

Introduction to AR & VR in Education

Richard Byrne

Augmented Reality vs. Virtual Reality

- Displays digital content in a physical world.
- Augmented reality content is typically displayed on your mobile phone
- Often relies on location to display images, text, video, and animation.
- Virtual reality content is typically displayed inside a virtual reality headset/ viewer.
- The digital content that you see is not dependent on your current physical location.

Mixed Reality

- Merges the concepts of augmented reality and virtual reality.
- Allows users to view augmented reality content independent of location.
 - Layering of virtual reality environments on to many physical world views.
- Microsoft's HoloLens and forthcoming mixed reality headsets are designed for merging of AR and VR.

The Past - Development

- Term “Augmented Reality” coined in 1990 by Tom Caudell.*
- First outdoor AR game, AR Quake, published in 2000 by Bruce Thomas.*
- Research on AR in educational settings began to emerge in substantial quantity at the beginning of 21st Century.

The Past - Development & Research

- Early AR uses were limited due to size and cost of equipment capable of displaying augmented reality.
- The fields of medicine and engineering were earliest adopters of AR at the university level.
- 2002 - Researchers noted patterns of improved collaboration through the use of AR.*
- 2005 - Researchers note longer engagements with learning experiences through AR & MR experiences.*

The Past - Development & Use

- Early commercial AR projects in education:
 - ZooBurst - Augmented reality books.
 - Aurasma - DIY augmented reality. Fixed by object recognition.
 - NASA Spacecraft 3D - Fixed by object recognition.
- Development of AR experiences largely limited to professional programmers.

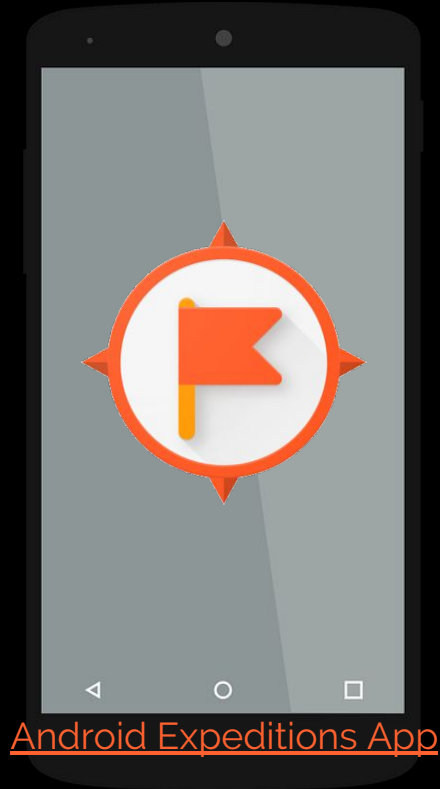
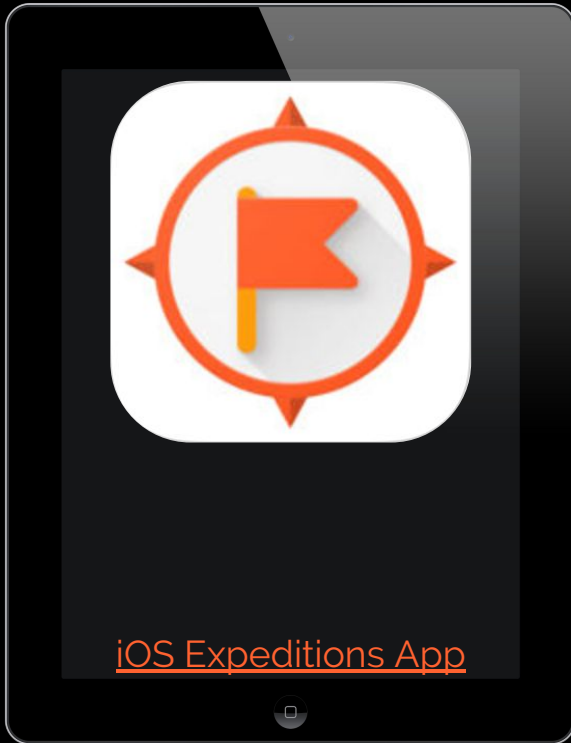
The Present - Accessibility

- Ubiquity of smartphones makes AR & VR accessible to more users.
- Expansion of 4G cell phone networks has removed many obstacles to location-based AR experiences.

The Present - Development & Use

- Metaverse Studio enables everyone to develop augmented reality experiences.
- AR experiences can be fixed to locations, to objects, or can be location/object independent.
- Programming is done through drag-and-drop block logic.

The Present Use of VR - Google Expeditions




The Present Use of VR - Google Expeditions

[Expeditions] - List of available Expeditions

File Edit View Insert Format Data Tools Add-ons Help

greg@edtechteacher.org

View only

	A	B	C	D	E	F	G	H
1	 Last updated 1/23/17							
2								
3								
5								
	NAME OF EXPEDITION			PANORAMA TITLES		LOCATION		DE
6	ENHANCED*	Borneo: The Symphony of the Rainforest	<ol style="list-style-type: none"> 1 - Recording the Rainforest Symphony 2 - Placing an Acoustic Recorder in the Rainforest 3 - Borneo's Dipterocarp Forests 4 - Removing a Tree 5 - Raising Baby Orangutans 6 - Enrichment Activities for Orangutans 7 - Orangutans Waiting for a Check-up 	Borneo	Journey to the wilds of Borneo. What sound can tell us about what animals compete for? How do they also compete for space in their ecosystem? Should be rich in biodiversity. Scientists at The Nature Conservancy are studying the rainforest's symphony of the rainforest to help keep the ecosystem healthy.			
7	ENHANCED*	Human Anatomy - Circulatory System	<ol style="list-style-type: none"> 1 - Introduction to the Circulatory system 2 - Defining the Circulatory System 3 - Structure of the heart 4 - Blood vessels 5 - Deeper look in to the heart 6 - Blood groups 7 - Pulmonary circulation 8 - Blockages formed in Coronary Arteries 	The human body	The circulatory system of the human body is one of the most important substances in the body. The center of it all is the heart.			
8	ENHANCED*	Licensed to Thrill: Aston Martin DB11	<ol style="list-style-type: none"> 1 - Design 2 - Research and Development 3 - Inside the Prototype 4 - Preparation and Development Workshop 5 - Experiment 6 - Production Line 7 - Quality Inspection 8 - Test and First Run 	United Kingdom	Legendary motor manufacturer Aston Martin's DB11 is a revolution in design and manufacturing secrets as we discover design secrets and keep secrets hidden from the public.			
9	ENHANCED*	The Space Race	<ol style="list-style-type: none"> 1 - Saturn V and the Race to the Moon 2 - Pathway to the Moon 3 - The Apollo Spacecraft 4 - Working on the Moon 5 - Launch Control 6 - Getting to the Launch Pad 7 - The Rocket Garden 	Florida, USA				

Contribute to a list of VR apps suitable for school.

goo.gl/eHUxwO



Creating VR Images



Google Street
View



Google
Cardboard
Camera

Build VR Tours on Vizion.io



[Editor](#)

[Jobs](#)

[About Us](#)

[Media](#)

[Blog](#)

Build the Immersive Web with Vizion

Create 360 tours, stories, sites and WebVR experiences
as easy as drag and drop.

[Open the editor](#)

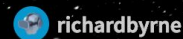


Click and drag to look around you

Patches.Vizor.io - Create Your Own VR Animations

Patches

Tutorials



Create WebVR experiences without writing code

EDIT THIS PROJECT

NEW BLANK PROJECT

The Future - Development & Use

- Students empowered to design AR & VR experiences.
- AR & VR programming as game design and logic lessons.
- AR & VR incorporated as key component in curricula.

Additional Reading/ sources

<https://www.microsoft.com/en-us/hololens>

<http://www.realitytechnologies.com/mixed-reality>

<https://uploadvr.com/microsoft-vr-ar-work-revolutionize/>

<https://www.theverge.com/2017/5/12/15625972/microsoft-build-windows-mixed-reality-hololens-vr-confusing>

<https://www.commoncraft.com/video-augmented-reality-explained-common-craft>

Additional Reading/ Sources

[Augmented Reality in Education](#)

[Collaborative Augmented Reality in Education](#)

[Mathematics and Geometry Education With Collaborative Augmented Reality](#)

[Augmented Reality: An Overview and Five Directions for AR in Education](#)