

LEARNING + GAMING: BUILDING COMPUTERS IN VR

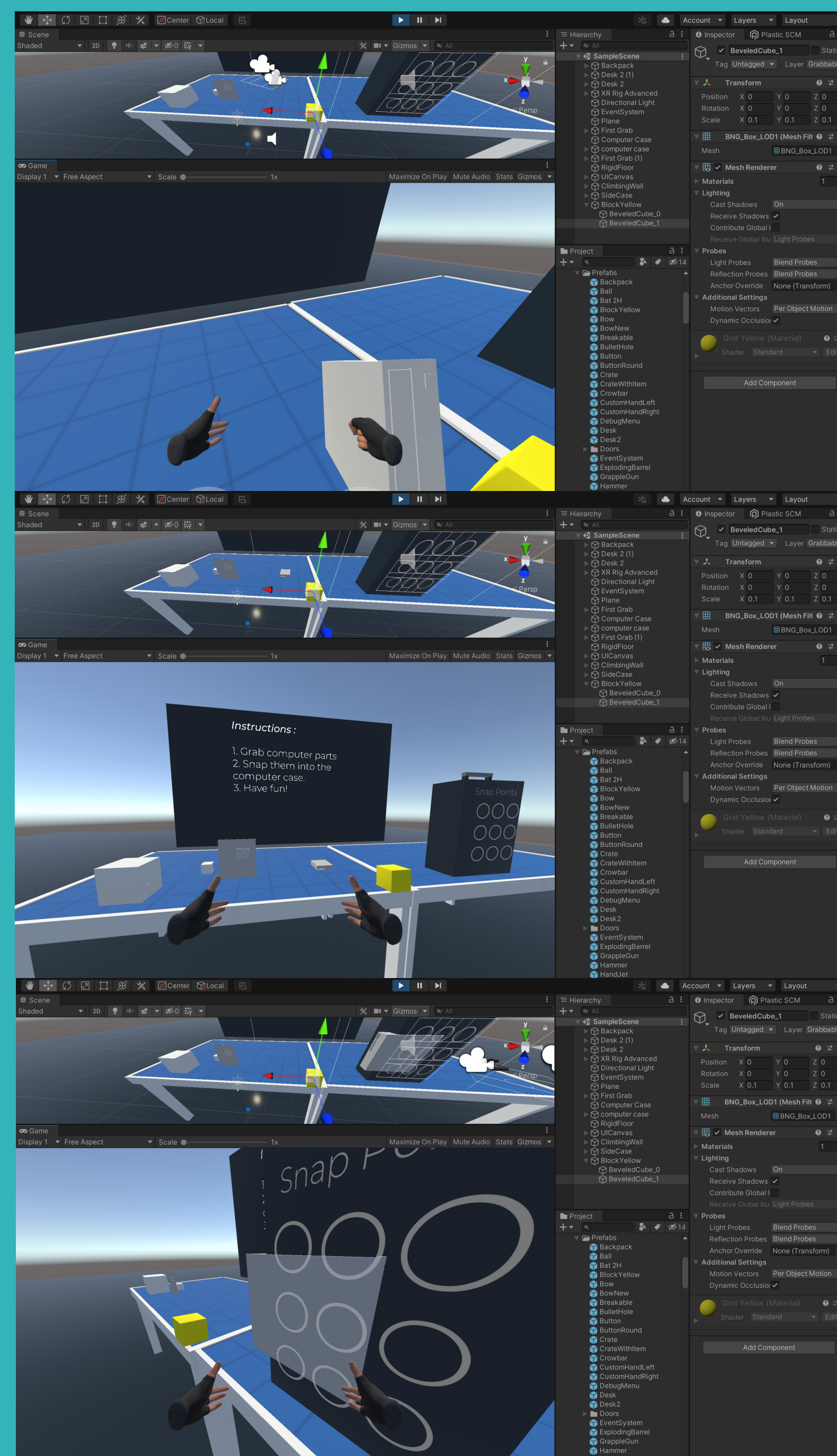
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Introduction

- Computer hardware and building computers is a useful skill in today's modern world of technology.
- Our grand challenge is the lack of computer hardware instruction in schools due to the cost of computer parts.
- As previous studies have shown, our hypothesis is that virtual reality betters students' understanding and increases socialization and motivation (1).
- Our novel solution was to disassemble a computer and create a VR environment of digitally modeled hardware components. This approach provides a broadly accessible way to learn about computers while increasing student engagement through a "gaming" interface (2).

Simulated hands grabbing the hard drive component.

Object symbolizing a computer tower used to snap components to a grid in the simulation.



Full simulation shown with instructions and components displayed on a table.

Unity framework showing our final computer build VR simulation prototype.

Acknowledgements

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CREATING THE VR SIMULATION

A short overview of what was accomplished to reach the final product.

STEP 1. COMPUTER KNOWLEDGE

We disassembled the computer in order to understand how each part fits into the overall system.



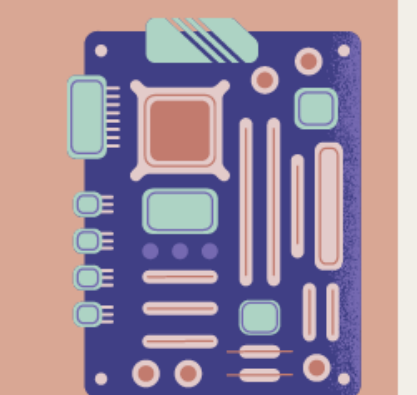
STEP 1. LEARNING VR

We learned the basics of Virtual Reality applications and game world creation by using Unity tutorials.



STEP 2. MODELING PARTS

The program Autodesk Fusion 360 was used to create in-game models of the computer parts inspected.



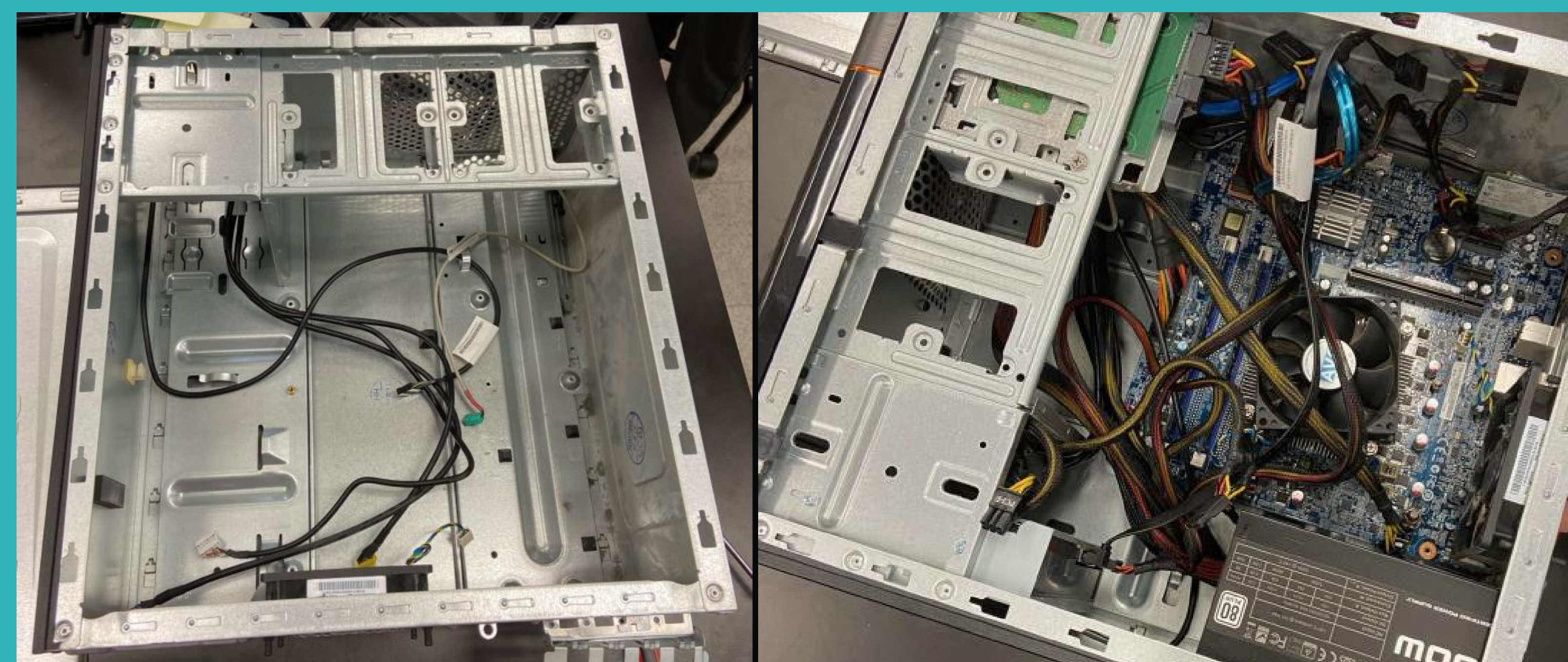
STEP 2. BUILDING AN APP

With the knowledge to build a Unity application, the base game was created with a structured layout in mind.



STEP 3. THE FINAL PRODUCT

Our knowledge of computer parts and VR game building combine to make the final simulation. This includes interactive computer parts to be moved by the user.



Results

- Our final product is a prototype simulation of a computer build in VR.
- Our simulation allows the user to drag and drop a few computer components into an object representing the shell of a computer tower.
- We showed that it is possible to simulate building a computer in VR.
- Results displayed in the following video. Scan below.



Conclusions

- VR Learning has been successful in increasing student productivity and engagement (1).
- Students' favorite approach towards learning is gamification, competition between peers or oneself in a game-like setting, due to feedback on academic progress (2).
- Students have increased motivation and desire to learn when they believe that the activity is entertaining, which is what our simulation accomplishes (3).
- The simulation we created can be used in educational settings to increase knowledge of computer architecture in a hands-on way.
- Group members learned how to create a game in Unity, use Fushion360 for 3D modeling, and read and write academic papers through this project.

Literature Cited

1. Yates A, Starkey L, Egerton B, Flueggen F. High school students' experience of online learning during Covid-19: the influence of technology and pedagogy. Technology, Pedagogy and Education. 2020 Dec 1;1-15. doi:10.1080/1475939X.2020.1854337
2. Pottle J. Virtual reality and the transformation of medical education. Future healthcare journal. 2019;6(3):181-185. doi:10.7861/fhj.2019-0036
3. Hajja A, Hunt AJ. A Novel E-Learning Platform for Building and Publishing Student-Driven Personalized Lessons. Proceedings - Frontiers in Education Conference, FIE. 2020;2020-Octob. doi:10.1109/FIE44824.2020.9274034