

## INTRODUCTION

Currently, the study of history is generally associated with feelings of boredom or repetitive memorization. I believe that this is in large part caused by the way that history is taught. The study of history requires an understanding of the world that is based on more than just a textbook and old documentaries. A visual and immersive experience could be more effective than these traditional methods. Today, we have the power to utilize virtual reality to break the barrier that prevents us from reliving history.

## APPLICATION

The virtual representation of major historical events was made possible through multiple steps. I began by gaining a baseline knowledge of Unity, a game engine that can be used to import and assemble assets, write code, and create or import animations. In this stage, I learned to position an XR Rig (which includes the headset and controllers), create grapple objects and hooks, and create teleportation anchors/areas. Upon becoming comfortable with the application, I then transitioned into creating the actual scenes within the project. Through a combination of taking advantage of free assets on the Unity Asset store and creating my own, I was able to create a short timeline of three pinnacle moments of United States history. This includes early British colonization of the New World, the American Revolution, and the U.S. as we know it today, depicted through the white House. I then began work on making the experience more immersive through haptic and audible feedback everytime the user would interact with the environment. I then utilized scripts within Unity to create 3 screens above the scenes that educate the user on the respective topic. Lastly, I created and rendered models of soldiers from Mixamo and added animations to them to create dynamic objects.

## IMPORTANT DEFINITIONS

**Virtual Reality**(VR) utilizes rendering, body tracking, input devices and more to create a seemingly real experience of a simulated three-dimensional environment.

**Six Degrees of Freedom (6DOF)** includes the freedom to translate forward/backward, upward/down, and left/right in three perpendicular axes, as well as a change in orientation through rotation about three perpendicular axes, often termed yaw (normal axis), pitch (transverse axis), and roll (longitudinal axis).

**Haptic Feedback** involves the sense of touch to transmit information and communicate with the user.



Soldier Asset from Mixamo in idle position

## BRITISH COLONIZATION

New British colonists sail on ships towards the new world where living areas have been established.

## AMERICAN REVOLUTION

An array of flags, weapons, and bases represent the revolution that would birth the United States of America.

## SKILLS LEARNED

### Unity:

→Used to create the interactive 3D applications within the project.

→Needed to learn how to get, use, and create assets within Unity

→Used XR Rig to track headset and controllers

→Learned to use materials and textures in Unity to create accurate models

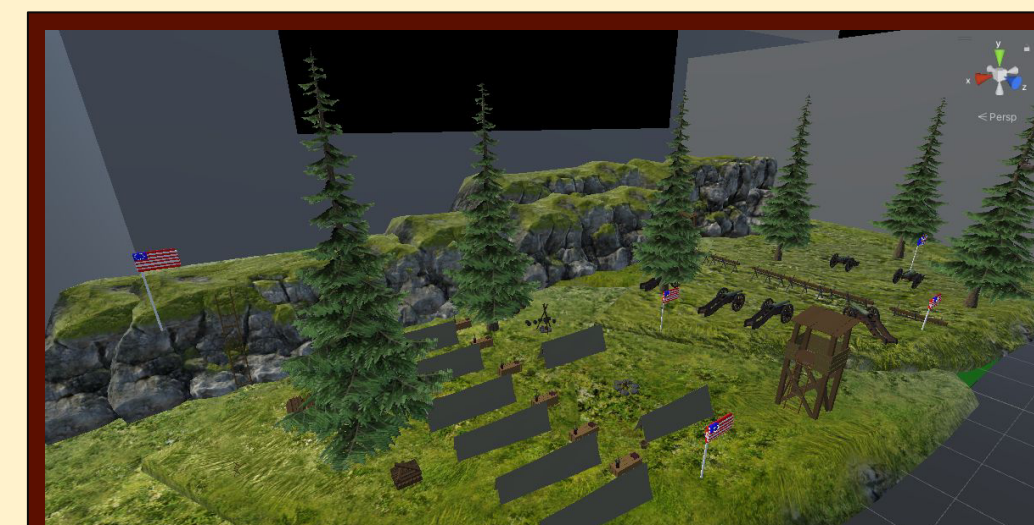
### Oculus:

→Can now use Oculus equipment to explore VR

→Learned how to use Oculus Link to develop things in virtual reality.

### Mixamo:

→Worked with dynamic characters through this application to add movement within my project.



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## CITATIONS

Van der Hooft, J., Schatz, R., De Turck, F., Begen, A. C., Timmerer, C., Wauters, T., & Torres Vega, M. (2020, October). From Capturing to Rendering: Volumetric Media Delivery with Six Degrees of Freedom.

## MODERN DAY

Model of the White House sits behind a line of bushes, representing the current strength and position of the country.

