

Design Document Outline

1 Executive Summary

Daily life can be a drag - predictable, mundane, and somber-colored. If you had the chance to escape your typical daily life and stay awhile in a world of color and sound, wouldn't you? Our project is a music-based immersive experience. The user finds themselves in a boring a typical office, when suddenly they are presented with an unusual looking muffin... Upon picking up the muffin (and taking a bite) their vision blurs and suddenly they are transported to a bright, abstract world filled with music, color-changing trees, mysterious floating office tools (the only remnants of their past), and bubbles that follow them around and dare to be popped. As an experience, our project is suited for people of all ages - from very young children to seniors. All you need is a desire to explore! We are scheduled to develop this game in the month of April, with alpha demo in early April, beta in mid April, and the final release in early May.

2 GAME Design - CREATIVE

2.1 High Concept

An interactive music-based immersive experience, where users are placed in an environment inspired-by and driven-by music, and where they can explore!

2.2 Design Goals

2.2.1 Main Design Features

What is it like to play the game, including:

2.2.1.1 Player goals and objectives.

Main goal: To explore the music world

Type of challenge(s):

The user is not required to solve 'challenges' as such, but they are invited to explore the music world, trying to pop as many bubbles as they can and understand their changing environment.

Type of conflict(s):

As our project is an experience rather than a game, there is not much conflict. The main instance of narrative conflict is in the muffin room, when the user has to figure out what to do next. The muffin glows, indicating it is a special object, and as soon as it is picked up the user is transported to the next room.

Winning condition – how does the player win the game.

No win condition

2.2.1.2 Main rules and procedures

Operational rules –

Player will enter the music-room by picking up the glowing muffin in the starting office room. Within the music room, the player can move through teleporting using a floating indicator in front of them that indicates where they will be moved to. They will be able to interact with elements of their environment, which will respond to elements of the song playing.

Main game mechanic: The user has two mechanics: locomotion and object-interaction. For locomotion, the user can teleport, first by 'casting' an object in front of them that indicates their teleported location. When they are satisfied with their new point, they can choose to teleport.

The other interaction is with objects in the world - with picking up / putting down objects and with popping / hitting other objects.

2.2.1.4 Boundaries and Constraints

The user has the ability to travel quite far, through the teleportation mechanic. They are limited into their allowable areas (the room and the area inside the mountains in the music room) based on the teleportation mechanic.

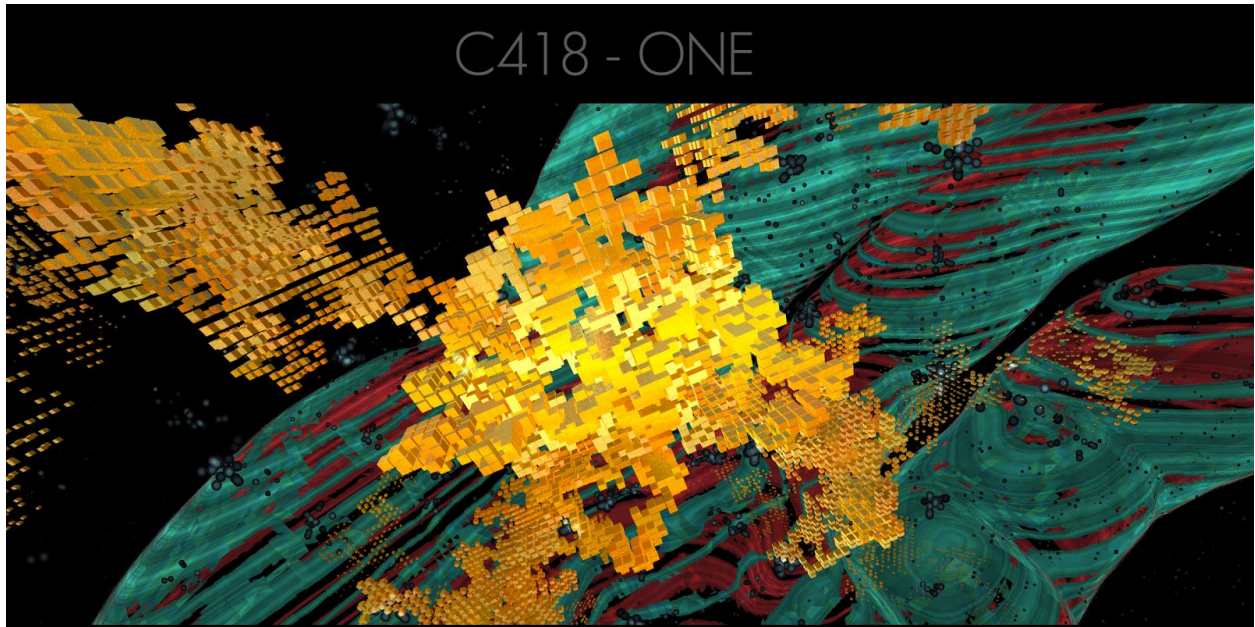
2.2.2 Appeal

We are hoping to target users of all kinds, especially those who might not be gamers and therefore less interested in using game-type VR interactions. Our goal is to provide a fun, whimsical, lighthearted experience that highlights the immersive powers of VR to users. Our target age group is from 6 years old+ - anyone who can physically put on a HTC Vive can use our application!

2.2.3 Look and Feel

It would be great to really abstract away from a classic game world and build an amorphous environment where interaction is engaging but unexpected. We also expect to be inspired by the music we are using.

One major influence is the artist/ director [cabbibo](http://cabbibo.com/). He's made a number of crazy procedurally generated worlds using threejs (a few even support the HTC Vive). Here's another reference link <http://toolofna.com/#!/director/cabbibo>



<http://cabbi.bo/c418/>



<http://void-ii.hi-res.net/room/urban-jungle>



<https://youtu.be/q4uZ5H0IT4Y?t=56>

2.3 Worlds, Characters and Story (if relevant)

2.3.1 Back Story

You are a normal person who enters a mysterious and simple room with a delicious-smelling muffin and a clear command: Eat me! Curious, and (to be honest) a little bored with your daily life, you decide to listen. Little did you know the adventure that would commence!

2.3.2 Spaces/Worlds

1. Office world: desk chairs, computers, typical colors, drab
2. Abstract landscape-like environment with bright colors and geometric shapes.

2.3.3 Characters

Player - You!. You are curious, explorative, and bored by your previous surroundings. You are delighted to explore your new worlds. Player character would be represented in-game as some kind of a floating entity with a hand that can interact with the world

2.3.4 Levels of Difficulty

None

2.4 Interaction Models

2.4.1 VR Interface - Navigation and Movement/Control

Potential locomotions:

1. Super man / balloon: The user can generate a large bundle of balloons from one of the controllers, and holding it up makes the user float. The user can point the controller in the direction they want to move, and releasing the button releases the balloons, which rise for a bit and fade.
2. Dissociation: the user can separate the camera from the character, and the user is essentially a floating camera, with the character in front of it. While floating, the camera could maybe move up and down very gently and slowly to indicate to the user that they are floating. The floating camera should be given a different perspective (wider angle of view? go very high up, like flying?) so that the world appears different and movement is less apparent. The user is now free to move around, and the acceleration of the movement will be made smooth to prevent sickness. Once a user decides on a location, they can land and return to their body, which is now at the new location. This may work without sickness because vehicles and flight seem to work, all of which have distinct kind of movements that the user can make sense of.
3. Chess: Maybe the user, once in the dissociated view mentioned in the previous idea, could choose the new location by grabbing and placing their body there—this could be interesting for other uses as well, like changing things on the character. Navigating their character from a bird's eye view could also be interesting. It could work by having a minimap-type board attached to a controller, which the user can bring up and move the character around in. While the user moves the character around, the user will be able to see a preview of the character's view, with most of the surroundings blurred out or remaining still. The transition in and out of the character first person would be a quick swoop/dive/warp or preview immersion.
4. Preview immersion: the user is able to manipulate an orb or a camera (from the perspective of the character), and is shown a live preview of what it will look like when the user teleports to that spot. It could be a floating screen above the horizon, or some other way that does not obstruct the view too much. Once the user confirms, it expands and surrounds the user, who is now at the new location.
5. Space-zip: the user can “unzip” the space in front and end up in the new location by indicating the new location and doing a downward swipe motion, which creates a portal to the new location that quickly surrounds the user.

2.4.2 Game Play Sequence and Levels

Muffin room (game lobby) that starts as ordinary, and you start the game by eating the muffin. After eating the muffin, the user is transported to the music room, where they exist for the rest of the experience.

2.4.3 User/Environment – Obstacles and Props

The user interacts with each environment in a similar way: hitting / popping. These objects can be bubbles, breakable objects, abstract shapes.

Stretch goal: additional gestures, i.e. following a sequence of gestures/motions or drawing shapes.

2.4.4 User/Character

N/A

2.4.5 Character/Character

N/A

2.4.6 Motion Tracking

Motion tracking will be used in gameplay, as well as in the muffin room. The player's motion will affect the appearance of objects and the environment, as if it is responding to the user. In gameplay, motion tracking will be used to check whether the user has hit the right object or completed the right gesture.

2.4.7 Multi-Player, 2.4.8 Mobile, 2.4.9 Networked Play

N/A

2.5 Performance and Scoring

2.5.1 State Variables

What are all the character, environment and gameplay variables necessary to save/restore or pause/resume the game or virtual world experience.

2.5.2 Feedback

Positive feedback: haptic feedback upon interacting with objects (in office and music room), being pulled by the muffin in the object room as soon as you make eye contact.

No negative feedback.

2.5.3 Performance and Progress Metrics

N/A

3 Game Design - Implementation Details

3.1 Design Assumptions

3.1.1 Hardware

HTC Vive

3.1.2 Software

Unreal Engine 4 or WebVR.

The upside of WebVR would be the reduced complexity when it comes to procedural work and collaborating on multiple computers. The upside of unreal is that it is a little more plug and play. We'd like your opinion on this.

3.1.3 Algorithms and Techniques

1. Collision detection for hitting objects with the controller
2. Extracting music qualities (frequency, amplitude, bpm) to drive elements of the music room.
3. Spline movement to direct the motion of several floating objects in the music room.
4. Interpolation to smooth the movement of objects according to the music.
5. Linear interpolation between color to smooth color transitions.
6. Random generation and spawning.
7. Changing the visual appearance of the walls and the visibility of objects based on game state.
8. Making the environment respond (in intentionally weird ways) to and encourage user movement and exploration.

3.2 Storyboards

Show storyboard sketches of your game environment and play sequences here. This should convey the look and feel of the game as well as illustrate the game play.

3.3 Design Logic

3.3.1 FSM - State/Effect

[Enter Muffin Room] → [Pick up the Muffin] → [Room warps, transported to Music Room] → [Music starts!] → [Interact with objects] → [Music ends]

3.3.2 User Solution/Actions

When the user looks at the muffin, it will draw them in so they will be almost certainly able to get to the music room quickly. At the start of the music room interaction, some interactions will be encouraged immediately so the user understands - aka, having bubbles immediately go to the user so the user understands they can pop them, etc.

3.4 Software Versions

3.4.1 Alpha Version Features (vertical slice through total experience)

The alpha version(s) represents the first time the game is “playable”. List the complete set of features to be included in the alpha version(s).

Picking up an object to enter a game, and proof-of-concept for the gameplay, where the user can interact with the spawned objects with the object in hand.

3.4.2 Beta Version Features

List the complete set of features to be included in the beta version

4 Work Plan

4.1 Tasks

List ALL the tasks and subtasks necessary to build the game application.

Provide separate descriptions of each task and subtask, which members of the group are assigned to it, and the expected task duration.

Muffin Room: 0.5 weeks

- Create room / assets (Davin)
- Game play actions for muffin (Luke)
 - Pick up
 - Transport

Magic Room: 1 week

- Create discrete distorted environment assets (Davin)
- Create object assets (Davin)
- Room interaction (Anosha)
 - Objects glow, etc when closer to them
 - Transport upon picking up objects

Games (3 types): ~1.5 weeks

- Audio: Import audio files and extract relevant data (Anosha)
- Environment:
 - Procedurally generate objects based on audio data (MinJae lead, others assist)
 - Add other assets, flourishes, etc to create visually pleasing environments (Davin)
- Game logic
 - Instruction at start (Anosha)
 - Take player position and calculate accuracy of movement (Luke)
 - Game difficulty changes (MinJae)
 - Win/lose conditions (Luke)
 - Exit game UI (Davin)

4.2 Milestones

4.2.1 Minor

Describe the functionality you plan to achieve (and will be able to demonstrate) at the end of each week of development

4.2.2 Major

Describe the major milestones of the project.

Alpha Version

Focus of this milestone is on having one magic-room with basic functionality complete and playable. Extracting information from audio files, game logic, getting user motions should be working. Game should be testable in VR.

Beta Versions

Describe the functionality you plan to achieve and demonstrate in the beta1 and beta2 versions.

Beta 1:

Focus of this milestone is generating procedural assets, completing secondary music-room functionality, and adding a basic transition from the Magic Room to the music-room. Game should be testable in VR.

Beta 2:

Focus of this milestone is on the Magic-Room - linking health to the room appearance, adding object assets, room navigation, and object manipulation. After this beta game functionality should be done with refining appearance + perhaps updating game-play actions.

4.3 Development Schedule

Organize your work plan tasks in some kind of readable format and attach it to this document.