



BUiLD
Virtual Reality
Introduction Workshop

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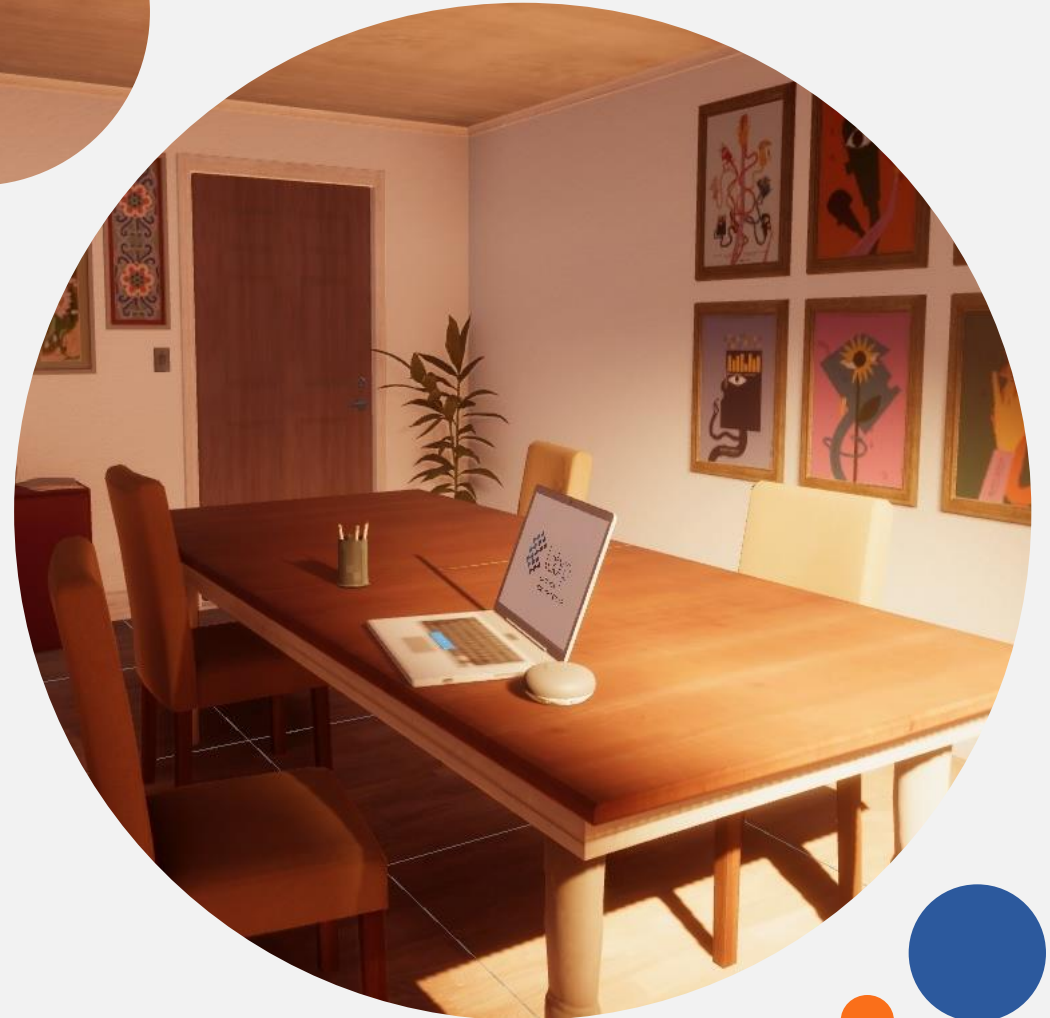
- **VR Environment Designer**

Working on VR + Biofeedback for Social Anxiety



Content

1. VR Evolution
2. The Hardware
3. Oculus Quest 2
4. VR Experience Design
5. Game Design Document
6. Q&A





VR Evolution

1

A little bit of history

Although Virtual Reality seems to be a recent technology in fact it's been in constant evolution for the past **60 years**.

Sensorama a multisensory experience created by **Morton Heilig** in **1962** is considered to be one of the earliest virtual reality systems, in it you could experience a motorcycle ride through New York.

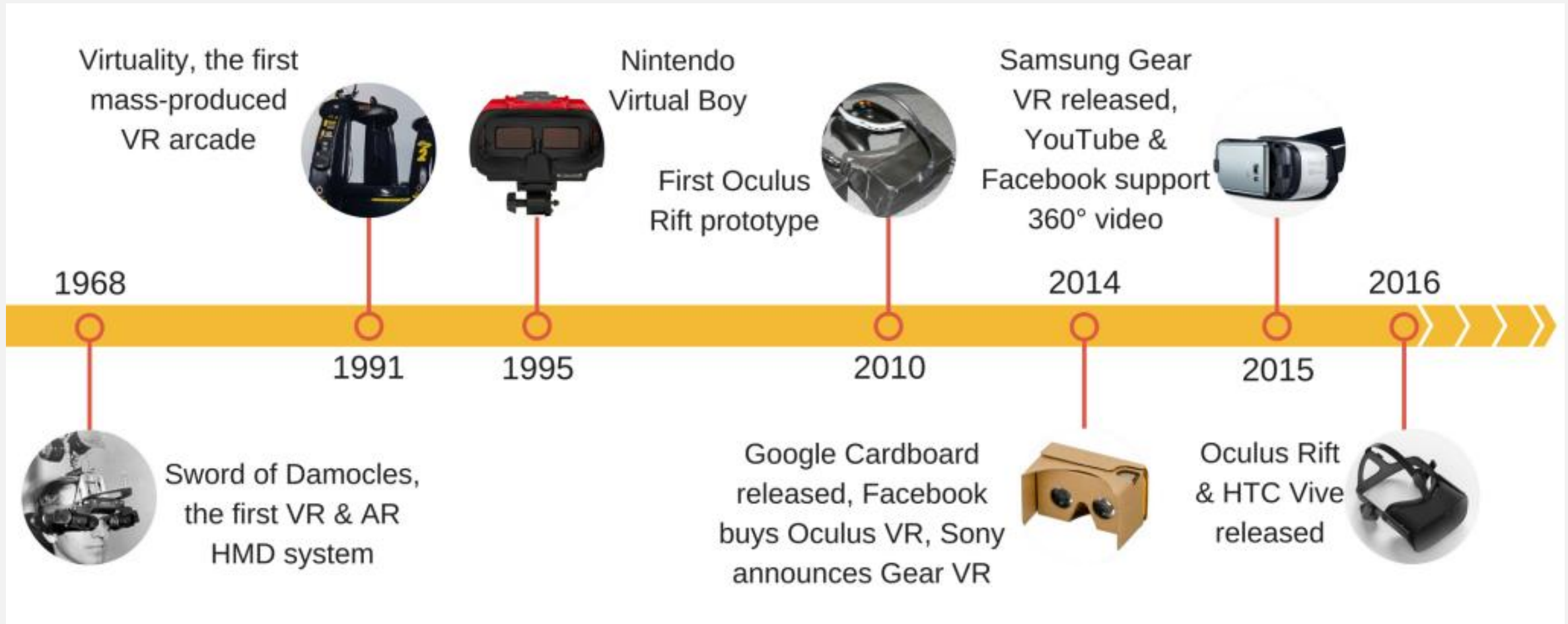
In **1968** **Ivan Sutherland** created **The Sword of Damocles** the first head mounted display.

The following decades saw advances in the form of military simulators mainly for air force training and research.

In the **90s** we saw the first attempts of commercial use of VR, although at that time technology was still too **“primitive”**, **bulky** and **expensive** to catch on.



A little bit of history



A little bit of history

The turning point was the arrival of the smartphone and with it quality LCD screen of small size, a new range of mobile sensors and processors.

The advancements enabled new companies like Oculus to develop their first prototype in 2010.

Since then, VR saw a huge growth, almost every year new hardware is released with improved graphics and tracking.

Thousand of VR games and experiences are available through app stores worldwide.

Today VR is used in almost every field imaginable, from

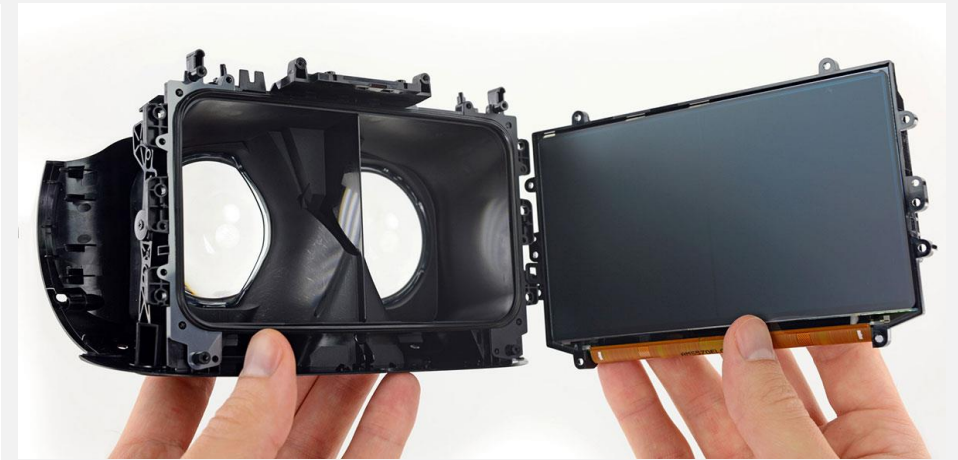
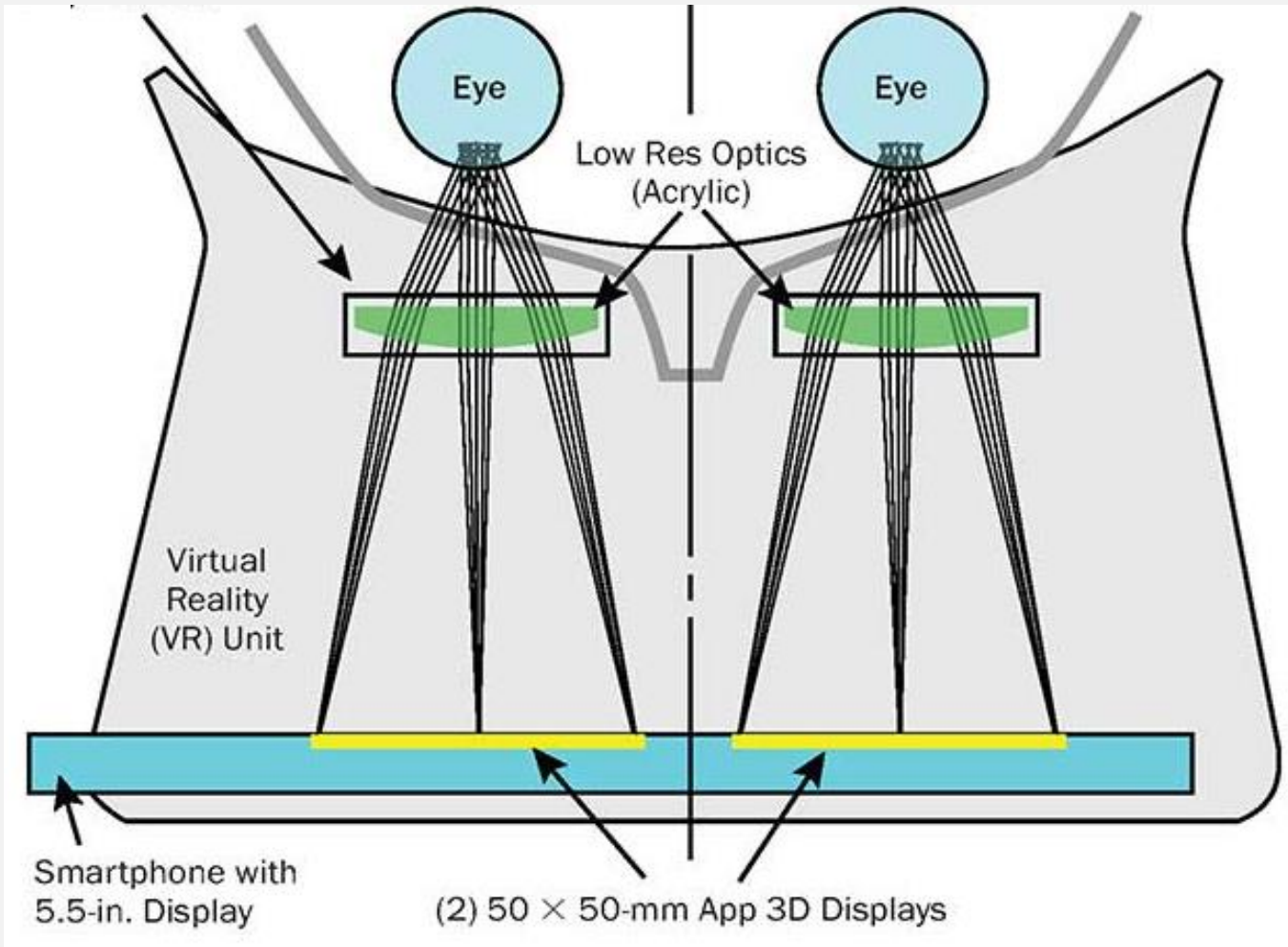




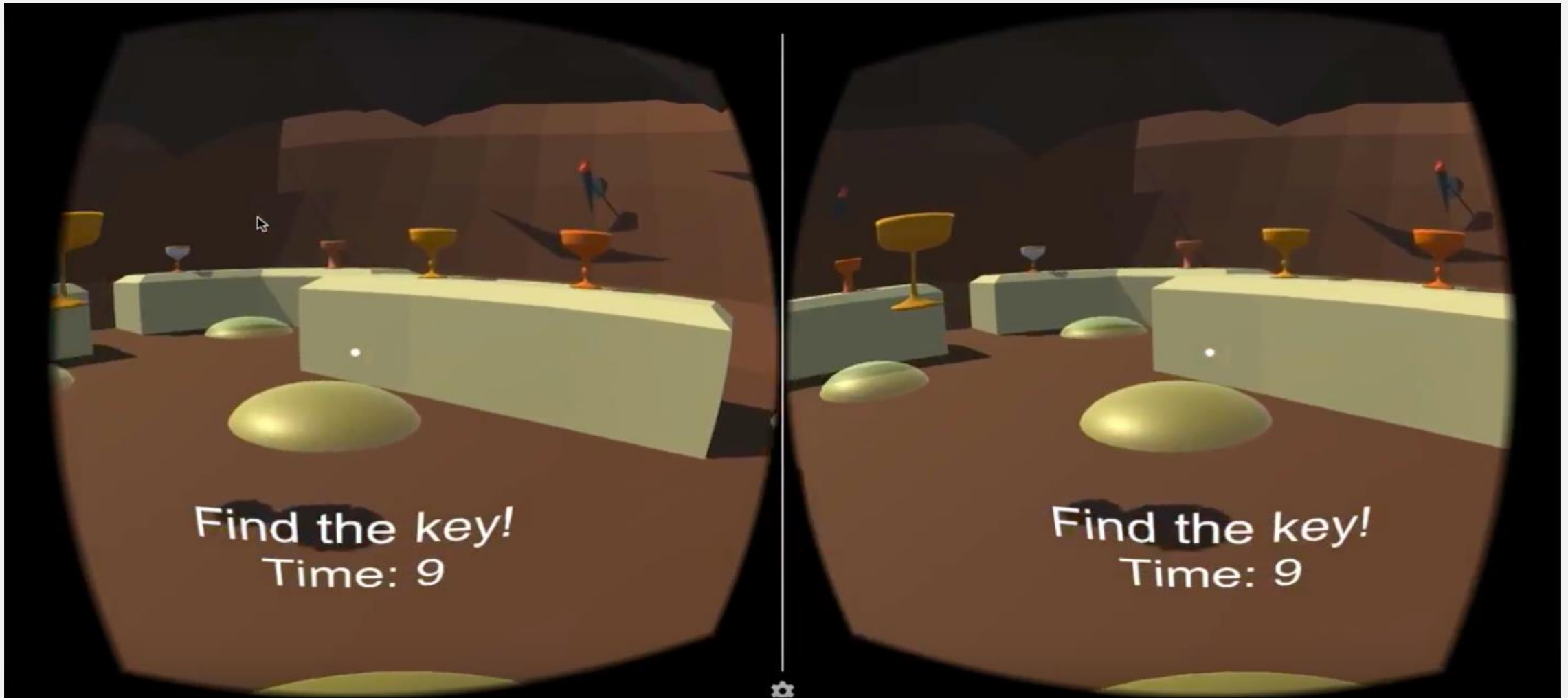
The Hardware

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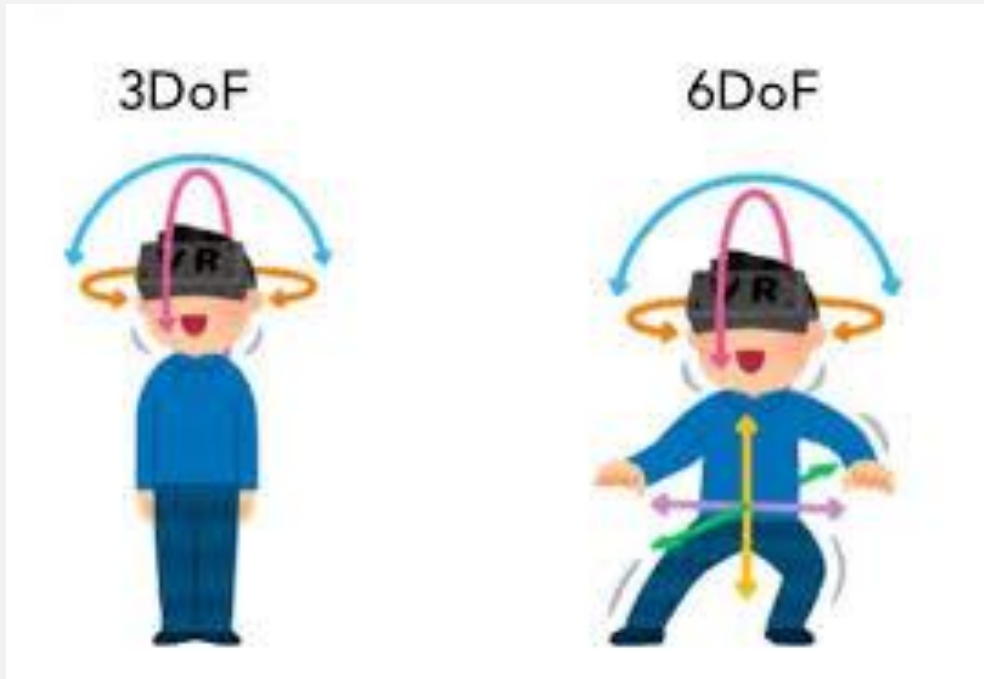
How does it work?



What you see

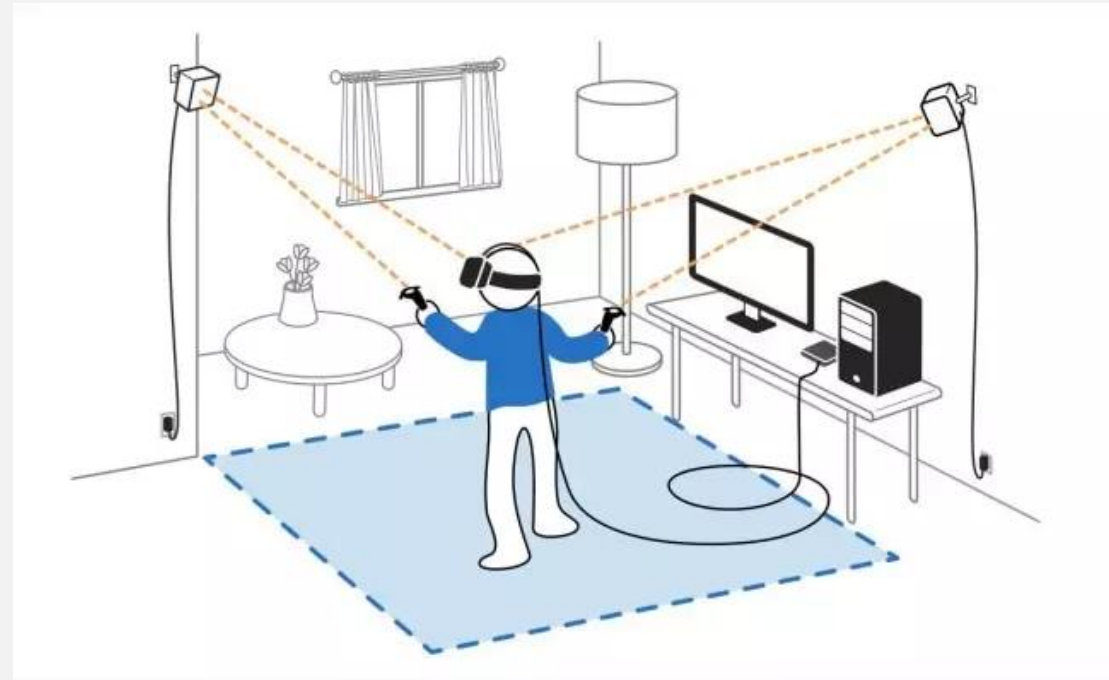


What about movement?



3DOF – Limited to the movement of the user head. (E.g. Mobile VR)

6DOF – Tracks the head and body movement of the user. (E.g. Fixed room-scale tracking)



Room-scale – Tracking of user body movement through a room space. Can use external sensor installed on the top corners of the room or new inside-out technologies the user computer vision to map the object in the room and use them as markers.

Mobile

Examples of this type of VR Headsets

- Google Cardboard
- Samsung Gear VR
- Google Daydream

Pros: Low Cost

Cons: Reduced freedom of movement (3DOF), dependent on the smartphone specifications (Low quality graphics)

Recommended for: Low-cost implementation, Expositive experiences



Fixed / PC Dependent

Examples of this type of VR Headsets

- HTC Vive Pro series
- Valve Index
- Oculus Rift and Oculus Quest (using Link)

Pros: Top of the line graphics, Room scale movement tracking (6DOF)

Cons: High Cost of Headset + Powerful PC, Requires the installation of external sensors, cables connecting the PC and Headset

Recommended for: VR Experiences that require realistic graphics



Standalone

Examples of this type of VR Headsets

- Oculus Quest series
- HTC Vive Focus and Flow series
- Pico Neo and G2 Series

Pros: Inside-Out movement tracking (6DOF), Affordable pricing, Don't require PC or smartphone, Easy setup (no external sensors required)

Cons: Low battery life

Recommended for: VR experiences where the graphics are not the focus, Use in classroom or showroom



A dimly lit room with a desk, laptop, and framed art on the wall. The room is dark, with a desk in the foreground and a wall of framed art in the background. A laptop is open on the desk, and a plant is visible in the background. The overall atmosphere is quiet and focused.

Oculus Quest 2

3

Unbox and charge the device

Start by unboxing the equipment. Take off the card covering the lenses area, the white paper covering the outside of the headset and carefully take off the plastic protection on each lens. The two controllers already have batteries inside, but you must pull the black plastic off, so the battery activates.

Video Guide - <https://www.youtube.com/watch?v=ZBSiZ5Pcjjg>

Some headsets come with a silicon protection that can be used to cover the foam facial interface of the headset to avoid possible skin irritation caused by the foam.

Plug the USB Type-C charging cord to the left side of your Oculus Quest headset.



The light indicator on the right side of the headset will turn green when fully charged.

Turn the headset on by pressing the power button on the right side of the headset till the light indicator turns white.

To turn the headset off, press and hold the power button for a few seconds till a prompt appears enabling the user to restart or shutdown the device.

Note: You can use and charge the headset at the same time if you really need to, but it's not recommended as it may cause the equipment to overheat.



Setup the Oculus App

Next, we need to install the Oculus App on a compatible device and use or create a new Facebook account to login the device.

Through the Oculus App you will be able to:

- Change the setting of you VR headset
- Install VR apps from the Oculus App Store
- Manage the VR Apps already installed on the device
- Cast the view from inside your headset to the smartphone or other compatible devices to see the same as the user
- Do the activation and initial setup of the VR device

The minimum OS requirements for phones to run the Oculus mobile app are:

- Apple iOS 10+ - <https://apps.apple.com/us/app/oculus-vr/id1366478176>
- Google Android 5.0+ - <https://play.google.com/store/apps/details?id=com.oculus.twilight>

After installation you need to login with a Facebook account to use the device. We recommend the creation of a new Facebook account instead of using an existing one, you can do so directly on the Oculus App.

After login with a new account, you will be asked to create a profile, skip this and do it later if you want. You'll also be prompt to choose your privacy setting and choose your method of payment for Oculus App Store.

Note: The smartphone should be connected to a Wi-Fi network and have Bluetooth turned on.

The Oculus App should automatically detect your Oculus headset and begin pairing, if not put the headset on and check if it is displaying a code on screen and if so in the smartphone app go to the menu Devices > Pair New Headset and type the code. The headset will begin pairing and the setup will continue using the headset itself.

The headset will begin updating and will notify you using sound when the update is complete.

Note: Do not close the smartphone app till the end of the configuration.

Video Guide - <https://youtu.be/ZBSiZ5Pcjjg?t=36>

Using the headset

These next steps must be repeated each time someone uses the device.

- Put the headset on and check if the image is clear for you.
- If you need you can adjust the distance between lenses, there are 3 positions you can choose from, just slide the lenses to the side till you hear a click. There's a small display between the lenses that shows the position you are currently on.

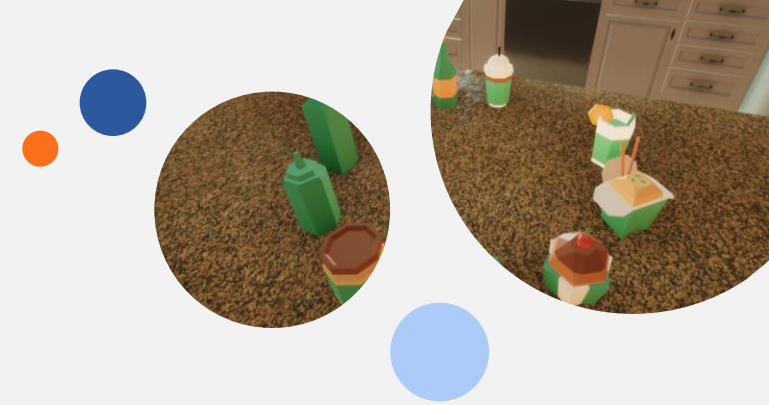


- Adjust the strap on the back and top of the head till the headset is in a firm and comfortable position.
- Gently pull the headset up or to the side to get a clearer picture.

Note: Your eyes need to be in line with the center of the lenses for the picture to be clear. If the headset straps are loose the headset will move during use and that can affect the quality of the experience.

Note: If you need to clean the lenses, be careful, use a special cloth to clean lenses and do it in circular movements starting from the interior of the lens till you reach the border. Use the same type of cloth to clean the external cameras on the side of the headset.

Video Guide - <https://youtu.be/ZBSiZ5Pcjjg?t=157>



Setting up the guardian

The Guardian is a safety feature of Oculus Quest that lets the user set up the limits of his play area.

If you're setting up Guardian for the first time, follow the instructions you see in your headset.

The system will let you see the real-life world through a black and white camera feed and will ask you to confirm the ground height by placing a controller on the actual ground.

Next you will have to choose between two modes:

- Stationary/Fixed: For using your headset while sitting or standing in place. Stationary Mode creates a default Guardian area of 1 meter by 1 meter centered on yourself.
- Roomscale: For using your headset while moving around inside your play area. Roomscale allows you to draw your Guardian boundaries in your physical space using your Touch controller. We recommend a safe and unobstructed space measuring at least 2 meters by 2 meters.

If you choose Stationary the system will configure automatically around your current position. In the case of Roomscale you will have to “paint” the boundaries yourself.

The Guardian will activate each time the user gets too close to the boundaries showing a red grid in front of the user.

Video Guide - <https://youtu.be/ZBSiZ5Pcjjg?t=200>



Navigating in VR

Navigating the menus of your Oculus Quest device is easy and intuitive.

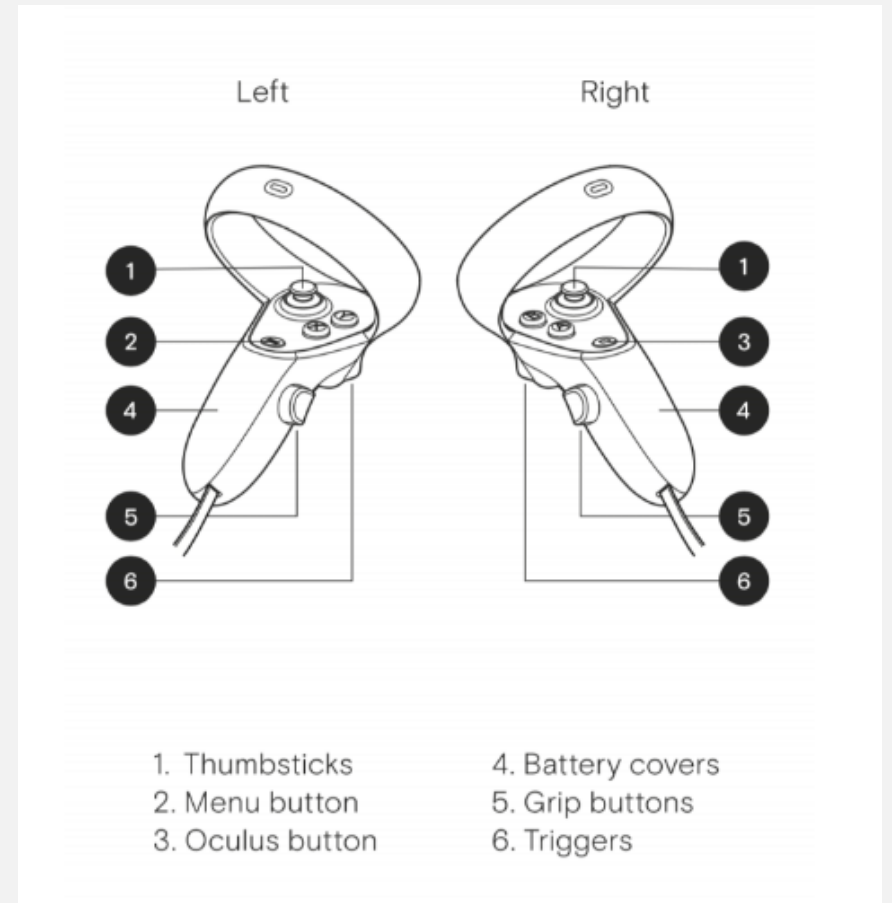
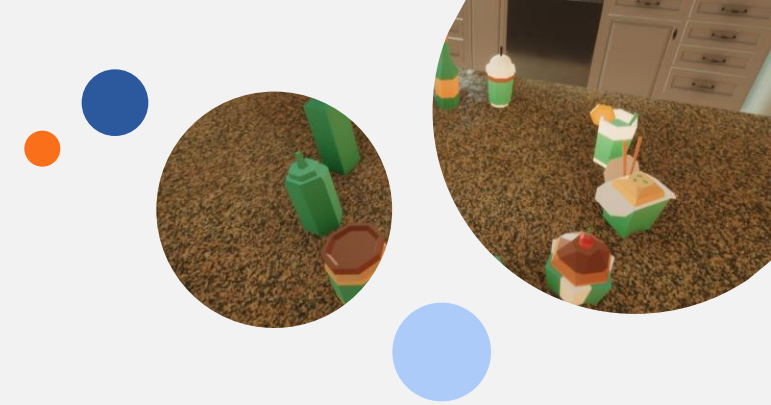
When you turn on your VR device you automatically enter the Oculus lounge area where you can access your apps and games, media content, settings, and other functions by simply using the controller to point at the icon you want and press the Trigger button. To scroll a page, you can point to a section of the page, click, and hold the Trigger button to drag it around.

If you close the main menu and want to get back to it, click the Oculus button one time to open the menu back again.

To exit a VR experience or game, click the Oculus button one time to access the menu and choose Quit.

To recenter your menu look in the direction you want, click and hold the Oculus button till the menu transfers to the new position.

Video Guide - <https://youtu.be/ZBSiZ5Pcjg?t=425>



Casting

A recent feature on Oculus Quest allows you to cast the view from inside the Oculus Quest headset to compatible devices like your smartphone, tablet, video projector or TV.

You can access this feature through the Oculus App on your smartphone. On the top right corner of the app you'll see the cast button, click it and choose your VR headset and the device you wish to cast to.

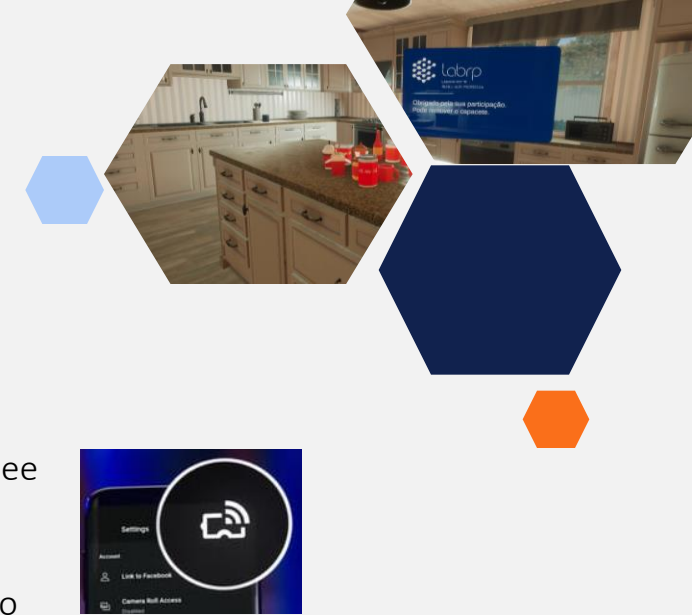
After you select your headset and the casting target a prompt will appear on the VR headset itself, the user needs to click the start button for the cast to begin.



Remember that the headset, your smartphone, and other devices you wish to cast to need to be on the same Wi-Fi network.

The cast can be limited by your Wi-Fi bandwidth and experiences may vary.

Video Guide - <https://youtu.be/ZBSiZ5Pcjjg?t=492>



A dimly lit room with a desk, laptop, and framed art on the wall. The room is dark, with a desk in the foreground holding a laptop and some papers. On the wall behind the desk, there are several framed pictures or artworks. The overall atmosphere is quiet and focused.

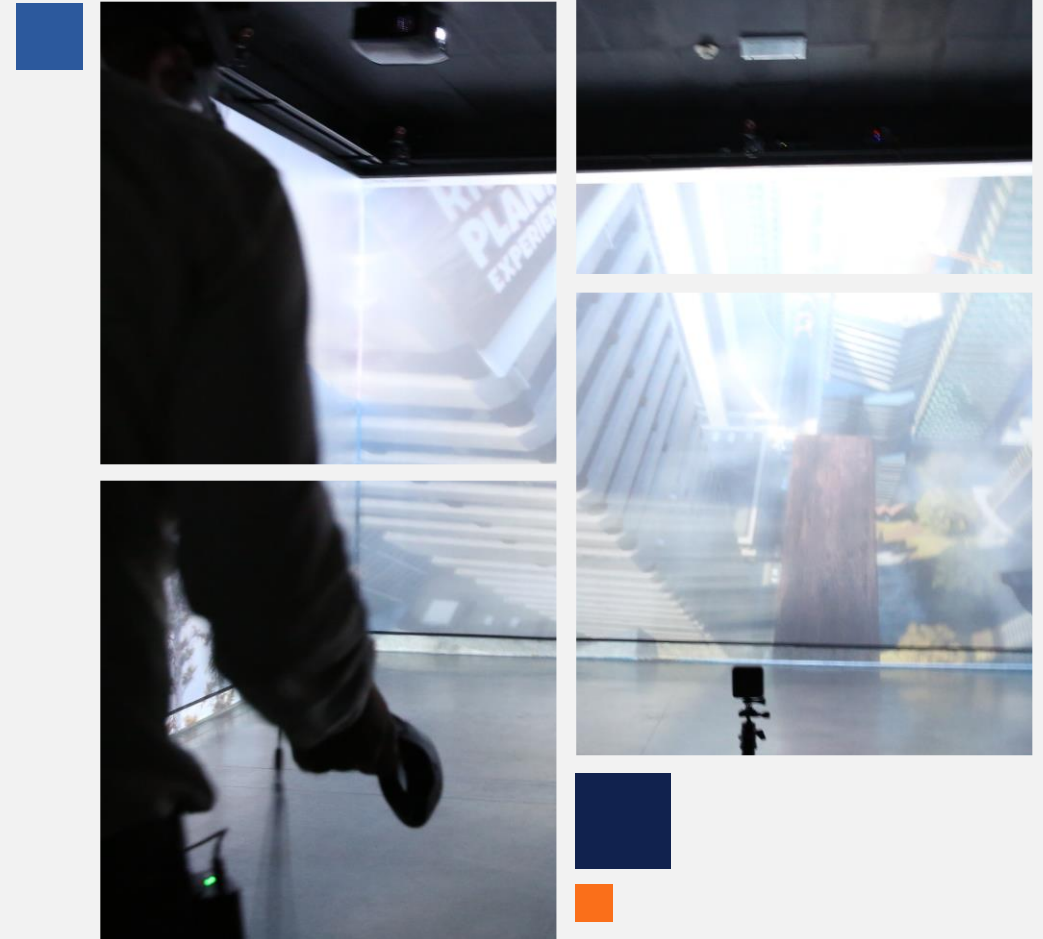
VR Experience Design

4

Developing VR

What you need to think first

- Objective
- Theme
- Target audience
- Timetable
- Monetary resources
- My team
- Target hardware
- Type of experience
- Type of development approach



Types of Experience

- **Expositive Narrative**

The user is exposed to a story driven experience focused on delivery of specific point of view to a subject. There's no interactivity between the user and the virtual environment. Generally, this type of experience is developed using the 360 video approach.

Pros: Linear development like a movie. No game mechanic or rule do implement. Can have a shorter development time

Cons: The user may feel alienated by the lack of interactivity.
- **Decision Making**

Similar to the Expositive Narrative experience but enabling the use to make decisions in specific points in time or situations. Each decision can change the outcome of the narrative. The interaction can be limited to question prompts the user need to select in a short amount of time.

Pros: Easier to use by target audiences lacking experience in videogames or VR. Can be used with 360 video or computer graphics,

Cons: The branching of the narrative needs to be well planned to avoid confusing the user.



Types of Experience

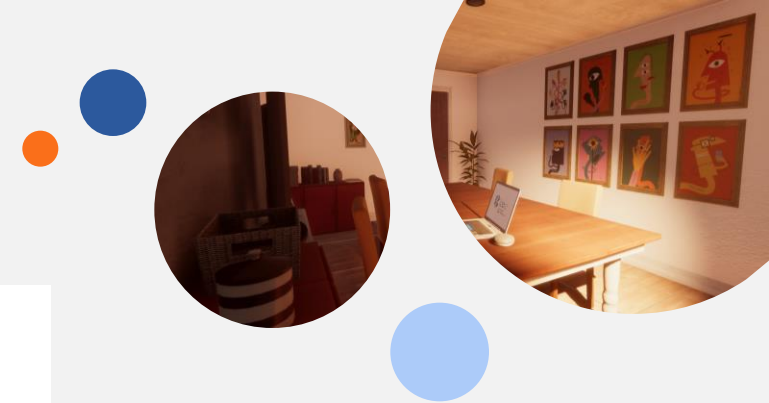
- **Interactive Scenario** The user has freedom to navigate inside the virtual world and can interact with various objects or characters. His actions can alter the narrative. This type of experience can only be done using computer graphics generated environments.

Pros: The freedom of interaction and movement add to the immersion of the user on the virtual world.

Cons: Game mechanics and rules can be difficult to implement. Development can be expensive in terms of money and time.



Development Approach



By
Mariana Malashniak
August 2016



Computer Graphics VR – Decision Making
CHLA –VR Training for Pediatric Emergencies



360 Video VR – Expositive Narrative

MSA – Fire Safety VR Training



Computer Graphics VR - Interactive Scenario
EmpatiaVR - Esquizofrenia



Game Design Document

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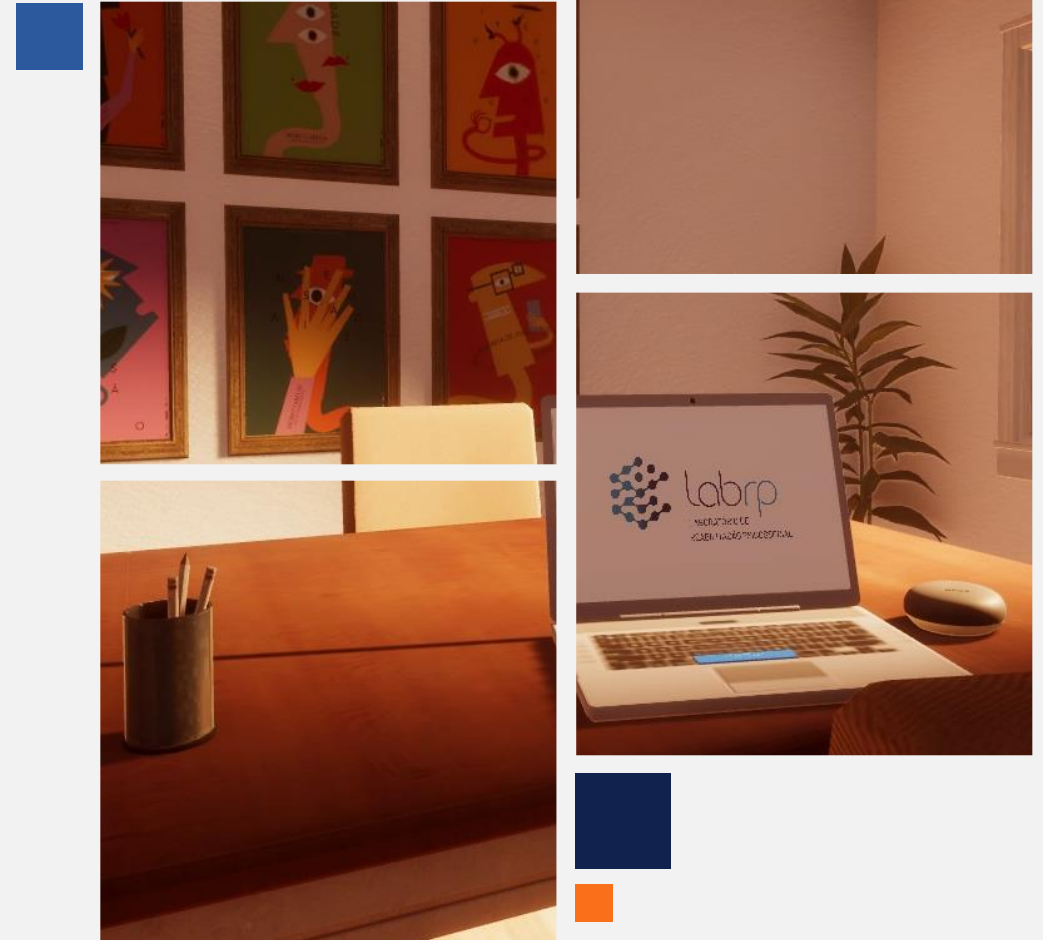
Game Design Document


What is it?

The game design document (GDD) is the blueprint from which a game is to be built. As such, every single detail necessary to build the game should in it.

It must contain your vision for the game/experience. Your objectives, target audience, how you want it to be played, the reward and punishment system for the user, and various other topic should be discussed with your development team and written down on this document.

The GDD serves as a guide, so every member of the team knows what is expected in the end of development cycle.





“We all live every
day in virtual
environments,
defined by our
ideas”

Michael Crichton



Thanks you for your
time.

Q & A

6