GNG 2101

Design Project User and Product Manual

OCD Immersive Experience

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Table 1. Acronyms

Acronym	Definition
UPM	User and Product Manual
UE5	Unreal Engine 5
OCD	Obsessive Compulsive Disorder

Table 2. Glossary

Term	Acronym	Definition

1 Introduction

This User and Product Manual (UPM) provides the information necessary for the client, future GNG students, and any users of this product to effectively use the OCD Immersive Experience and for prototype documentation.

This document offers complete documentation of the OCD Immersive Experience starting with an overview, cautions, and warnings covering the project and product generally. Then in the getting started section, the document offers an insight into configurations and user access considerations, as well as accessing the system and the general system organization and navigation for the different sections of the product and experience. After that, the document delves into how to use the system by going over how the user would interact with the product in the different sections of the experience. Then the document starts to cover trouble shooting, maintenance, and support for the experience and product. After that, the document looks into the prototype documentation, including the subsystems, their BOM, equipment list, and the instructions. Lastly, the document covers the conclusion and recommended future work. All of those sections are accompanied by helping materials, such as figures, tables, and pictures if available and deemed necessary.

Before delving into this document, it is assumed that whoever is using this product or looking at the UPM has the minimum requirements needed to run all of the equipment and software listed in this document.

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2 Overview

People live different lives with different challenges, and some people experience disabilities and disorders which could affect their quality of life. Most of us never truly get to "walk a mile in someone's shoes." Which leads us to the fact that people often do not get to see the viewpoint of others, which creates a hurdle towards fostering empathy among ourselves, especially to those who may experience disorders and disabilities.

Empathizing with other people means providing community and societal support for people who need such support by making people more understanding of the experiences of people who have disabilities and disorders. Such empathizing development promotes fruitful personal growth and human connection. In addition, such change is viewed as educational awareness where it helps people be more ready and aware of such experiences. Lastly, this could lead to local and / or global impact given the right circumstances which would lead to a better understanding of communities and societies.

What is fundamentally needed here is a way of showing the insight or the viewpoint from the perspective of people who have disabilities or disorders presented in a fashion that conveys the message correctly and helps the user develop empathy.

Our solution to this issue comes in the form of a VR experience covering OCD that strives to foster empathy by allowing the user to go through a sample of someone's life experiences who suffers from such a disorder. This VR experience contains a cohesive, coherent, and a well – written story to convey our intended message portrayed as internal monologue as to make it more immersive. It is a short, easy and an uncomplicated way of helping foster empathy. Additionally, it accurately represents our chosen disorder of OCD as well as helps the user reflect by providing a reflection section at the end of the experience to help the user guide their empathizing journey.
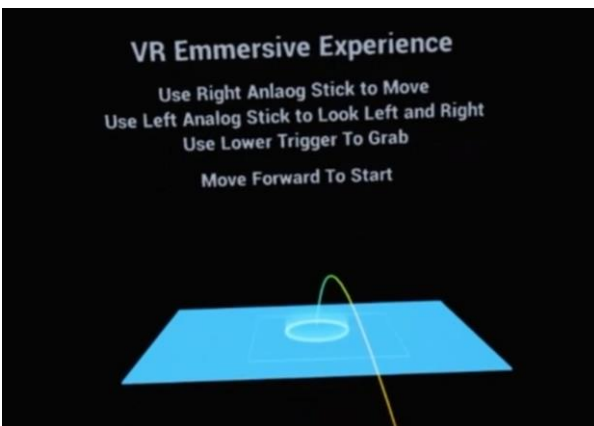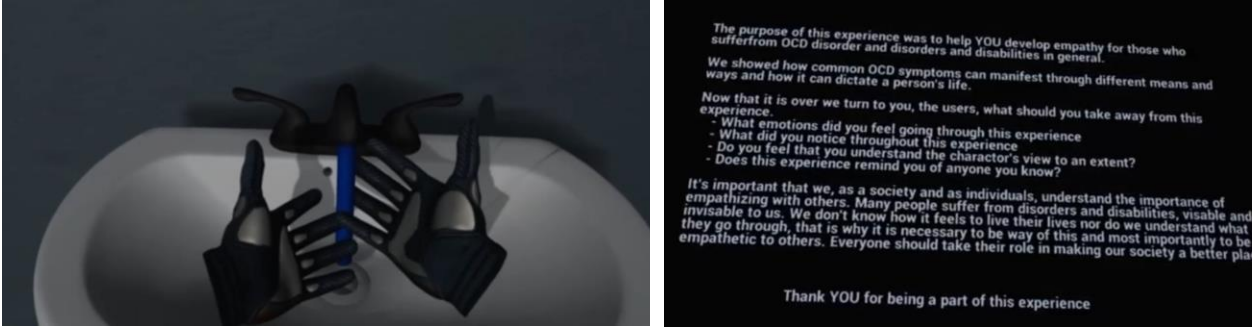
Figure 1 - Pictures of the Final Prototype

Our product could be described mainly as an interactive VR experience made to help develop empathy in the users. It's a program run locally on the user's VR headset or personal computer and using the controllers associated with the headset to interact with the experience. The user needs to install software needed to run the experience, including: SteamVR, Unreal Engine 5, and the Oculus App (or the equivalent software of any other VR headset).

2.1 Conventions

<No conventions are used in this document>

2.2 Cautions & Warnings

1. Physical Space: Make sure the space around you is safe and free of obstructions. Be aware of your surroundings.

2. Motion Sickness: Experience may cause motion sickness if you move around too quickly. Be cautious and stop playing if you feel sick or dizzy.

3. Physical Activity: Avoid sudden movements if possible and be mindful of your surroundings.

4. Epilepsy Warning: Certain visual effects and flashing lights in VR experiences in general may trigger seizures for individuals with photosensitive epilepsy. If you have a history of epilepsy or seizures, consult a doctor before playing.

5. Cables and Equipment: Make sure to set up equipment to minimise cables on the ground or around you. Possible tripping hazard.

6. Health Conditions: Consult a doctor before using VR if you have pre-existing conditions, such as heart problems, epilepsy, or other medical concerns.

By using this VR experience, you acknowledge and accept these health and safety guidelines. If you experience any adverse effects or discomfort, stop using the VR equipment immediately.

Note: ChatGPT was used as a guide here since these Cautions & Warnings are generic for our project.

3   Getting started

3.1   Configuration Considerations

The necessary software to install before running this program are as follows: UE5, SteamVR, and the Oculus App. First you must install the UE5 engine, following this link, https://www.unrealengine.com/en-US/download, and clicking download launcher. For SteamVR, you must install the game at this link, https://store.steampowered.com/app/250820/SteamVR/. For the Oculus App you must install the app at this link https://www.meta.com/ca/quest/setup/?utm_source=www.google.com&utm_medium=oculusredir ect, scroll down to download software, and install. After downloading all the software, run all the programs to install them, you may need to create accounts to continue if you do not have any so follow the steps on each app. For physical hardware needed it is just an oculus device, and an oculus link cable (USB-C to USB-C cable). You can wirelessly connect to the oculus; however, it can be slower than the cable.
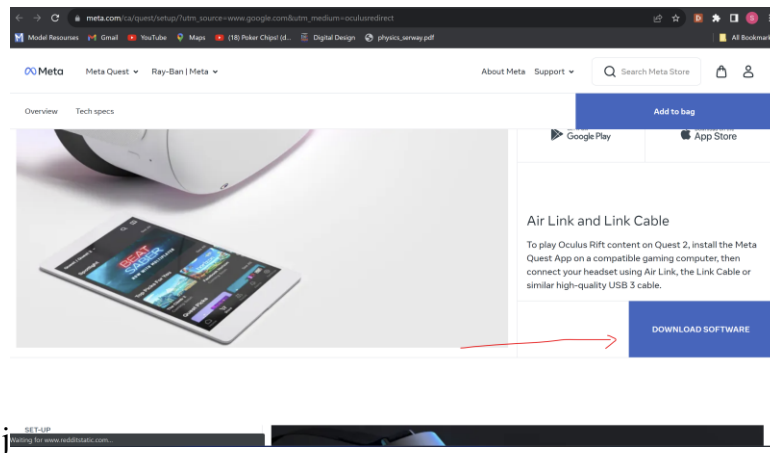

Figure 2 - Downloading the Oculus App
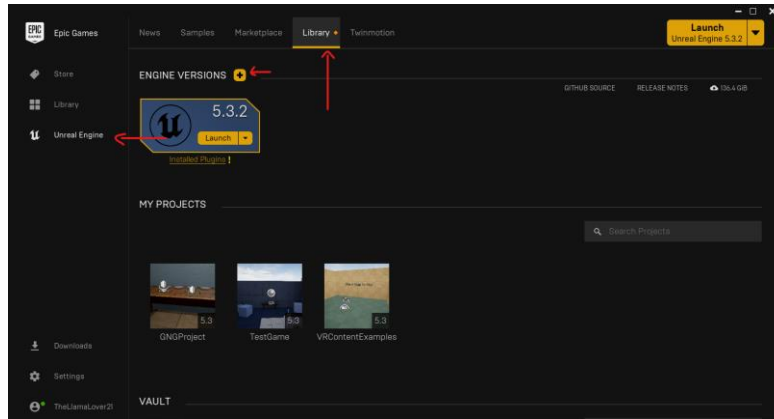
Figure 3 - Downloading Unreal Engine 5
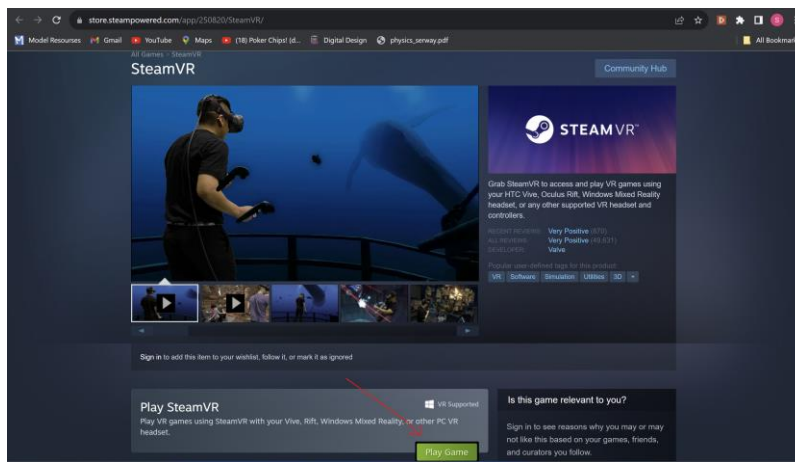
Figure 4 - Downloading SteamVR

3.2 User Access Considerations

The design of the app was made to allow many people to use this service, even with no previous knowledge of VR or other game consoles. The oculus headset has adjustable lenses for viewing so that people with different spaced eyes can view the image normally. This is a visual experience, so people with visual impairments will not be able to use the experience. Also, you need to use your hands to control the experience, and although the buttons and movement sticks are quite large, and few, if you have poor fine motor skills it may be hard to control the simulation.

3.3 Accessing/setting up the System

To turn on the VR experience, first open the oculus app, plug in the oculus device using the link cable, and then connect the device to a USB-C port on your computer. In the oculus app, select the connect device tab, and add the device. In your oculus headset, you may have to click the enable

quest link prompt that opens when you connect the device. Next run SteamVR, and after opening a small window should appear on your computer, that shows a headset connected, if not, ensure that the oculus app is connected to your headset. Finally open the experience file using UE5. Once the program is loaded, click the three dots near the top of the screen and click VR Preview. The experience should start and be running on your headset.
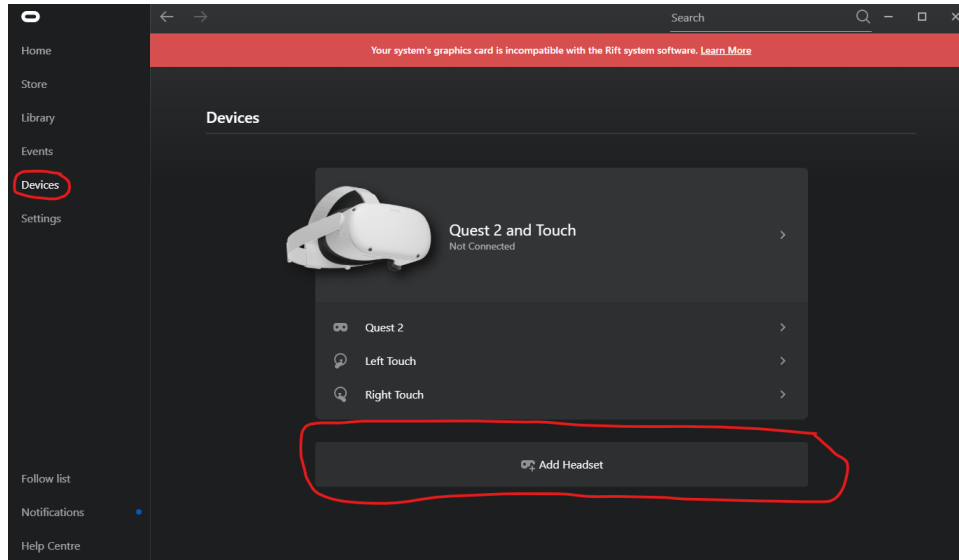
Figure 5 - Adding a headset on the Oculus App
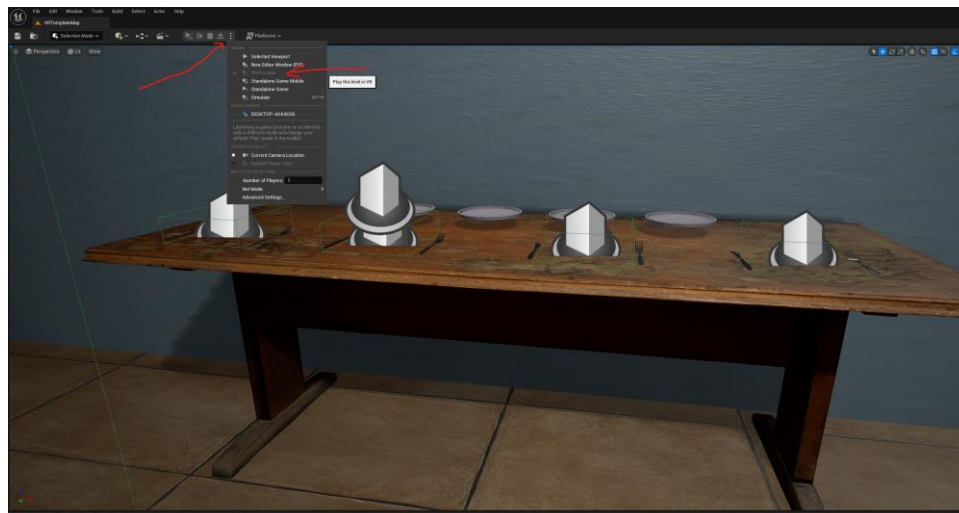
Figure 6 - VR Preview in Unreal Engine 5

3.4   System Organization & Navigation

3.4.1   Controls

The controls of the experience are limited, and easy to understand. The left analog stick pans the camera left and right. The Y button opens the menu, only needs to be used at the end of the simulation, or if experiencing any unforeseen technical difficulties. The right analog stick is used to teleport where the player needs to go. The bottom triggers held with your middle fingers are the grab buttons to grab the plates.
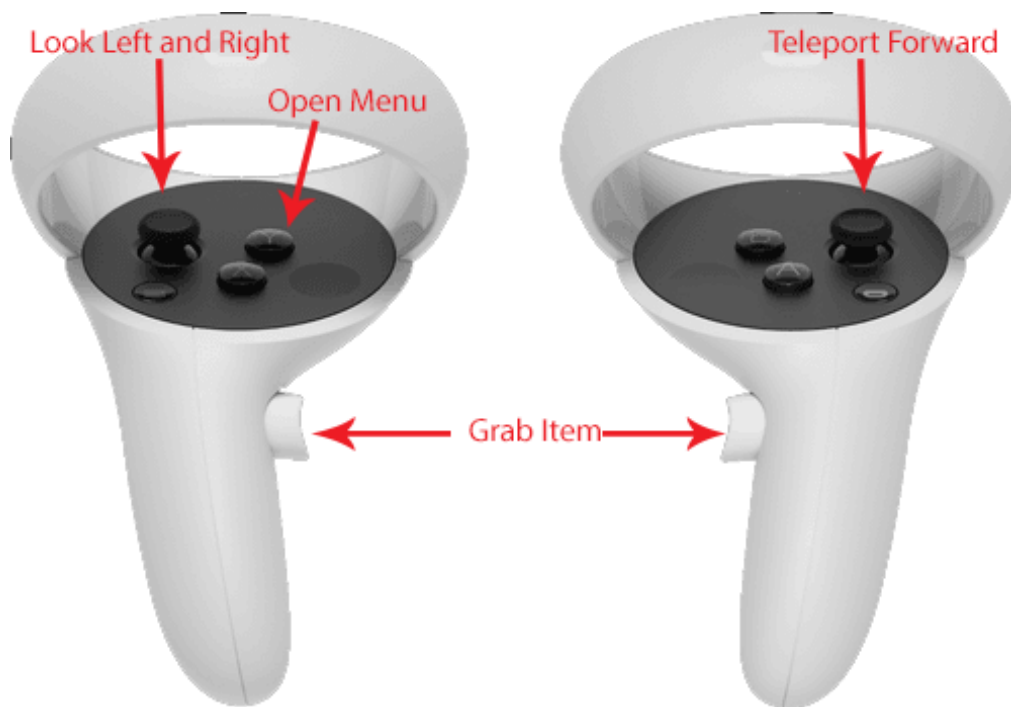
Figure 7 - Controls on the VR Controllers

3.4.2   Starting screen

This is the area you start in, and that tells you about the controls you need to get started. The player is told about the controls mentioned in 3.4.1. The player is then told to move forward to continue. This ensures that the player knows how to move the player, which is one of the most important aspects of the experience.

3.4.3 Main Experience

The user moves around the room that is put into. This is a small room resembling a dining room, that contains a table, a sink, and a door, the things that the user will be interacting with in this experience.

3.4.4 End Area

After the user completes the main experience, the user is moved to the end area, where he is debriefed and given some extra context as to what he has just experienced.

3.5 Exiting the System

To properly exit the simulation, you must press escape on the keyboard that is running the simulation. Once the simulation is halted, you may close all the needed software, such as UE5, SteamVR and the Oculus App, as well as disconnecting the Oculus Headset.

4 Using the System

The following sub-sections provide detailed, step-by-step instructions on how to use the various functions or features of the OCD Immersive Experience.

4.1 Setting the plates

In the simulation the user can set the plates by using the grab button and picking up a plate. Then the user must set the plates in a spot indicated by the blue circle. Once the plate is set the simulation detects this, removes the blue circles, and the experience continues.

4.1.1 Setting Individual Plates One at a Time

The plate setting system is designed in such a way that any plate can be set in any order, and the system will react by not considering this spot the next time you set the plates. This allows the user to complete the other tasks by leaving and coming back to a different spot, in any order. The user does have to be careful, as the simulation has no way of stopping you setting all the plates at once at the start, so if this is done, the simulation will continue, instantly completing the subsequent plate setting tasks, and the logic of the game, can break.

4.2 Washing Your Hands

In the simulation, the player will be instructed to wash their hands. To do so the player must use the move feature to move towards the sink. The player must then mimic washing their hands by putting them in the sink for a certain amount of time. While the player is washing their hands, the text boxes on screen will change, representing the character's thoughts while washing their hands. Once the task is done the user is instructed to complete the next task.

4.3 Checking the Door is Locked

Another task that the user will encounter is checking that the door is locked. This is the simplest task as it involves the user walking to the door and staying there for a set time. This is to just simulate that the character is just checking it is already locked, rather than locking it, which enhances the story by showing that the door was already locked, and the urge to check the lock was irrational.

4.4 Start and End Areas

Before the experience begins, the player is given the basic instructions and is instructed to move forward to start. This introduces the movement mechanic, the control that takes the most getting used to, and ensures that the user is able to move around the setting. Before moving the player to the room where the tasks are completed, they are given a brief story orientation. After all the tasks

are complete, the user is given a quick story ending, then an infographic to explain what the simulation was and what the user can take away from it.

5 Troubleshooting & Support

5.1 Error Messages or Behaviors

If the user encounters any problems in the simulation, the user can use the Y button to open the menu and use the right hand to select reset. This will usually fix any problems with experience. The most prevalent one is described in 4.1.1, and any problem like this, where the simulation is stuck, not moving on, a text box is persistent, can just be reset, which should reset the states of any of the problem parts of the simulation. Similarly, while only encountered during early prototypes, if the user escapes the designated area, or becomes stuck in a wall, you can reset the simulation.

5.2 Special Considerations

The system developed by our group should work on most VR headsets and should be able to be opened by most computers. For complete assurance that the system will work, the system was developed and compiled on a Windows 10 and 11 computers, using Unreal Engine 5, and run on a Meta Quest 2 device. If there are any issues while using different untested systems, you may have to adapt the project to work for these devices, however, they should be easily used by other devices.

5.3 Maintenance

The maintenance for this project mostly consists of upgrading the software if the current software becomes obsolete. This should not be an issue for many years; however, you may have to run the program on a newer version of UE5 and recompile for future devices.

5.4 Support

If you encounter an issue while running the program on UE5 the best place to get support is the Epic Games support page linked here: Epic Games Support Page. They have a community page, that allows you to get help quickly by people who have used the platform extensively, and Epic support, from Epic Games themselves, if the problem needs more expertise. If you have an issue with the Oculus quest and loading, running, or connecting the program to the device, you can use the following link to get to the Oculus help centre: Oculus Help Page.

6 Product Documentation

For the final prototype, the project was separated into two main subsystems: the main storyboard, and the VR simulation. The simulation storyboard was the hardest subsection to figure out properly, as it was the backbone of the entire simulation and thereby the project. It was also a major aspect of the project that the client wanted to work with.
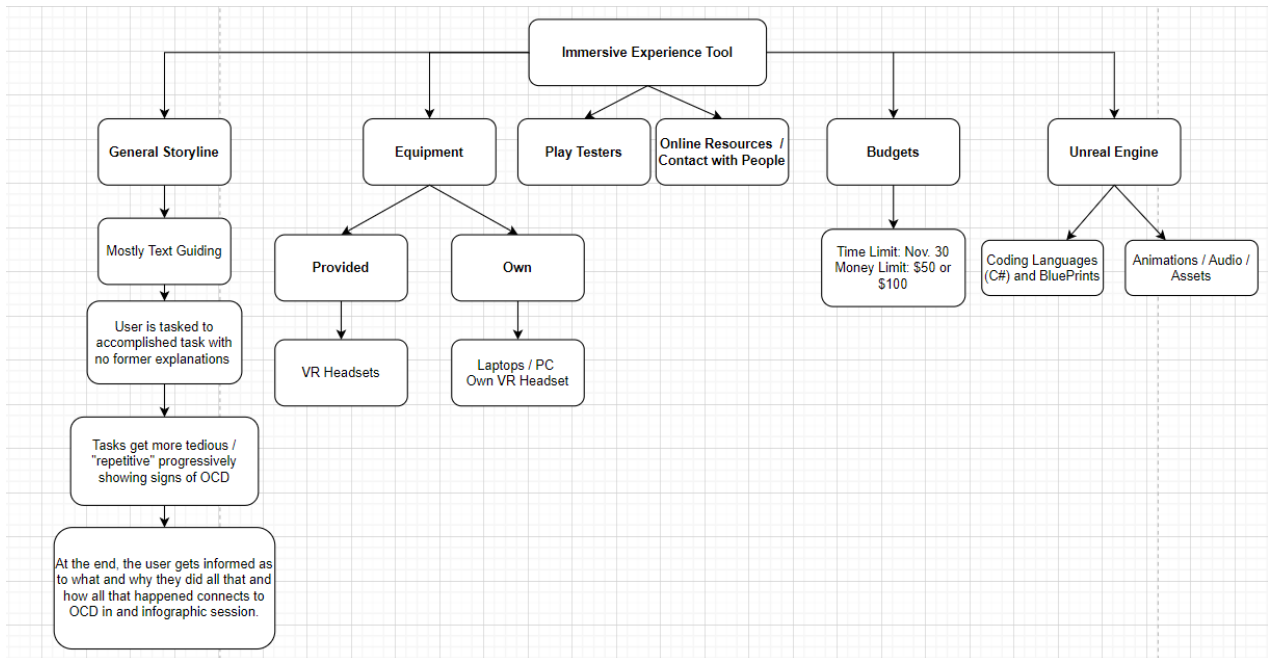

Figure 8 - General Flowchart of Project

6.1 Storyboarding

6.1.1 BOM (Bill of Materials) for Storyboarding Not Applicable

6.1.2 Equipment list

- draw.io (diagrams.net)
- Microsoft Word

6.1.3   Instructions

1. Rough Storyboard

   Start with a rough draft of all the elements you want to introduce to the simulation. These are the scenes/scenarios that are necessary for the simulation. Keep the storyboard simple at this point but leave room to change or edit the storyboard later. This is also where you can create a technical flowchart of all the aspects of the simulation, so that it's easier to implement what is needed to the VR experience.

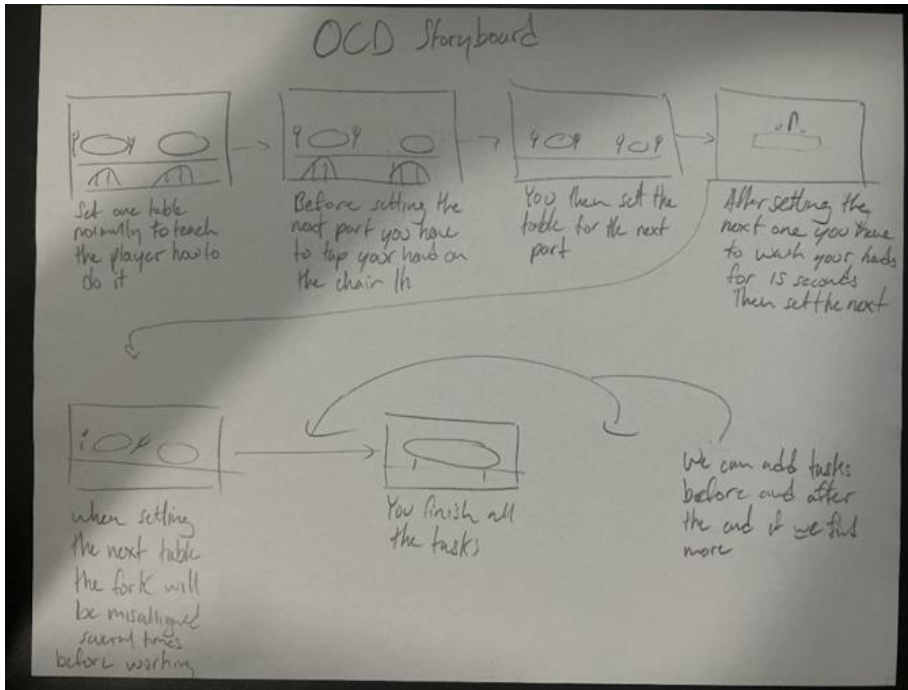*Figure 9 - Initial OCD Storyboard*

2. Refined Storyboard

   Once the technical flow of the simulation is created, the refined storyboard is made with the client's considerations in mind. The refined storyboard has more of the finer details of what the user will go through in the experience. It also shares the scenes and interactions that will go into the final prototype.
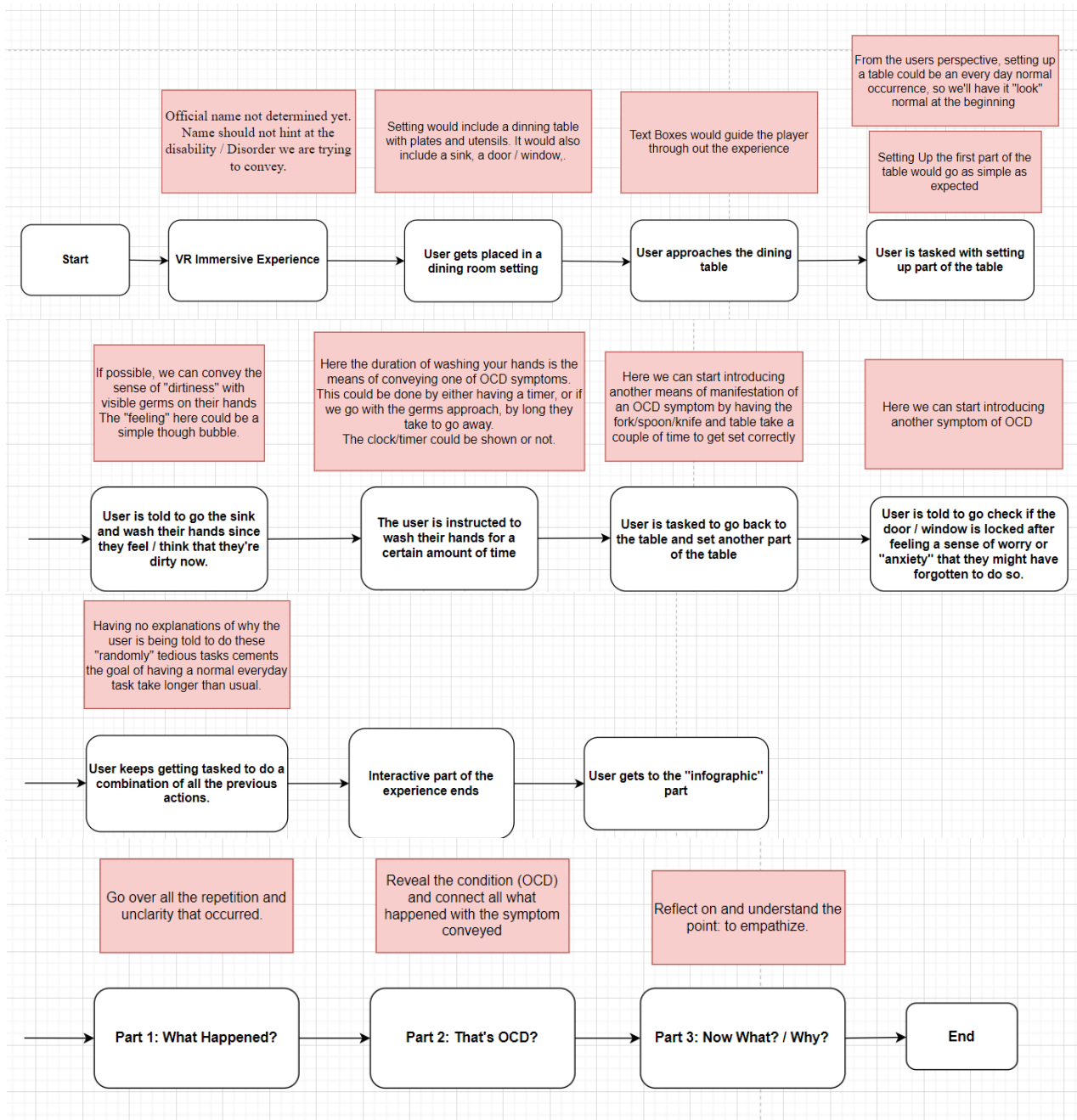
Figure 10 - Refined Storyboard

The storyboard contains the following flow:

Row 1:
- Start → VR Immersive Experience → User gets placed in a dining room setting → User approaches the dining table → User is tasked with setting up part of the table

Annotations (pink boxes):
- Official name not determined yet. Name should not hint at the disability / Disorder we are trying to convey.
- Setting would include a dinning table with plates and utensils. It would also include a sink, a door / window,.
- Text Boxes would guide the player through out the experience
- From the users perspective, setting up a table could be an every day normal occurrence, so we'll have it "look" normal at the beginning
- Setting Up the first part of the table would go as simple as expected

Row 2:
- User is told to go the sink and wash their hands since they feel / think that they're dirty now. → The user is instructed to wash their hands for a certain amount of time → User is tasked to go back to the table and set another part of the table → User is told to go check if the door / window is locked after feeling a sense of worry or "anxiety" that they might have forgotten to do so.

Annotations (pink boxes):
- If possible, we can convey the sense of "dirtiness" with visible germs on their hands The "feeling" here could be a simple though bubble.
- Here the duration of washing your hands is the means of conveying one of OCD symptoms. This could be done by either having a timer, or if we go with the germs approach, by long they take to go away. The clock/timer could be shown or not.
- Here we can start introducing another means of manifestation of an OCD symptom by having the fork/spoon/knife and table take a couple of time to get set correctly
- Here we can start introducing another symptom of OCD

Row 3:
- User keeps getting tasked to do a combination of all the previous actions. → Interactive part of the experience ends → User gets to the "infographic" part

Annotation (pink box):
- Having no explanations of why the user is being told to do these "randomly" tedious tasks cements the goal of having a normal everyday task take longer than usual.

Row 4:
- Part 1: What Happened? → Part 2: That's OCD? → Part 3: Now What? / Why? → End

Annotations (pink boxes):
- Go over all the repetition and unclarity that occurred.
- Reveal the condition (OCD) and connect all what happened with the symptom conveyed
- Reflect on and understand the point: to empathize.

3. Final Script

Once the refined script is completed and reviewed with the client, the final script can be made. This version has both the scenes that will be played out by the user, and the lines of text that the in-game character will read out.

Figure 11 - Sample of Final Story Development Board

6.2 VR Experience

6.2.1 BOM (Bill of Materials) for the VR Experience

Table 3 - BOM for the VR Experience

Item	Description	Source	Cost
Unreal Engine 5 (UE5)	Game engine	https://www.unrealengine.com/en-US	$0
VR Headset	VR headset to run	University / Personal	$0

GitHub	Software Version Control	https://github.com/	$0
Assets			
Plates	Plates for the player to stack	UE5 Quixel Bridge	$0
Room Textures	Design of the room the player is in	UE5 Quixel Bridge	$0
Table	Table where the player interacts	UE5 Quixel Bridge	$0
Sink	Where the player will wash their hands	UE5 Quixel Bridge	$0
Door	Where the player will check the lock	UE5 Quixel Bridge	$0
Total			$0

6.2.2   Equipment list

- Oculus Quest 2 VR Headset
- Personal Laptop or Computer
- Unreal Engine 5
- Oculus App

6.2.3   Instructions

Suggestion: Have some understanding of the software prior to the start of development to have an idea of how to convert the storyboard into the actual experience.

Start by launching the engine and creating a new project. Choose the blueprint template that suits your VR concept, such as the First Person or Third Person template. Then start with building the setting of the story. This is done by finding the assets that will be needed for the experience and then implementing them into the chosen template. Then using the tools provided in UE5, build the rest of the storyboard, and implement the interactions that the player will experience. Next implement the sections of the experience that are needed to make it complete, such as starting and

ending screens. Lastly, the VR experience must be play tested to find bugs, any unintentional features, and to test the cohesiveness from beginning to end of the experience.

6.3   Testing & Validation

Throughout the creation of the prototype, we had multiple users test and review the main aspects of the VR simulation and storyboard. For the storyboard portion, we had around 20 university students give reviews based on the accuracy of the simulation. The students were given a mini survey to help us determine their feedback and analyze the results.

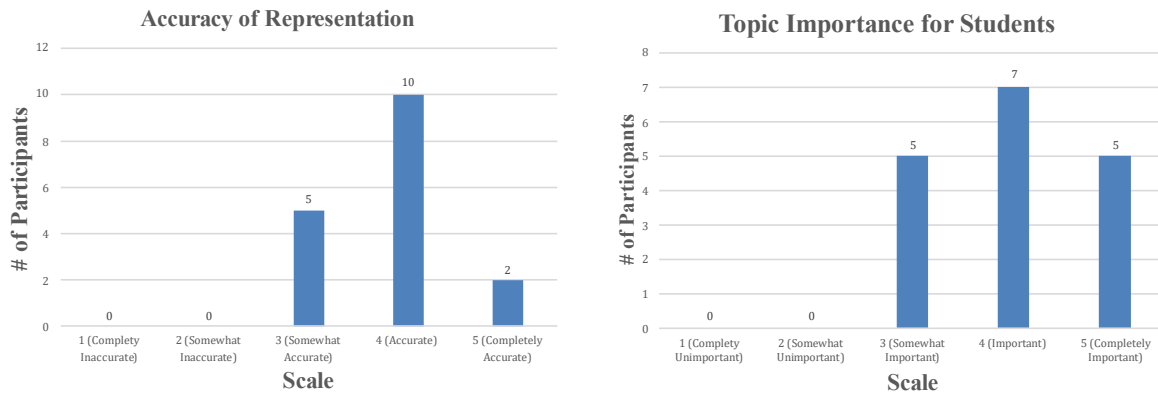# User Feedback

17 Participants – 71% at least a 4 on both

Figure 12 - Results from User Survey

Figure 13 - Design Day User Testing

7 Conclusions and Recommendations for Future Work

Overall, the project was a success with a lot of positive reviews and hard work put into it. One of the main learning points we figured out while working on the project was the importance of delegating tasks among team members so that all aspects of the project ran smoothly. Separating the main project into mini tasks that each group member could complete on their own time kept the project moving forward and made everyone accountable for the success of the group. We also learned about the importance on working on the storyboard as soon as possible, as we soon realized that it was the most important part of the simulation.

If we had a few more months to work on the project, we would have added in some quality-of-life fixes to the simulation itself. The simulation could have had a more detailed room layout to make it seem more realistic to a home environment, as well as changing some of the textures. We had also though about having the character reading the lines out loud while the simulation was going but scaled it down due to it being too confusing to new VR users.

For people trying to improve on the work we have done, we recommend on the storyboard and general meaning behind the simulation, as it is the most important part of building an impactful simulation.

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Start now! https://finmodelslab.com/blogs/startup-costs/vr-training-simulation-

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APPENDICES

9 APPENDIX I: Design Files

Link to MakerRepo: https://makerepo.com/Jamerob/1861.ocd-immersive-experience

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Table 4. Referenced Documents

Document Name	Document Location and/or URL	Issuance Date
Final Story Development and Script	Available on MakerRepo	29/11/2023
Project Deliverables Combined File	Available on MakerRepo	9/12/2023

10 APPENDIX II: Other Appendices

All critical work is documented in the project deliverables: [Here](#)