



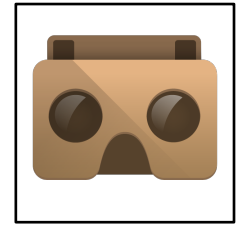
## MY HERO IMMERSIVE TECHNOLOGY GUIDE

### A Guide to Virtual Reality for Social Good in the Classroom

Welcome to the future, or the beginning of a future where many things are possible. Virtual Reality (VR) is a new tool that is being researched for use in many different disciplines. Researchers and Developers are looking into VR's use in Gaming, Psychology, Medicine, Storytelling, and Education.

My Hero strives to help Teachers, Students, and the general public use the available technology to maximize outcomes in education.

My Hero Educator Guides are designed to lead to activities that build empathy, promote activism, provide inspiration, harbor innovation, and promote new practices in education. If all expectations are realized, VR will be a strong tool in the modern classroom. This guide is a primer on VR and a go to guide for resources to get started.



### Current State of VR

Virtual Reality has been generating a lot of hype and promises. Maybe you are confused and uncertain. Don't feel alone. The VR "Industry" is just as uncertain. There is no formal "Industry" at this time as the details, usage, and standardization is being worked out. As VR was invented in the late 20<sup>th</sup> Century, the patents have mostly expired and we are in a Wild West tech run on devices and software. Consumer VR hardware and software are being produced now for launches in the near future.



The details and standardization will eventually work out. But as with Technology battles of the past (see BluRay vs HD DVD, Beta vs VHS, etc.), this will take a while to sort out. The first goal of this guide is to de-mystify what Virtual Reality is all about. After that the guide will help you implement a feasible solution in your classroom that uses positive stories and topics to promote VR for Social Good.



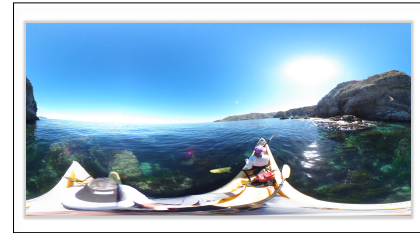
## Virtual Reality 101

Virtual Reality (VR) is a catch-all phrase that is loosely used to describe an immersive experience that surrounds the user in an interactive environment. VR allows the participant (player) to determine the view of the experience.

### Types of VR

The immersive experiences included in VR are:

- CG (Computer Generated),
- 360 degree video, and
- Augmented Reality (AR).



Single Frame 360 image

### Types of VR in More Detail.

CG VR experiences are created by use of a 3D computer application. The worlds, props, models, and assets are created using 3D computer Animation Techniques

360 Degree Experiences (360) are video playbacks of video recorded with specialized 360 Cameras. The user is lead through a linear experience much like a standard video but with interactive choice of direction of view.

Augmented Reality (AR) blends the reality space the participant is in with images created in a media creation software application. These images can be 2D or 3D images.

### Equipment Needed

VR can be viewed on a phone, a laptop, a tablet, or a specialized viewer called a Head Mounted Display (HMD).

For full immersion a HMD is employed to block out the outside world and also facilitate the projection of a Left Eye and a Right Eye Image for the 3D affect.



Samsung's Gear VR

For 360 and AR a phone, tablet, or glasses can be used. All of these devices use some sort of head tracking to determine which direction the user is facing. HMD's can use Radio Frequencies (RF) or Infrared (IR), or the gyroscope of the device. Most experiences are "Seated". This means that the tracking only follows the head. The location of the user isn't recognized. You cannot walk around in a large environment such as a cafeteria or basketball court for example. But many VR systems now employ space awareness or a "Room Scale". This allows for some movement limited to a "Play Area". This is adequate for moving in a small environment but not running down a mountain or through a supermarket. The Room Scale solution is an advanced system.



## How to view VR in classroom

The requirement for VR is the display device. The differences between devices are mainly if you use a manufactured HMD or using a personal device and adapting it to view VR. A personal device can be a phone, tablet, or personal computer.

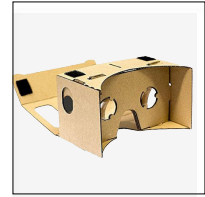
### Head Mounted Displays

There are many HMD manufacturers. Look in the resources section for a full list. But as of the timing of this guide there are only a few Consumer Choices.

These are:

Google Cardboard, Samsung Gear VR, and the Mattel Viewmaster.

Google Cardboard is the least expensive and most flexible for use. The Google Cardboard is an HMD designed for use with Cell Phones and is literally built using cardboard the Cardboard can be used with a wide variety of phone manufacturers and models.



[Google Cardboard](#)

Samsung Gear VR is a HMD that uses only Samsung Phones. This HMD was a joint project of Samsung and Oculus (owned by Facebook). It can be bought at major Electronic Stores and phone outlets and of course online. The content is downloaded from the Oculus Gear VR store.



The Mattel Viewmaster is a re issue of the famed old stereo toy. This time the Viewmaster has a high tech edge. Content is loaded from online sources.

### Self Contained HMD's

Self contained HMD's contain their own displays and are always connected to a computer via a multi-core cable. They allow for better resolution, Room Scale Tracking, and hand controllers. There are many to choose from, but none are available for the consumer market, yet, only developers. At this time there is three major devices. Those HMD's are the Oculus Rift manufactured by Facebook, The Morpheus by SONY (Play Station), and the Vive manufactured by a partnership between HTC and Valve software (Steam Games). (side note: these experiences can cause discomfort. Oculus experiences display a pop-up disclaimer at the beginning to warn of possible side effects of VR).



## How to Start Using VR in the Classroom

The easiest path to getting started with VR in the classroom is the 360 experience. 360 experiences can be viewed on phones, tablets, computers, and Google cardboard. 360 media is supported on YOUTUBE and FACEBOOK in using specific Internet Browsers. Chrome and Firefox are the only browsers supporting 360 right now. Safari and Internet Explorer are not supported. Many content creators have their own Apps to view the content as well. There are easy and fun AR experiences too. These can be entertaining and educational and great teaching aids. The minimum requirement for 360 is a computer or device connected to the Internet with Chrome or Firefox.

First off, you can browse for 360 content on YOUTUBE with your computer. You can check out the resources page for direct links to suggested content and lesson ideas. This is an easy way to engage students and allow for exploration.



The Google cardboard is a great Do It Yourself (DIY) HMD. Cardboard kits can be purchased from Google or 3<sup>rd</sup> party manufacturers at a very small price. Students can have fun folding and bending the simple cardboard boxes into shape. The cardboard increases immersive-ness by blocking out the environment and allows for a button or trigger to initiate starting of the experience or selecting options. The Cardboard supports Android and Apple iOS phones.

If you or the students have a Samsung Phone, and a budget, you can implement the Samsung Gear VR. As of now the GearVR HMD is included in the purchase of a new S7 phone. This is strictly the Android environment and will not work with an iPhone.

With a bigger budget and a powerful computer you can obtain a Self Contained HMD. Soon you can purchase an Oculus Rift, HTC VIVE, or SONY Morpheus. With the release of new hardware, there should be inexpensive used HMD's on the market. These will be heavily biased towards gaming and all the educational considerations that come with using games in the classroom.



### Suggestions on Implementation

Almost all VR is a single user experience. Only one user or player can be in the experience and control the interactivity. But there are ways to include more students.

Use a HMD that can stream the view to an external device.

Samsung phones can stream to Chromecast and Apple phones can stream to Apple TV. Students not in the HMD can watch the user's view on a monitor as the player guides the interactions.

Obtain multiple Google Cardboards

Students can share a common experience after building their own HMD's. This helps with sanitation concerns and they have fun putting them together.

Obtain multiplayer experiences

Some content allows for multiple users (players) to be in and interact together in an Environment

### The power of VR in Education

The research is in it's early stages but evidence is strong in the power and affective qualities of VR. The attractiveness now is in the newness of the technology. Students are drawn to VR by the hype and the interactive nature.

VR will bring the 2D images of encyclopedias and internet sites into an environment of experiencing. The difference in reading about the Great Wall of China verses walking and looking around the view from the wall cannot be measured. Any place can now be demonstrated in a unique presentation that educates and entertains.

The advancements in technology has made experiencing VR affordable. From Google Cardboard, to Mattel Viewmaster, to the high end Head Mounted Displays. Using VR in the classroom is now an achievable solution. Even for Schools that are budget conscious, VR is obtainable and content is accessible for next to nothing.

Enjoy your classroom experience and be sure to logon to the My Hero Site for more information on content resources and lesson plans on how to create your own Virtual Reality Experiences.