Wall Mounted Level: A Cooperative Mixed Reality Game About Reconciliation

Kyoung Lee Swearingen
Department of Design
The Ohio State University
swearingen.75@osu.edu

Scott Swearingen
Department of Design
The Ohio State University
swearingen.16@osu.edu

Figure 1: Wall Mounted Level.

ABSTRACT

Wall Mounted Level is a cooperative mixed-reality game that leverages multimodal interactions to support its narrative of 'reconciliation'. In it, players control their digitally projected characters and navigate them across a hand drawn physical sculpture as they collaborate towards a shared goal: finding one another. The digital and physical characteristics of the game are further reflected in the ways in which players interact with it, by making use of digital input devices and physical 'touch'. The abstract and poster discuss the design choices that were made for creating the varying modes of engagement and the motivation behind player collaboration in 'Wall Mounted Level.

CCS CONCEPTS

• **Human Centered Computing → Interaction Design, Collaborative and Social Computing**

KEYWORDS

Game design, art, mixed reality, projection mapping

1 INTRODUCTION

The game begins with a cut scene of the two players-characters coming onto the screen and having an argument with one another. Shortly after, it resolves to the 'next day' where the players take control of the characters and reunite them under the guidance of supporting audio and visual cues. The fractured landscape doubles as a metaphor for the characters' internal struggle as they navigate it trying to reach one another. The space is composed of interiors and exteriors that reveal and conceal not only the characters, but also obstacles that are meant to be avoided. These obstacles are the remains of the argument that took place 'the day before', and need to be navigated around. More so, they also reveal in some cases the path that players must take, and should be considered carefully as they make progress. In "wall Mounted Level', knowing the position of the other player (your goal) is just as important as knowing where your own character is. We decided to connect the characters visually with a digital 'string' that also turns red when either one of them touches an obstacle. This visual language parallels the coordination of the players themselves who are also connected to one another.

2 AESTHETICS AND TECHNOLOGY

The game environment is a hand drawn cityscape that was laser-cut and assembled into a paper sculpture. Serving the metaphor of the characters' internal struggle, we decided to further fragment the sculpture and create a deeper relief out of it. Other materials that we considered for the construction of 'Wall Mounted Level' included cardboard, chipboard, wood, and plexiglass. Ultimately, we favored the inherent quality of paper as a tangible, vulnerable, and interactive medium.
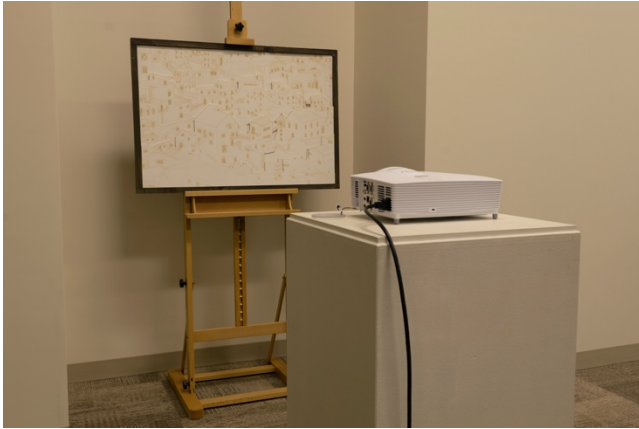
Figure 2: Sitting on an easel in front of projector. Testing dimensions and footprint of entire setup.

All of the digital elements in 'Wall Mounted Level' employ projection mapping and other compositing techniques. As characters move through interior spaces, we mask them by projecting black pixels onto a sorting layer in front of them. At the

Figure 3: In-game close-up of relief sculpture with game elements projected onto it.

same time, windows and doors light up in sorting layers behind the characters to indicate which building they are currently located in. This helps players to keep track of their own location as they move throughout the level. However, because the level was no longer flat, single-exposure projection was not a suitable option given the range of depths. Utilizing the software Isadora, we project multiple exposures of the digital elements at the same time, and corner-pin them independently. This provided us the flexibility to further fragment the level and provided us with greater agility in designing it.

The modes of player interaction parallel the sculpture itself in terms of digital and physical engagement. Digital interactions account for lateral movement as each player steers their own character through the environment using an analog stick. On the

other hand, moving up and down ladders and transitioning between floors requires players to touch on another and complete a 'Makey Makey' circuit that they are connected to, which in turn sends the appropriate output message. However, this output message is shared between both players and will affect them equally if they are in valid positions (e.g. at the top of a ladder, or at the base of a stairwell) when the message is sent. Employing digital and physical interactions in this manner also provides opportunities for both symmetrical and asymmetrical collaboration. Similar to the physical quality of the sculpture, the verbal communication and physical coordination that takes place between the players is especially important to us in terms of human-facing interactions as it extends the narrative of 'reconciliation'.

Figure 4: Showing player interactions and use of touch.

3 CONCLUSIONS

Our motivation for creating 'Wall Mounted Level' was to embrace tangible surfaces as mediums for digital games to exist in, and for the interactions between players to occur in person. Throughout its development, 'reconciliation' served as the underlying narrative and concept that drove aesthetic choices, gameplay, and the interface not only between the players and the game, but between the players themselves. It was important to us that the game required the physical presence of the players to embolden the collaboration between them.

REFERENCES

Patrick Oswald, Jordi Tost, Reto Wettach. 2014. The Real Augmented Reality: Real-time Game Editor in a Spatial Augmented Environment. Retrieved from http://opac.vimaru.edu.vn/edata/EBook/TAILIEUSO/ACM/ISMAR%20Mixed%20and%20Augmented%20Reality/a32-oswald.pdf.

Isadora. 2017. Retrieved from http://en.wikipedia.org/wiki/Isadora_(software).

Makey Makey 2018. Retrieved from http://en.wikipedia.org/wiki/Makey_Makey.

EELS – 3D Projection Mapping Multiplayer Game. Retrieved from https://vimeo.com/211020864.