

VRDC

What Really Happens When You Put Virtual Reality in Schools

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What is foundry10?

Educational research organization

Focused on non-traditional learning

Projects with preschool through college-aged

Our work in VR

Focusing on applied settings

Putting VR in the hands of more teachers and students

Supporting educators to explore untapped ideas and uses



Coming up...

Exploring learning and cognitive development in VR from 30 schools

Use cases and requests from actual kids and teachers

Psychological/ethical considerations for use with students



Demand is high for VR content in education



Educational communities are excited about VR and we need more stuff.....

Round 1: Pilot Study with DK 2's

Local teacher, computer science

Ended up with five DK 2's

Students as content creators



Round 2: Seven school study

Middle & High School

Focus on:

- Implementation

- Challenges

- Classroom

- Management



Round 3: A much larger group

Current study has 19 schools and we work with about 7 additional partner schools

Focus on:

- Presence and Immersion

- Perspective taking

- Perceived value of content

What we are gathering

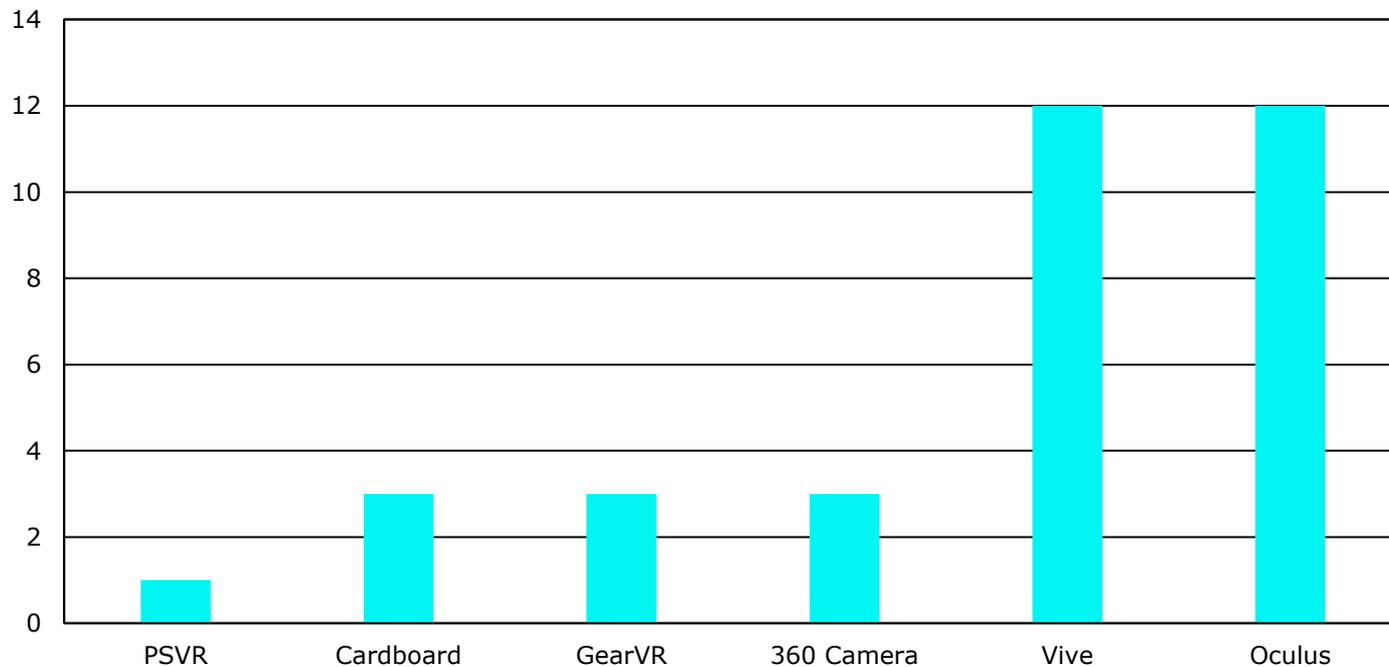
Educator interviews, student surveys

Partner VR schools, not in the formal study

External university education partners

Sponsoring other VR events for college

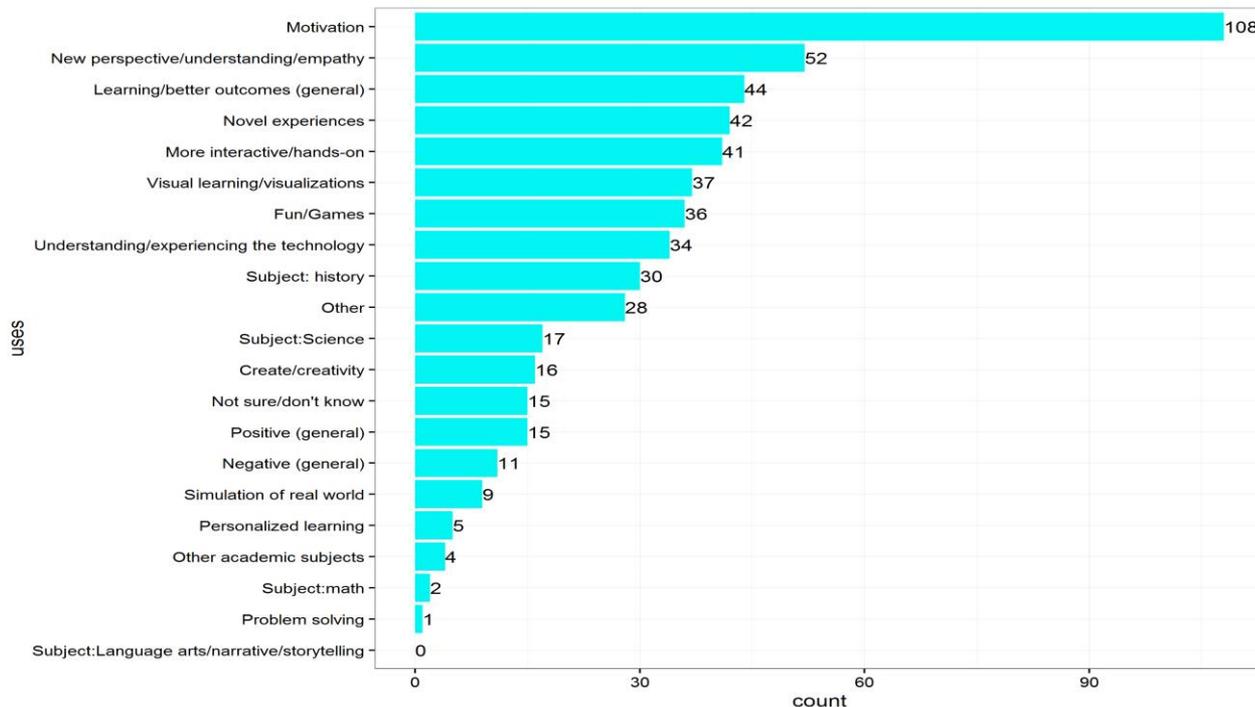
Gear breakdown (19 schools)



A person with long dark hair is wearing a black VR headset and a dark grey t-shirt. They are holding a black VR controller in their right hand. In the background, a large monitor displays a VR application interface with a dark background and colorful, glowing particles. The interface includes a top menu bar with options like 'HOME', 'ABOUT', 'CONTACT', and 'HELPING'. A central window shows a 3D scene with glowing particles. On the right side of the screen, there is a list of items: 'ITEM 1', 'ITEM 2', 'ITEM 3', 'ITEM 4', 'ITEM 5', 'ITEM 6', 'ITEM 7', 'ITEM 8', 'ITEM 9', 'ITEM 10', 'ITEM 11', 'ITEM 12', 'ITEM 13', 'ITEM 14', 'ITEM 15', 'ITEM 16', 'ITEM 17', 'ITEM 18', 'ITEM 19', 'ITEM 20'. The person is looking towards the screen.

Kids

The potential kids see (usage)

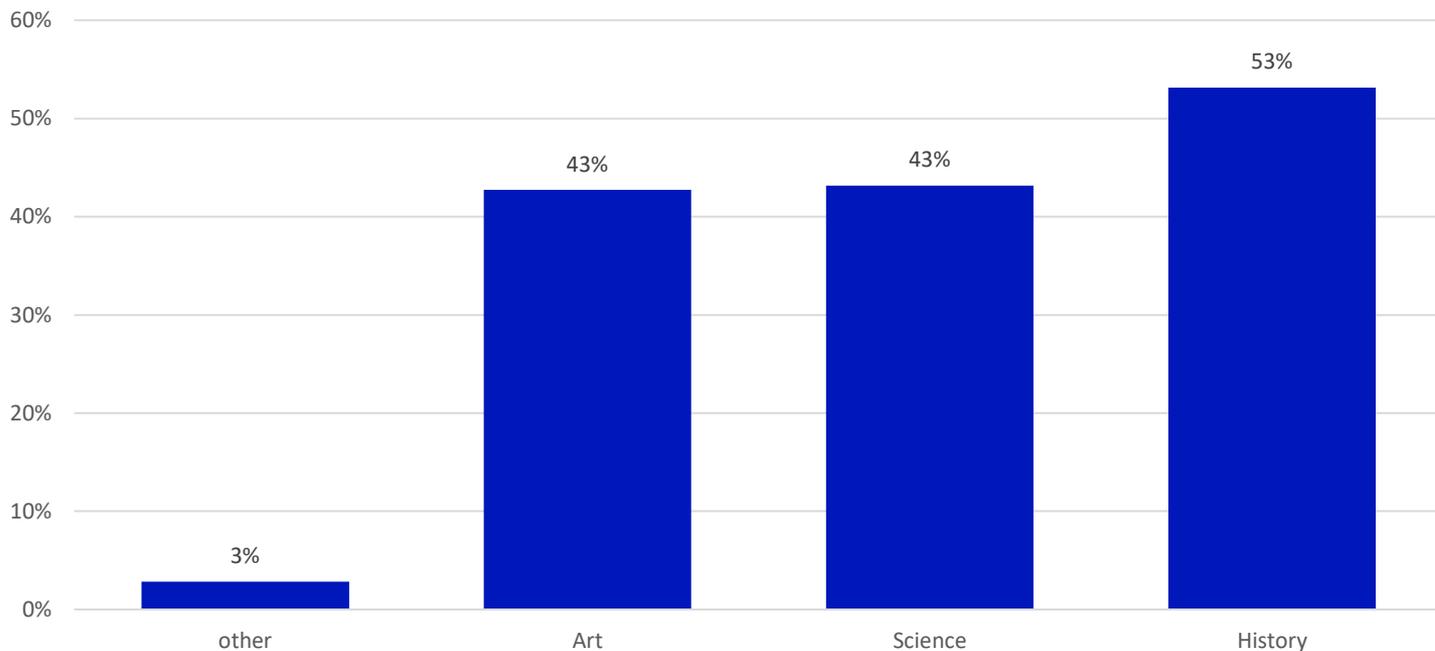


The potential kids see

"I think students would remember things better if they actually got to experience them for themselves."

"I would like to experience life in a different world. Not only use VR as a project for learning but also a change to get away from life if even for a moment and experience a new reality."

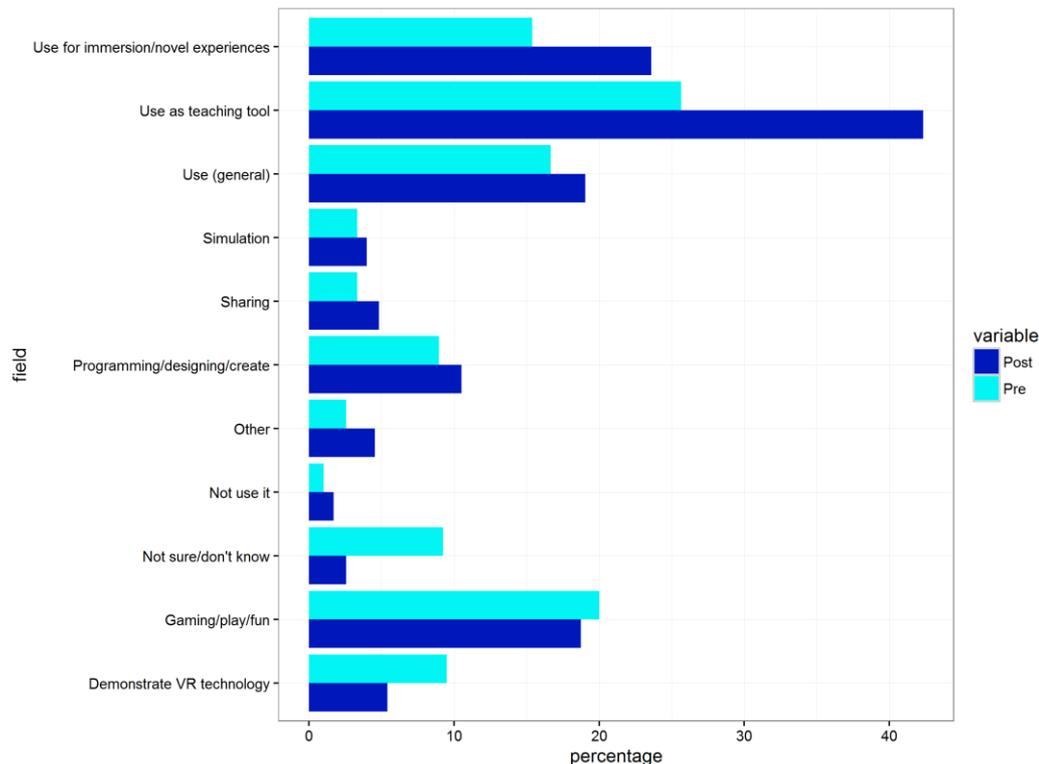
The potential kids see (subject)



Shift over time

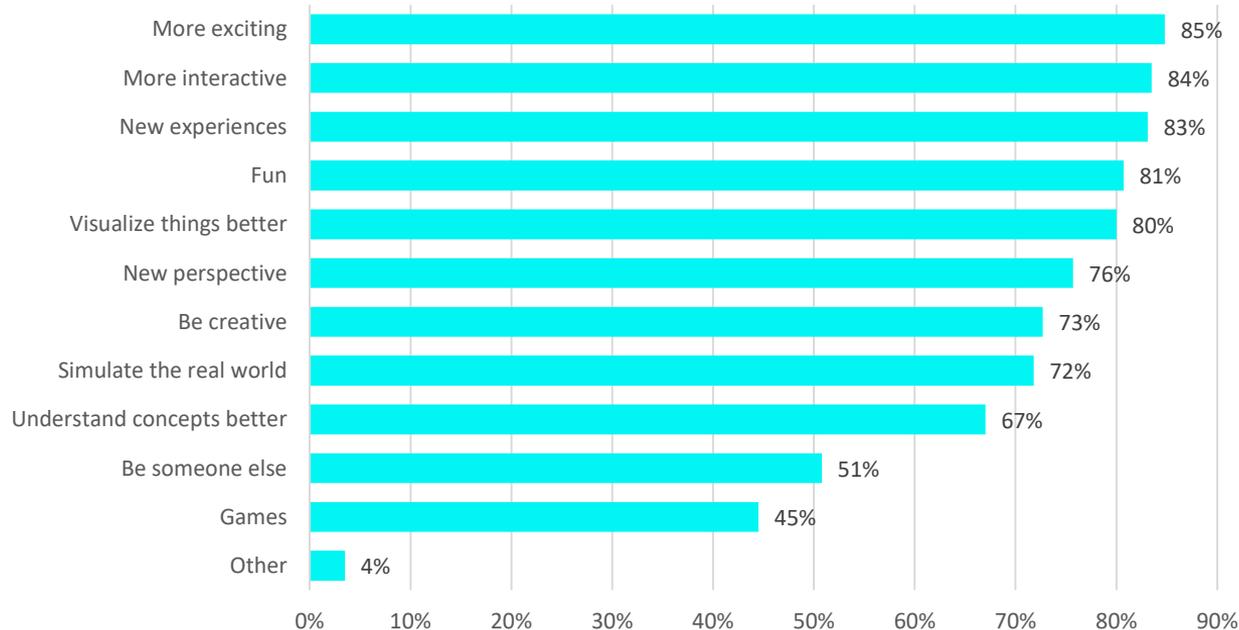
Sharpest increase in seeing it used as a teaching tool

Slight drop in using it for gaming



Importance of interactivity

Students were asked "why might VR be valuable for learning?"



Kids don't want us to screw this up

They literally said, "Don't screw this up."

They don't want digital textbooks

They don't want moving diagrams

They don't want VR lectures

Not for everyone...

"I think that it is a cool experience but it should not be incorporated with everyday lessons. Students need to learn social skills and communication that is not based on technology"

**The less
I care,
the happier
I am.**

Misconceptions we hear about VR

Isolation

Too hard to manage

Games platform

Kids will just goof off



It turns out...

Students share experiences

Scaffolding helps manage

Huge Breadth of content

VR is more compelling



*"I was literally floored"
– high school student*

Kids want developers to know...



They want to
personalize and
impact the
experience
around them

Kids want developers to know



They will suspend disbelief...if it makes sense

Kids want developers to know

They learn about new content through their favorite YouTube personalities

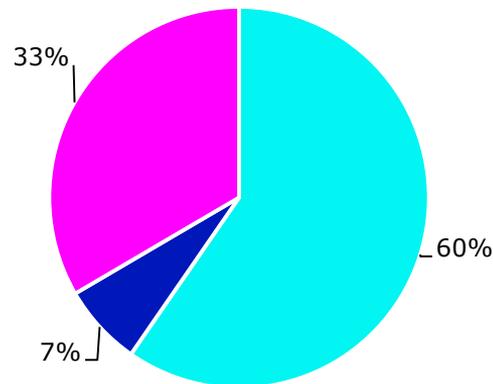


Kids want developers to know

They aren't just thinking about playing games.

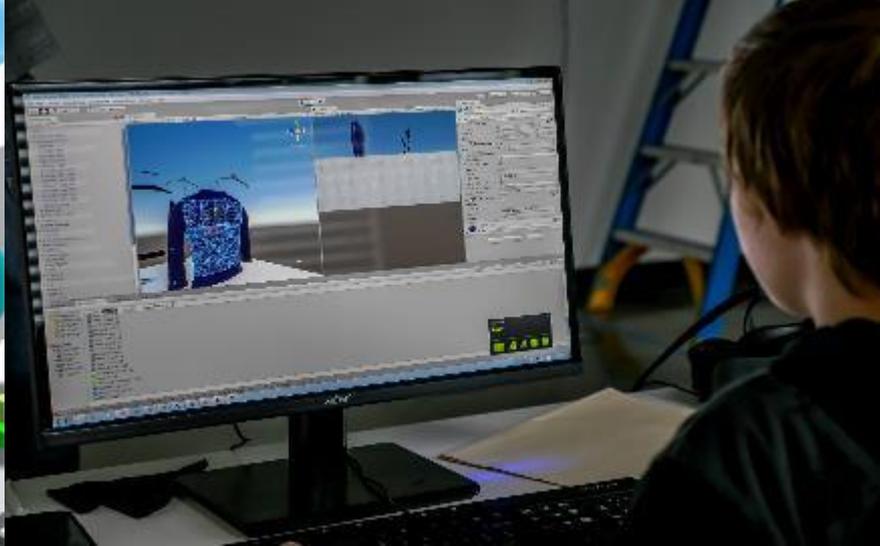
They are thinking about what it means to make them.

Interest in content creation vs. consumption



■ Both ■ Content creation ■ Content consumption

They are making content too

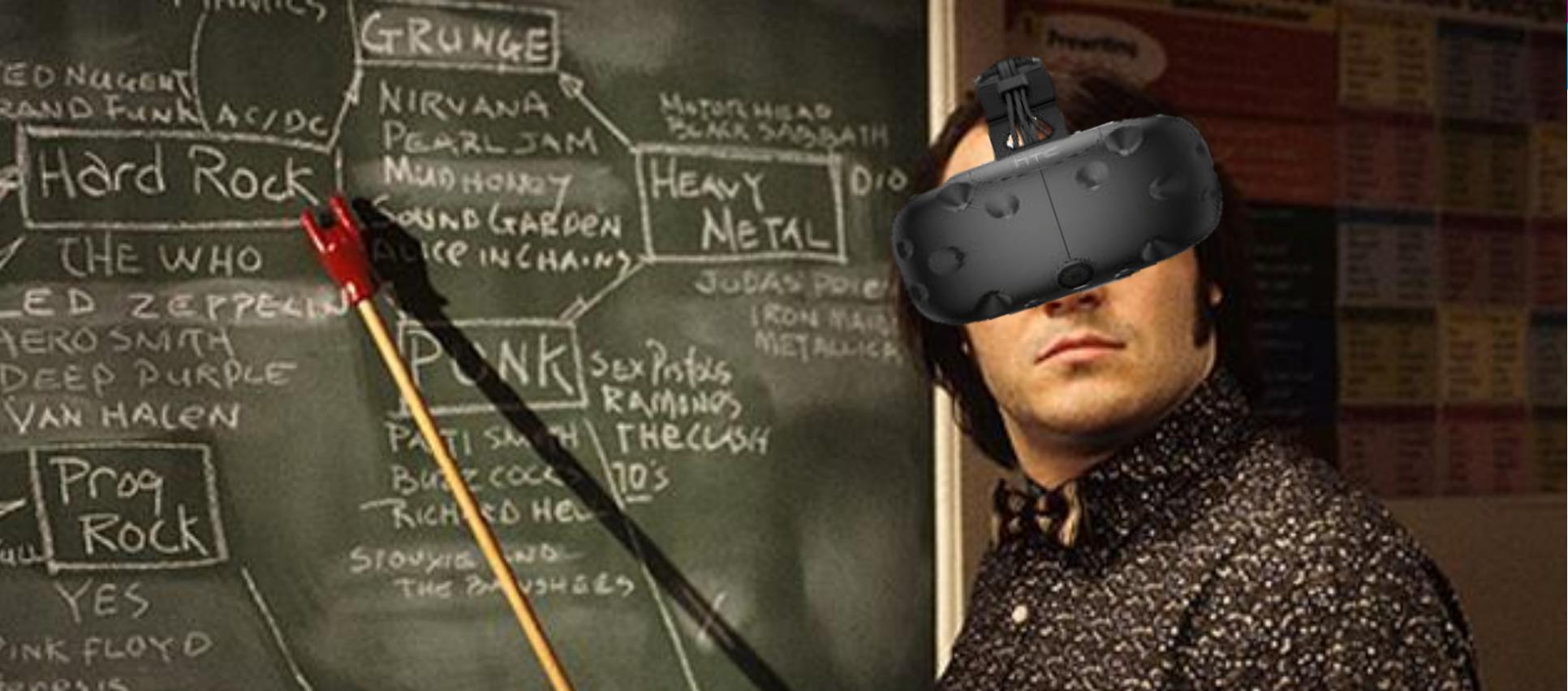




Teachers

They are just as excited as kids





They just think about different things

Getting educator buy-in

Often times you need a teacher to champion VR in a school or district

Or, buy-in has to already exist



Teachers want developers to know

VR presents ways to explore an abstract concept of reality

"We are using an almost sci-fi technology... I want them to break that [reality] and manipulate it in a way that creates another type of experience." – Middle-school art teacher

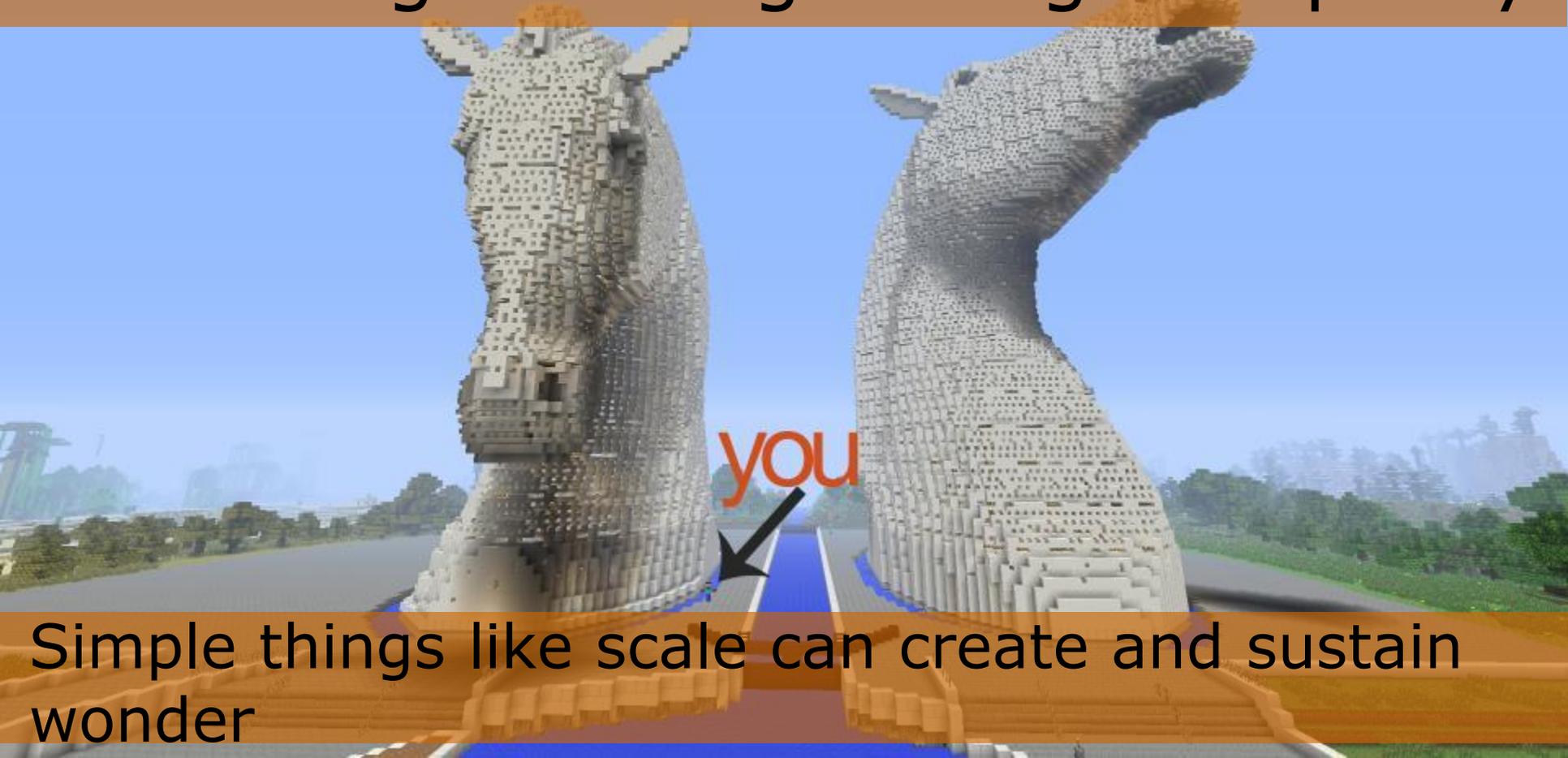
Using VR as an equalizer

Providing students access to things they wouldn't normally

"We are a rural, high poverty area, to go to Walmart is a big deal to them. An experience as mind-blowing as VR is so far off."

Can VR level the playing field for student experiences?

Enhancing meaning through simplicity



Simple things like scale can create and sustain wonder



Teachers want developers to know

Being a part of the story brings huge meaning to students

Teachers want developers to know

You do not have to spell everything out

Part of learning is grappling with the truth and trying to address misconceptions



Teachers want developers to know

This can be a medium that draws in kids that are not engaged with traditional learning

"I am an extremely visual learner, so my hope is that virtual reality will help me visualize whatever it is I need to learn about"

It's important to engage the non-immersed



KTSNE

Advanced headsets
offer advanced
engagement

Sociable experiences

Management

Multiple students
engaged

One student immersed

Different hardware,
different solutions



Teachers want developers to know

A man wearing a VR headset is shown in profile, looking down at a glowing virtual object he is holding. The background is dark with some blurred, colorful shapes, suggesting a virtual environment. The text is overlaid on the image in two orange banners.

VR can be used to explore new creative methods and outlets



foundry10

What
do you
want to
LEARN?

Psychology, learning and technology

From a cognitive standpoint

Key pillars of learning

Active

Engaged

Meaningful

Socially interactive



Cognitive load

The amount of information working memory is able to hold at one time (Sweller, 1988)

To “learn” information, we need to transfer new knowledge into our long-term memory

Different types of load...some of which are distracting and take away from learning

Cognitive overload

A great paper on this is:

Design of Interactive and
Dynamic Anatomical
Visualizations : The
Implication of Cognitive Load
Theory



How VR can help

Part of what is intriguing in VR is that it might lessen cognitive load

But we need to be thoughtful about the design

Student feedback here is really, really helpful

(Regian et al, 1992; Pantelidis, 2010; Winn, 1993; Psootka, 1995)

Engagement is not just a buzzword

Whitehall et al, 2014, *The Faces of Engagement*

Using facial recognition, they detected how student "engagement" during a class

Engagement found was a good predictor of student performance



Virtual people and student rapport

Research challenges the idea that education has to be serious, formal

In fact, children better connected with virtual people that spoke more informally and would joke with them and retained more info.



Virtual people and student rapport

The social element of connectivity, even with a virtual agent is a key component for learning

(Ogan et al., 2011; Ogan et al., 2012; Sinha & Cassell, 2015; Finkelstein, et al, 2013)

How might we consider these elements in VR?

Immersion and Presence

“Technological immersion has a medium sized effect on presence.” (Cummings & Bailenson, 2015)

Immersion – the technological quality of experience

Presence – the psychological experience of being there

But how present are we in reality?

Interesting study: “Using Presence Questionnaires in Reality”
(Usoh, et al. 2000)

Considering the idea that “being there” is the ability to act there.



What did they find?

Questionnaires designed to measure presence should undergo tests with actual reality

However, there are some useful takeaways when thinking about design

- Again, that social impact of others in the virtual space

- Normal things we may ignore: background noise

- The interactive element...my actions make a difference

Virtual places vs. virtual people



Researchers want developers to know

Talk and playtest with people who understand learning

New media can be ineffective if designed without learning expertise



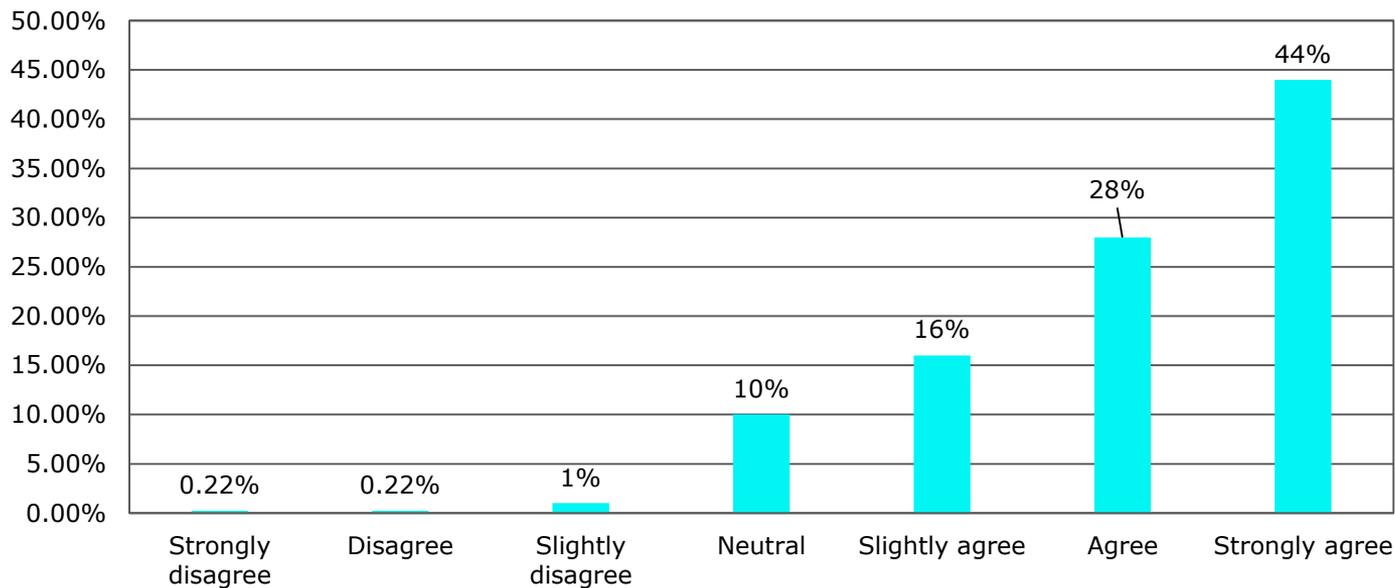
Accuracy

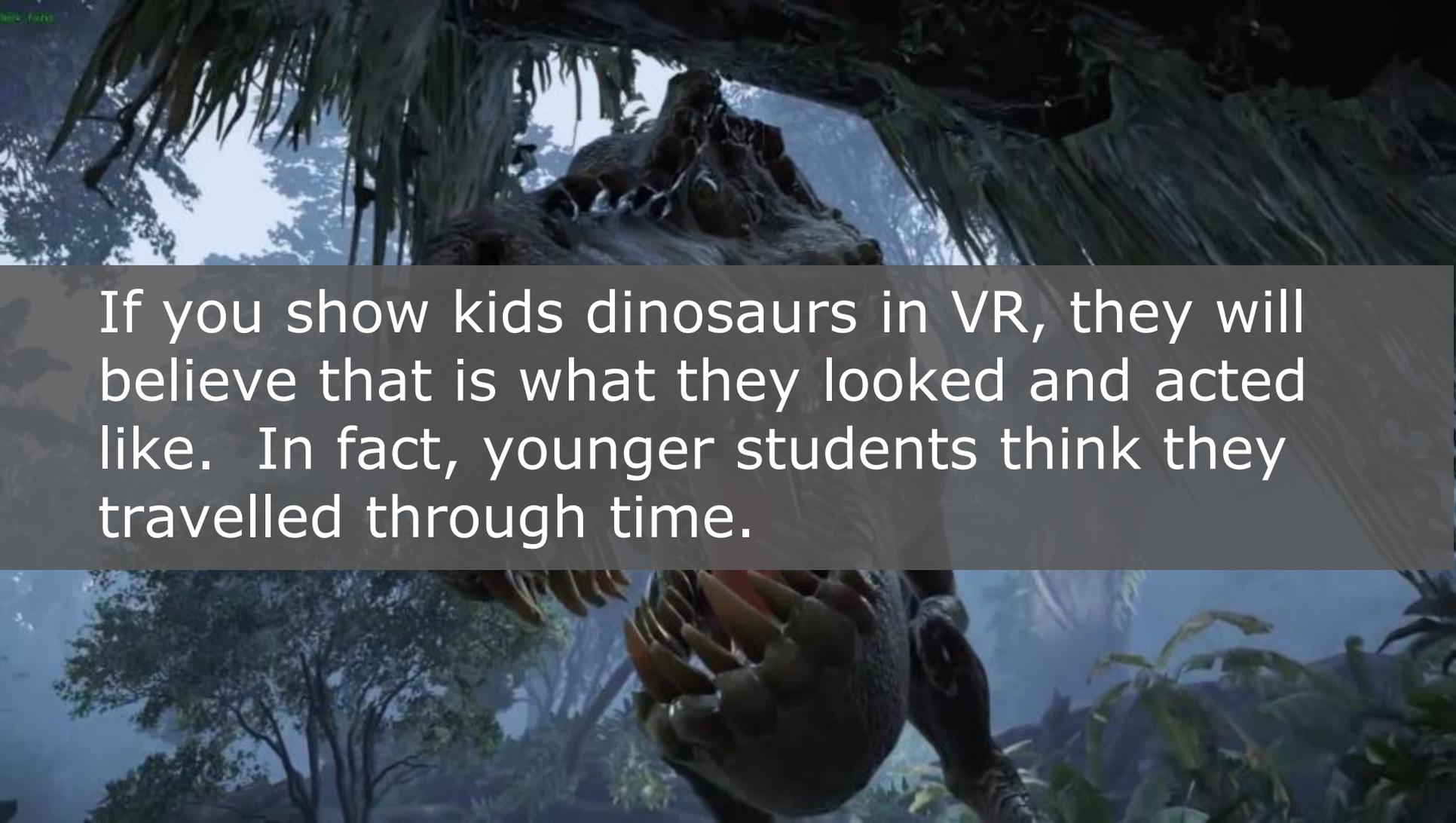


You might not know this, but...

Teachers, students, parents,
administrators, etc... all think you really
know what you are talking about

Developers are knowledgeable about the subject they are creating for...





If you show kids dinosaurs in VR, they will believe that is what they looked and acted like. In fact, younger students think they travelled through time.

An aerial, high-angle photograph of a dense urban skyline, likely New York City, featuring numerous skyscrapers and a grid of streets. A digital clock overlay in the top right corner shows the time 08:48. The image is partially obscured by a magenta banner at the bottom.

08:48

Conceiving different perspectives

Differing viewpoints on what constitutes accuracy

"You want students to wrestle with content. Present as much truth as possible, but at the same time you want them to put the truth together." – High school teacher

Technical vs. historical accuracy

Tech teachers
evaluating experiences
with students

Humanities teachers
looking to offer new
perspectives



Ethics and classroom VR use

Ethically using VR to help students

Safe spaces, mindfulness and suicide prevention



Putting VR in real classrooms

How are teachers funding VR?

School grants

School foundation grants

Go Fund Me

Donors Choose

Utilizing other courses: Computer building

Subject areas... revisited

Social studies, social studies, social studies

Science

Foreign language

English and the narrative story

Math is in demand, but we have yet to see it done

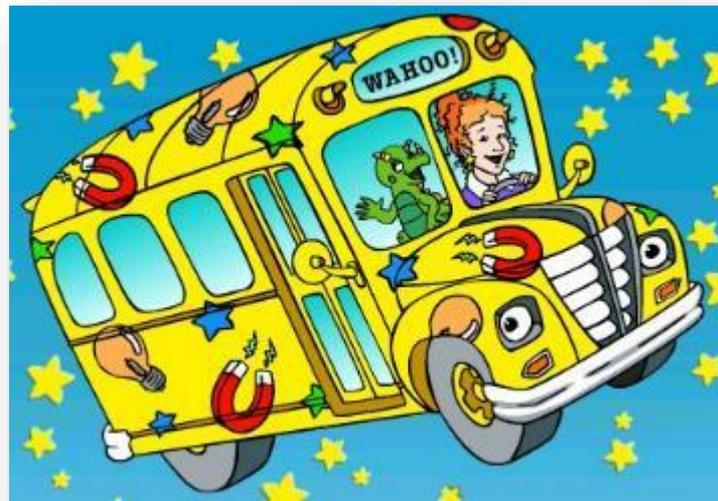
Giant

Concluding thoughts

Low hanging fruit

Getting past the Magic Schoolbus

Kids want to be more than just observers



Snapping back to (real) reality



What breaks the sense of presence in schools settings

Audio can provide a barrier to breakage

Playtest, playtest, playtest

Playtest data and feedback from real students is a rarity

Go out and get it



Our website

Foundry10.org/subject-areas/virtual-reality



Contact info!



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