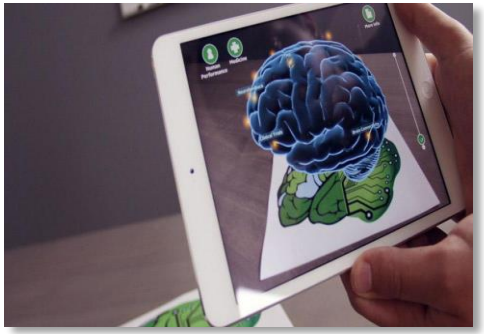
Going places

- Consider where kids come from, low income or rural students don’t often get field trips

AR, marketed vs. real

Are teachers interested in it?

- There seems to be some buzz with Teachers and AR.
- Engaging use of 3d diagrams.
- Interaction with characters



Ethics

This is something we need to consider in VR!

Our current/future work in VR

Bowling Green

UBC...building a VR experience based on our data

Another applied study increasing demographic reach

Experimental study on learning

A couple final thoughts

I learned that VR was more than just a headset that you could move your head around in. It was a portal that could teleport you to anywhere you wanted. I had a hard time differentiating from my VR game to real life the first time I experienced virtual reality. Middle School

I used to think it was just video games and things like that. But virtual reality can help express your creativity and help students learn how to react and communicate in situations. High School

I realized that VR could impact learning more than we think. It gives us a real perspective of what actually happens instead of imagining it through a book or a textbook. My understanding has changed because I realize that VR could potentially impact the world greatly. Middle School

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