

Thesis Project Portfolio

Assisting the Inhabiting Byzantine Athens Project: A Case Study of Educational Virtual Reality

(Technical Report)

The Potential of Military Mixed and Augmented Reality as an Interface of Dissociation

(STS Research Paper)

An Undergraduate Thesis

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Executive Summary

Virtual Reality, Mixed Reality, and Augmented Reality, though decades old, are now beginning to gain mainstream acceptance in earnest. With technologies whose entire premise is to alter the way we perceive the world, there comes the possibility of dramatically shaping how we live day-to-day both for the better and for the worse. I begin with the former through discussing my work implementing an educational Virtual Reality environment for an Art History Professor at the University of Virginia. Through this experiential report I intend to impart what I learned along the way so that other educators can have a clearer idea of how to and how not to approach the task. My STS research meanwhile is concerned with the latter potential of Extended Reality (XR), specifically the dangers of militaries inviting these technologies into warfare to enhance soldiers' combat ability. In that paper, I investigate to what extent such headsets may enable soldiers to dissociate from their environment, putting themselves and others at risk. By combining these topics, I hope to communicate both sides of two technologies that have as yet undetermined, though potentially monumental consequences for society at large.

Although it would be unreasonable to think that reflection on my time as a research assistant would fundamentally change the way this work is done, I do still wish to make my own modest contribution to the growing field of educational VR. On this project, I was charged with developing a VR world encompassing a small segment in time and space of Medieval Byzantine Athens. I did this using the Godot game engine on the Meta Quest 2.

As of writing this in April of 2024, work on the project is ongoing. Nevertheless, it has been progressing at a steady and satisfactory pace and I expect to finalize the application sometime this Summer. In terms of lessons learned along the way, the most important is that one should invest a significant amount of time at the outset to decide what platform is best for their

particular needs. In hindsight, other game engines appear to be better suited to VR development than Godot though it has proven useful in other ways such as its intuitive design and quick iteration process.

As for the dangers of XR, while such headsets may pose a threat to mental health in general, public use, the risks they bring with them become even more worrying when put in the hands of armed individuals by institutions with a vested interest in the secrecy of their technological developments. My concern is that Mixed/Augmented Reality headsets used in combat may affect their users in such a way that they become more prone to dissociate from their surroundings which is especially dangerous as dissociation is already prevalent within the military and is shown to increase the propensity of anybody, not just soldiers, to commit violent acts. Given the aforementioned secrecy, I primarily tackle this issue by looking at analogous technologies closely related to XR to see if there are any warning signs visible.

Through my literature review I found limited evidence in support of these concerns including research that discovered simply having glasses that distort your vision can induce dissociation. Despite this, the literature concerning this topic is too sparse to definitively make a case either for or against the existence of these dangers. As such, it is of the utmost importance that groups developing this technology do so in a responsible manner that ensures it will not be given the opportunity to unintentionally harm individuals.