

PROJECT OBJECTIVE

- University of Houston was unprepared for an abrupt shift to an online education due to COVID.
- We propose a technology-based VR solution to replicate the in class/lab experience.

PROBLEM STATISTICS

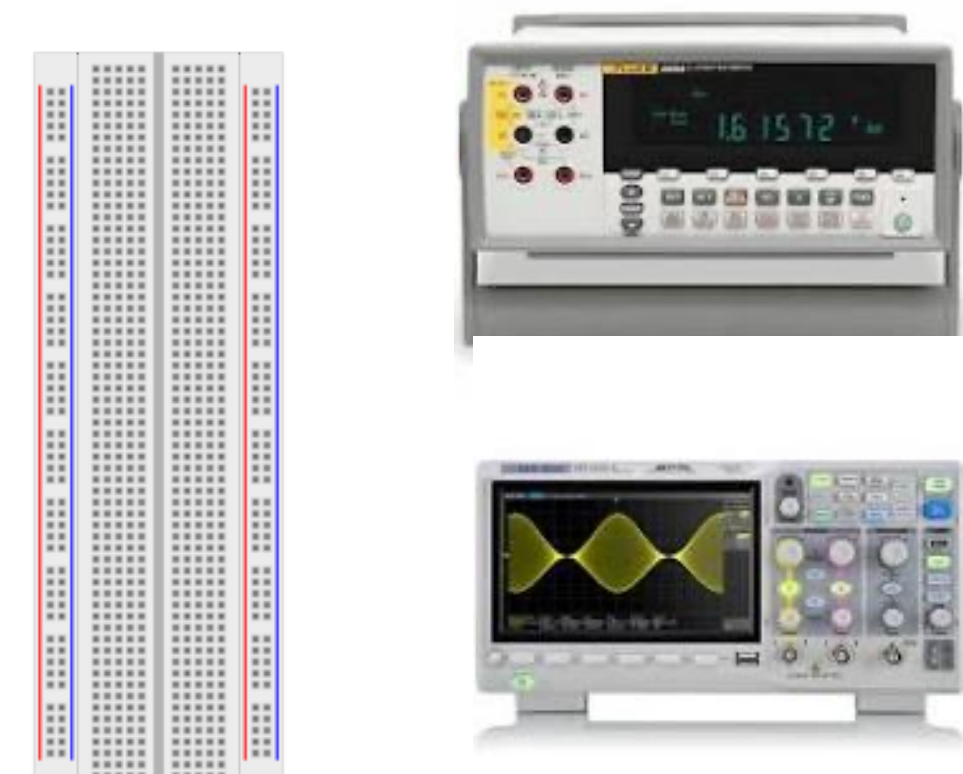
- The college of technology cannot provide, oscilloscopes, multimeters, breadboard kits to each individual student as it is too expensive.
- As the current cost of tuition increases the **value** of education is not reflected in the cost.

Year	In-state Tuition	Spring 2019	Spring 2021
2010-2011	\$7342	Fee - Student Services \$260.00	Fee - Student Services \$231.00
2015-2016	\$8759	Fee - University Center \$135.00	Fee - Online Education \$273.00
2019-2020	\$9221	Fee - Rec & Well Ct \$106.00	

EXISTING SOLUTIONS

Pre-Covid Technology Solution

- Function Generator
- Oscilloscope
- Waveform Generator
- Multimeter
- Spectrum Analyzer



Covid Technology Solution

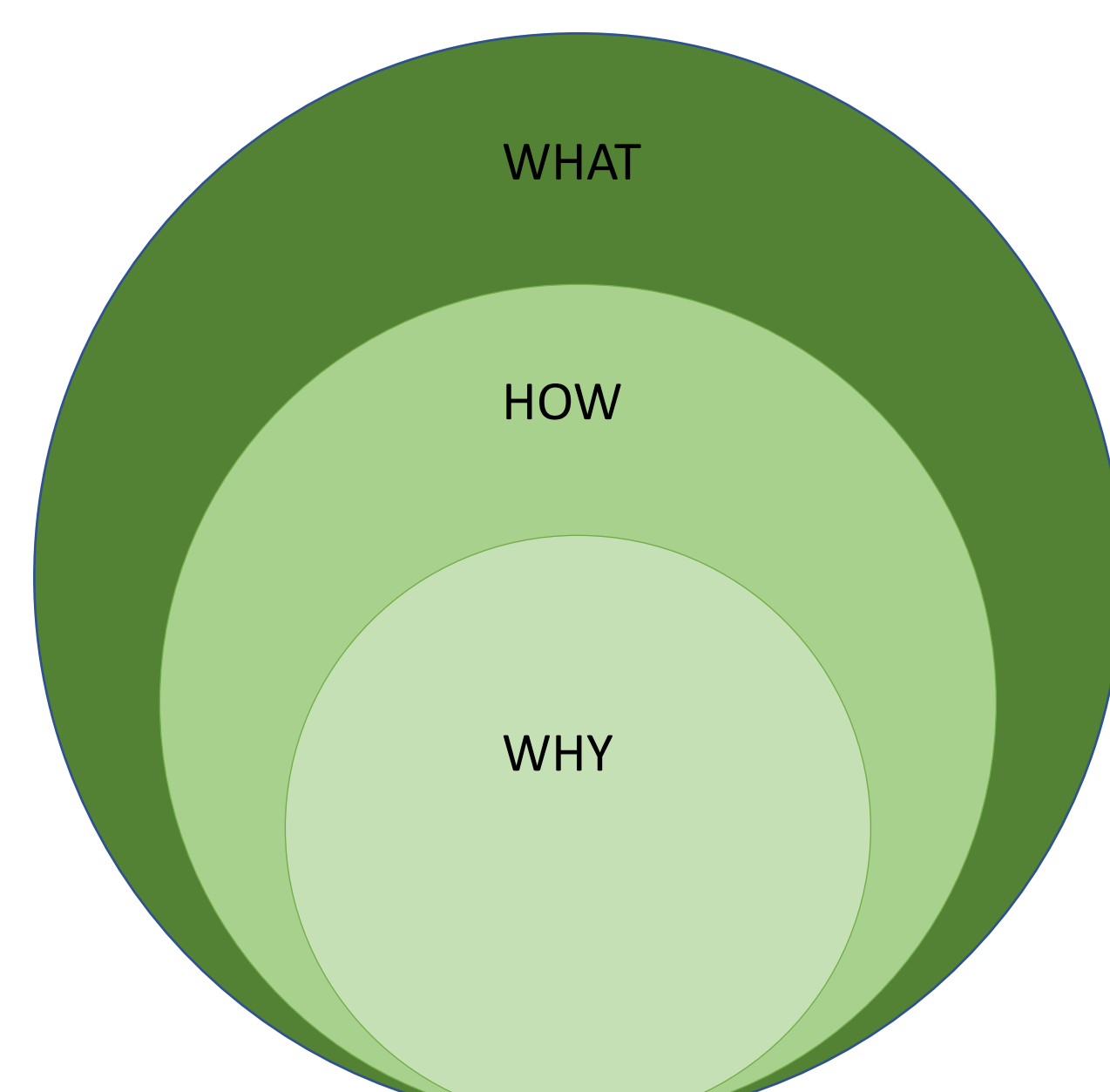
- Analog Discovery Studio
- WaveForms software to access lab equipment at home



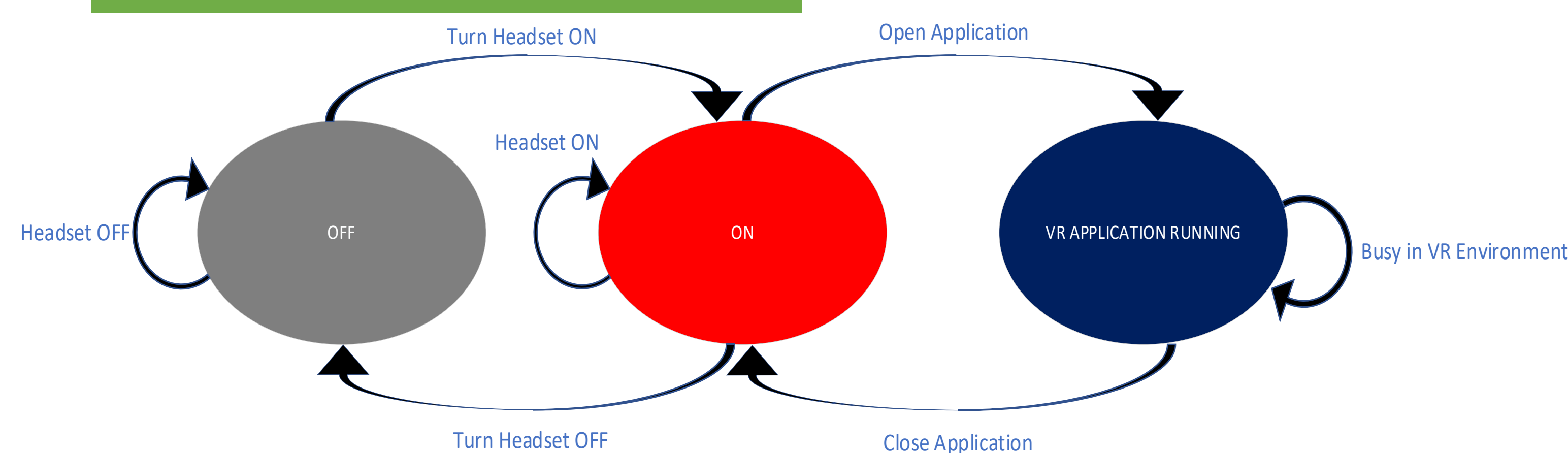
OUR TEAMS SOLUTION

- Create 3D Virtual Reality lab environment with breadboard, oscilloscope, multimeter, and components.
- Gamify the learning experience
- Level up throughout the semester

- WHAT:** We will create a VR application to help students continue to use lab equipment and learn about electronic components.
- HOW:** Collaborate with College of Technology at the University of Houston.
- WHY:** To solve the problem of not having the option for in-person teaching or labs.



FINITE STATE MACHINE



TECHNICAL CONTENT

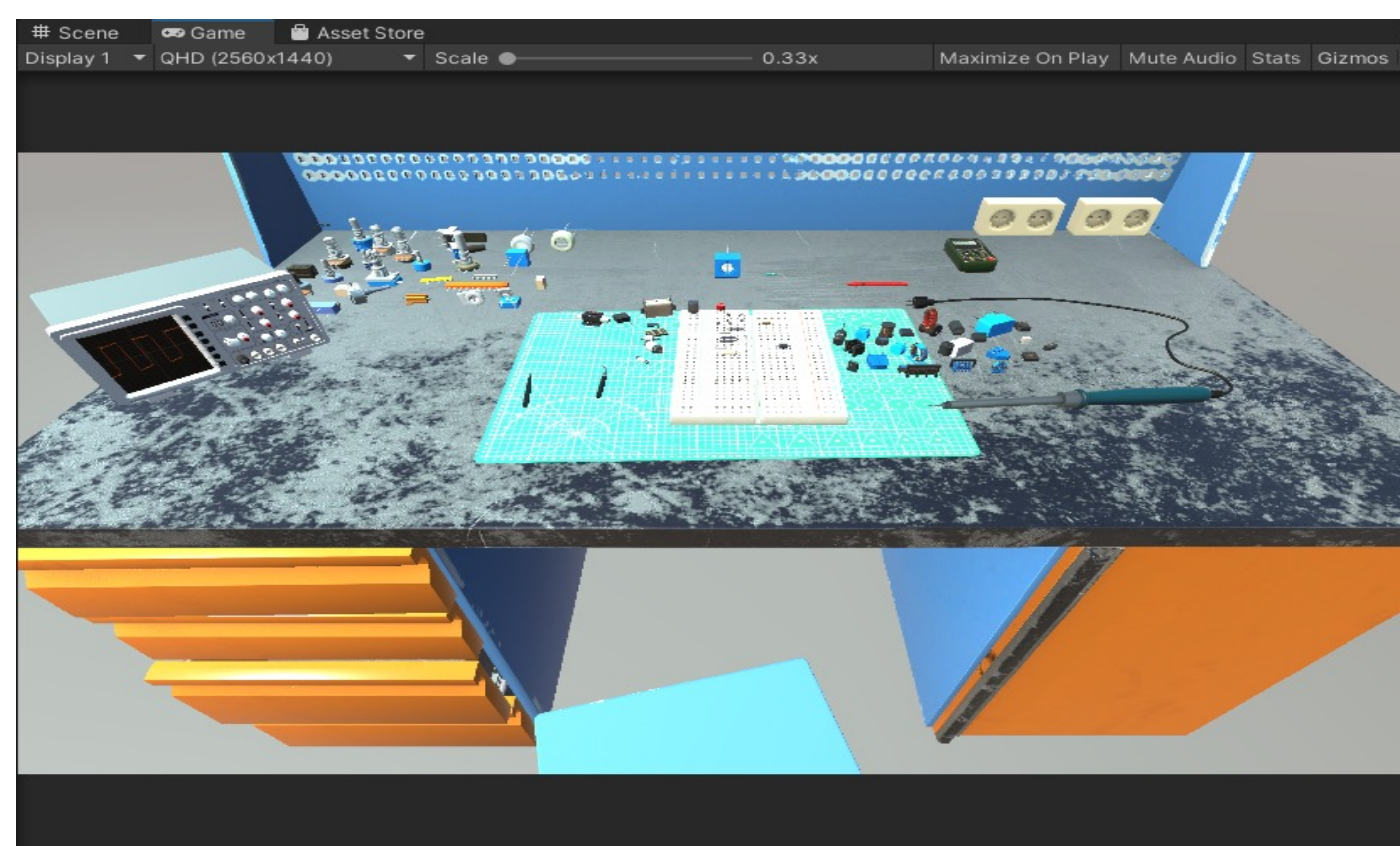
Hardware

- Oculus Quest II VR Headset



Software

- Unity 3D



COST REDUCTION

Pre-Covid COT Lab Equipment Cost	Current COT Lab Equipment Cost	VR Education Cost
Multimeter-\$400	Analog Discovery Studio - \$600	Oculus Quest 2 64 GB - \$300
Oscilloscope-\$300	BNC Oscilloscope Probes - \$40.00	Unity Engine - FREE
Function Generator-\$400		
Breadboard-\$20		
Total = \$1120	Total = \$640	Total = \$300
Pre-Covid to Current Cost	Current to VR Ed Cost	Overall Cost
$(1120-640) / 1120 * 100 = 42.85\%$	$(640-300) / 640 * 100 = 53.13\%$	$(1120-300) / 1120 * 100 = 73.21\%$

CONCLUSION

- Solve the issue online learning though virtual lab
- Reduce costs through making equipment digital.
- Gamify the leaning experience.

REFERENCES/ACKNOWLEDGEMENTS

We would like to acknowledge Dr. Moges, and our TA's Alexander and Summer for their guidance and support.

[1] Saksena, Sanchay. "Oculus Quest 2 System Requirements; What Do You Need to Run the Oculus Quest 2?" Republic World, Republic World, 19 Oct. 2020. www.republicworld.com/technology-news/gaming/what-do-you-need-to-run-the-oculus-quest-2.html.
 [2] PCMAG. "Definition of 6DOF." PCMAG, 2021, www.pcmag.com/encyclopedia/term/6dof.
 [3] Kexugit. "Unity - Developing Your First Game with Unity and C#." Unity - Developing Your First Game with Unity and C# | Microsoft Docs, docs.microsoft.com/en-us/archive/msdn-magazine/2014/august/unity-developing-your-first-game-with-unity-and-csharp#:~:text=Unity%20allows%20you%20to%20import,animation%20system%2C%20and%20much%20more.