



Faculty of Computing
Fakulti Komputeran



MDECTM
Premier Digital
Tech Institution

BCM 3103 VIRTUAL REALITY

FINAL ASSESSMENT HOSPITAL TRAINING SYSTEM Group 23 Section 02A

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MODULE 1: COUNTER HOSPITAL & MEDICINE By: CB22141 NUR ALYA SYAKIRAH BINTI NASARUDIN

1. Introduction of VR Module



Figure 1 : Hospital Training

The VR simulation focuses on hospital training, particularly on handling medication and interacting with various elements in a hospital setting. The primary actor in this scenario is a nurse, and the interactions include grabbing medicine, using a counter, throw a rubbish, and dealing with sockets. Grabbing medicine is to simulate the process of retrieving and handling medication, basket is to ensure proper throw of rubbish, socket interaction is to the usage of equipment in a hospital setting. Using VR for hospital training creates a very immersive and realistic learning environment in which nurses can practise important skills. Furthermore, VR training is cost-effective, as it reduces the need for physical resources and allows for remote, scalable teaching at any time, improving overall efficiency and standardisation in nurse training programmes.

2. VR Technical Specification

VR Display :

The "Hospital Training: Counter Hospital & Medicine" VR uses an updated headset to give ultra-high-definition visuals, resulting in an immersive and realistic teaching experience.

VR Content :

- A medicine counter for storing medications.
- A counter for interact with patient.
- A dustbin for throw of used items.
- Hook for hanging decoration.
- Four mats (teleportation areas).
- Seven interactive items: medication bottles and boxes, foolscap paper, crumbled paper, photo frame (2) , mask.
- Objects produce sounds when hovered over or grabbed, and the mats and rug make sounds to assist with movement.

VR Interaction :

- Use the counter to prepare and organize medications
- Grab and handle items like medication bottles and boxes, foolscap paper, crumbled paper, photo frame and mask.
- Throw unused items in the dustbin.
- Hang photo frame into the hooks.
- Move around by stepping on mats (teleportation).
- Sounds appear when interacting with items.
- Interface like welcome canvas, step, information and instruction to more understand how to interact with the items.

3. Potential Market

1. Healthcare Organisations: Collaborate with hospitals and clinics to include the VR module into their employee training programmes, showing its efficacy through on-site workshops and trial programmes.
2. Medical Training Institutes: Collaborate with nursing schools, medical colleges, and vocational training centres to integrate the VR module into their curricula, offering students hands-on experience in a controlled, virtual environment.
3. Corporate Wellness Programmes: Provide the VR module to businesses with big in-house medical teams to supplement their own training and development programmes.

We can access these markets:

- I. Conduct webinars and virtual demos to highlight the VR module's features and functionality.

- II. Utilize digital marketing strategies, including targeted ads, content marketing, and partnerships with healthcare influencers to raise awareness and generate interest.

4. Technical Explanation on VR Development

- a. Interaction events with at least FIVE (5) grabbable objects as per real-world

I. Medicine Boxes



Figure 2 : Medicine Boxes

II. Medicine Bottle

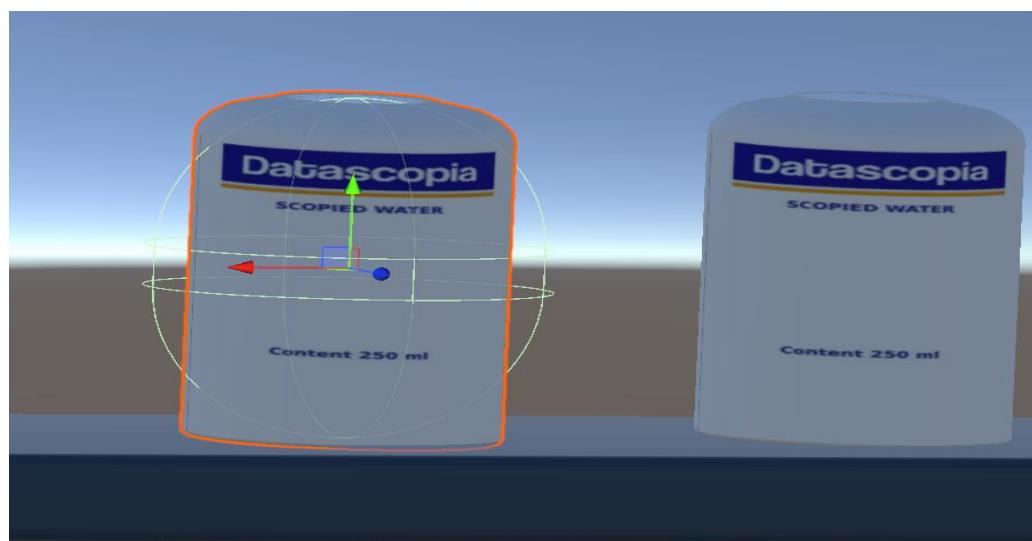


Figure 3 : Medicine Bottle

III. Crumpled paper

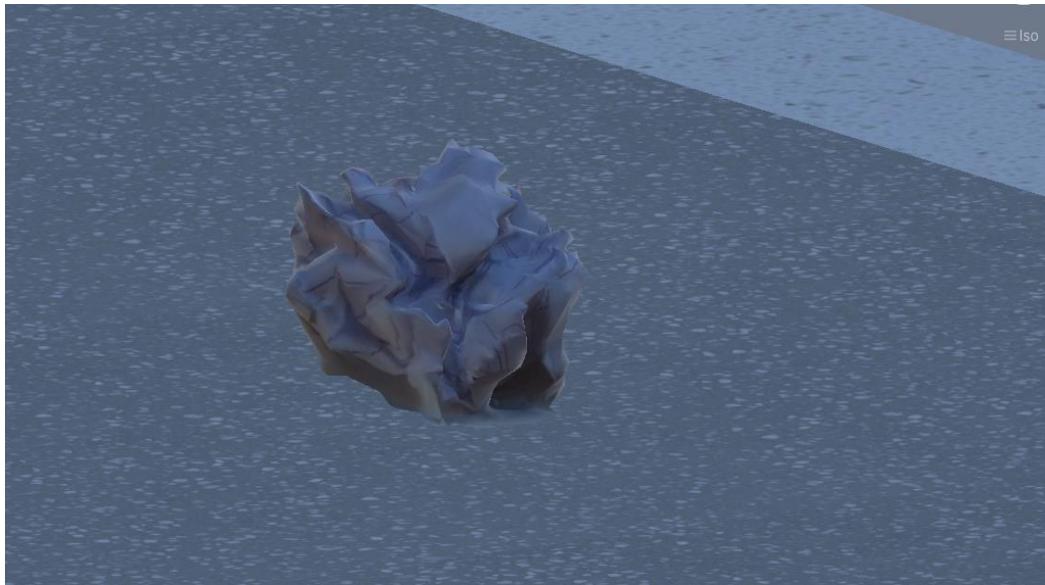


Figure 4 : Crumpled paper

IV. Foolscap paper



Figure 5 : Foolscap paper

V. Photo frame

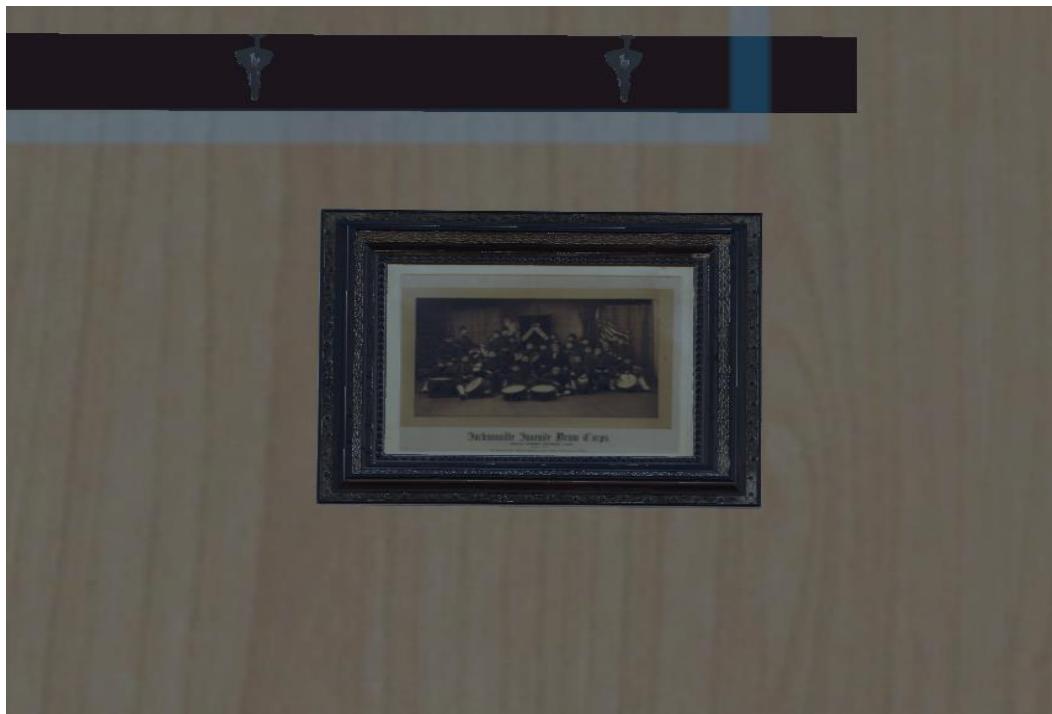


Figure 6 : Photo frame

VI. Photo frame



Figure 7 : Photo frame

VII. Mask



Figure 8 : Mask

- Here's are the setting of grabbable :

I. Medicine Boxes

To enable grab functionality for the Medical Boxes, a 'Box Collider' component was initially applied to prevent it from going below the floor level. Subsequently, the 'XR Grab Interactable' component was integrated, as illustrated in the figure below. This addition automatically included the 'RigidBody' component with Collision Detection configured as Continuous Dynamic, facilitating user interaction for grabbing medicines. Then, the Movement Type was found to be set to 'Kinematic'.

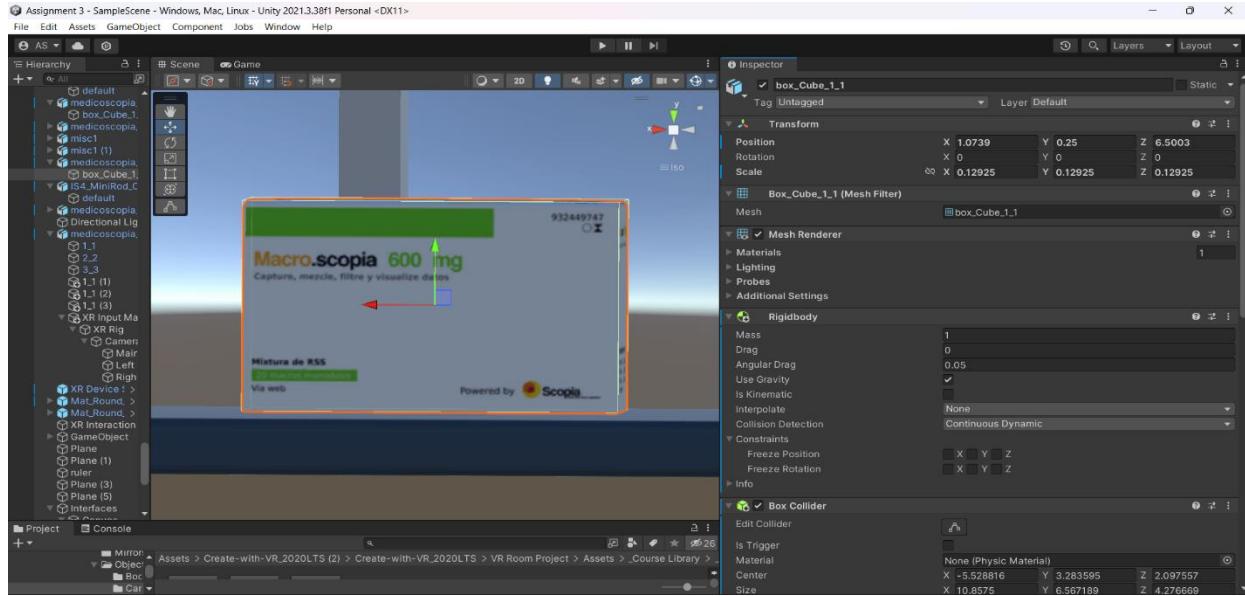


Figure 9 : Grabbable Setting of Medicine Boxes

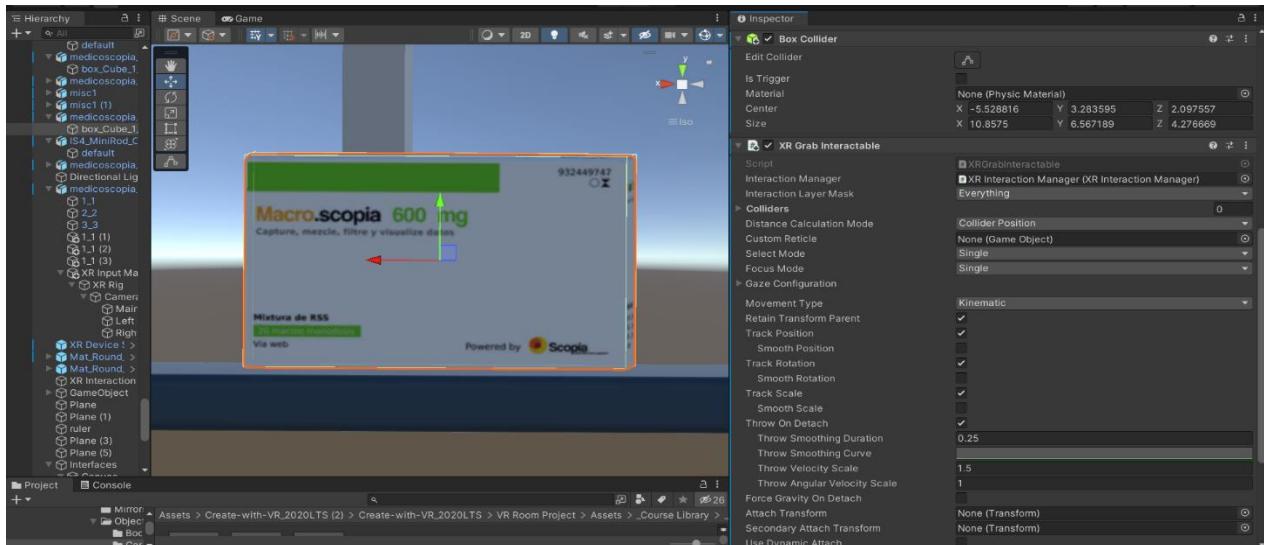


Figure 10 : Grabbable Setting of Medicine Boxes

Next, I save and play it to make sure its position and rotation so that the Medical Boxes align correctly when grabbed. In the figure below, you can see the overview



Figure 11 : Overview

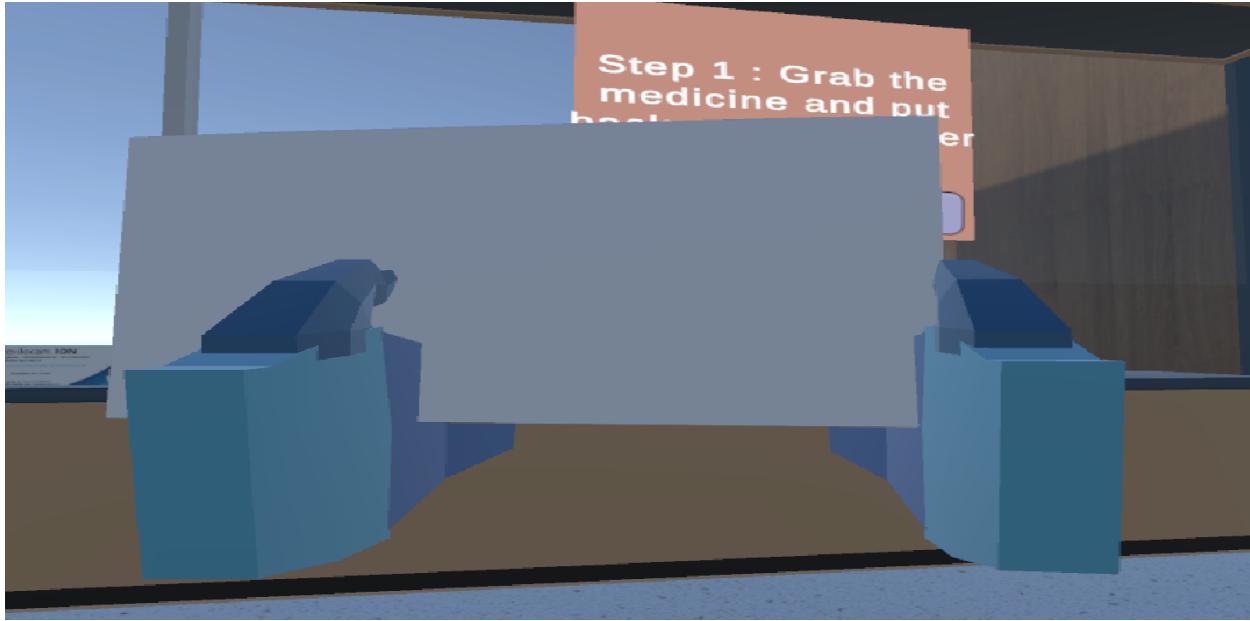


Figure 12 : Overview

II. Medicine Bottle

To enable grab functionality for the Medical Bottle, a 'Capsule Collider' component was initially applied to prevent it from going below the floor level. Subsequently, the 'XR Grab Interactable' component was integrated, as illustrated in the figure below. This addition automatically included the 'RigidBody' component with Collision Detection configured as Continuous Dynamic, facilitating user interaction for grabbing medicines. Then, the Movement Type was found to be set to 'Kinematic'.

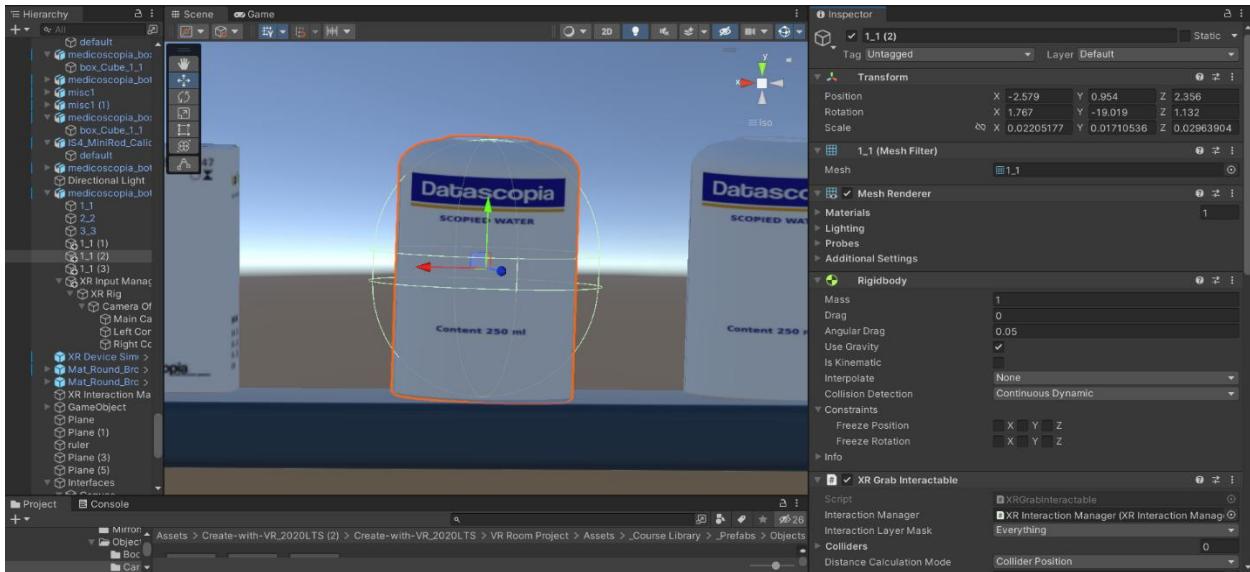


Figure 13 : Grabbable Setting of Medicine Bottle

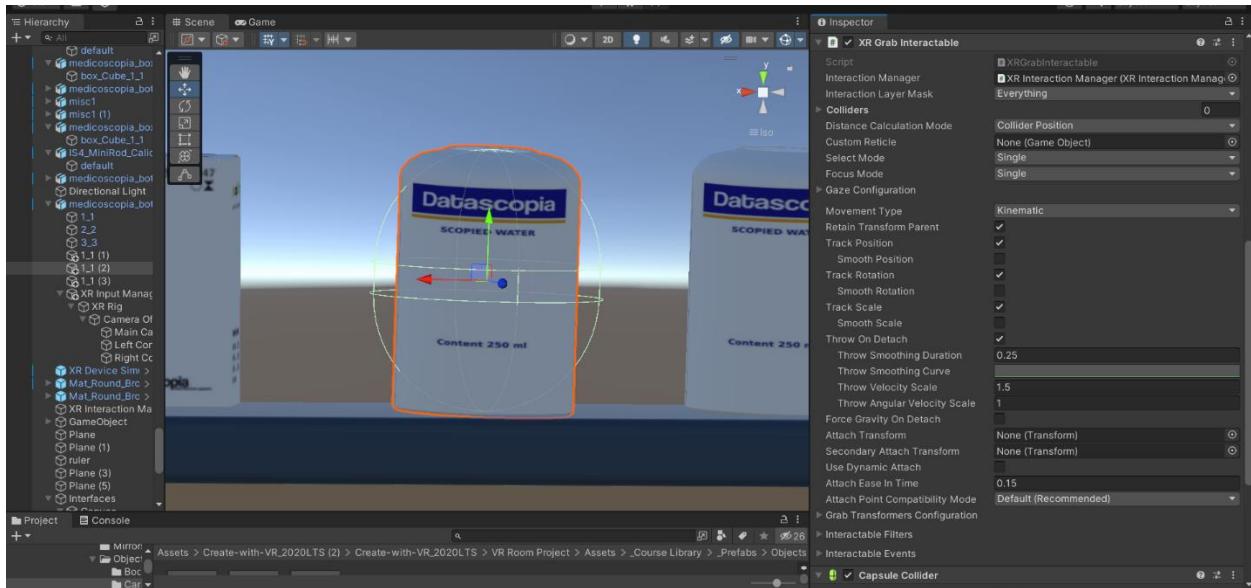


Figure 14 : Grabbable Setting of Medicine Bottle

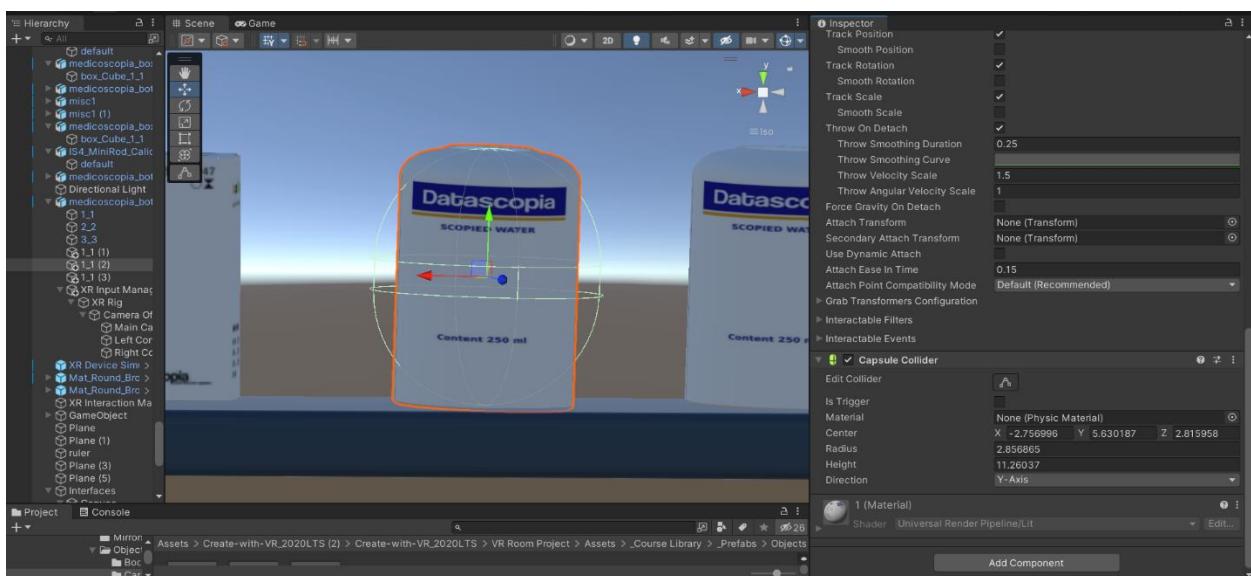


Figure 15 : Grabbable Setting of Medicine Bottle

Next, I save and play it to make sure its position and rotation so that the Medical Bottle align correctly when grabbed. In the figure below, you can see the overview

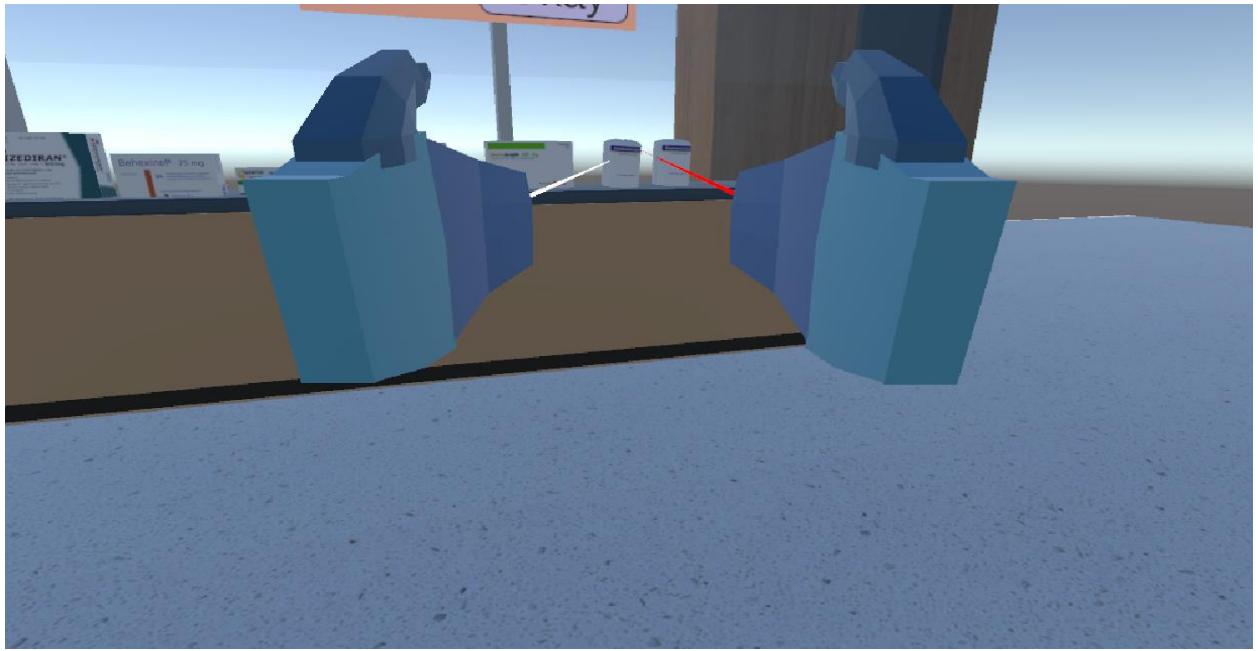


Figure 16 : Overview

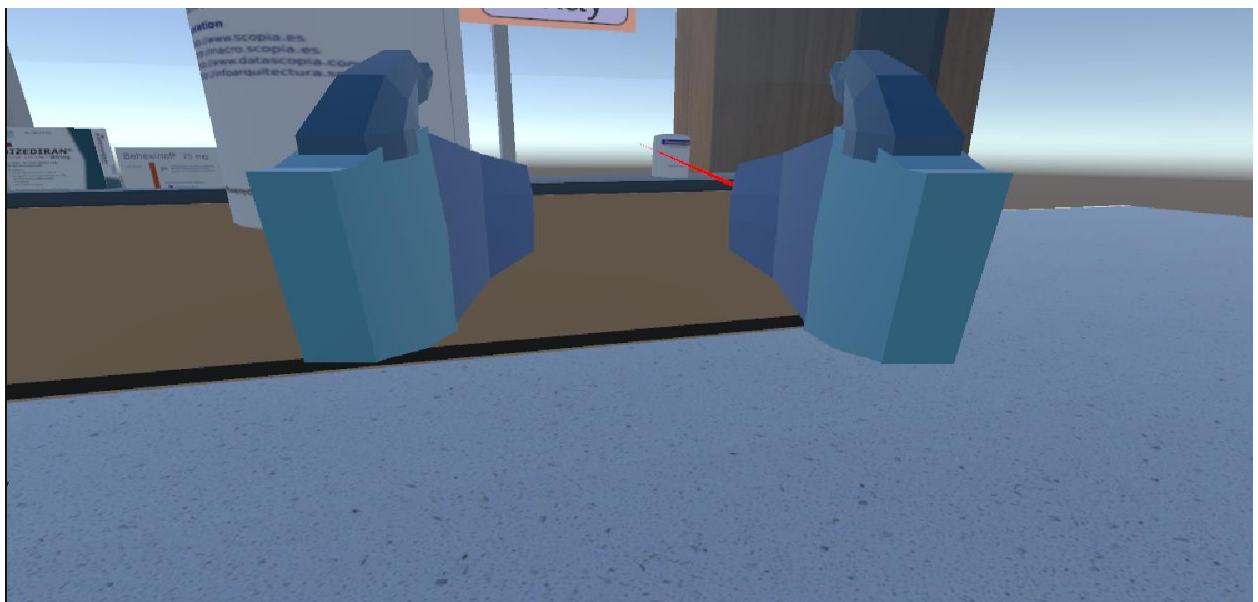


Figure 17 : Overview

After setting up the grabbing functionality, I created a box collider for put the Medical Boxes and Medical Bottles above stay at the counter Then I adjust as shown in the figure below.

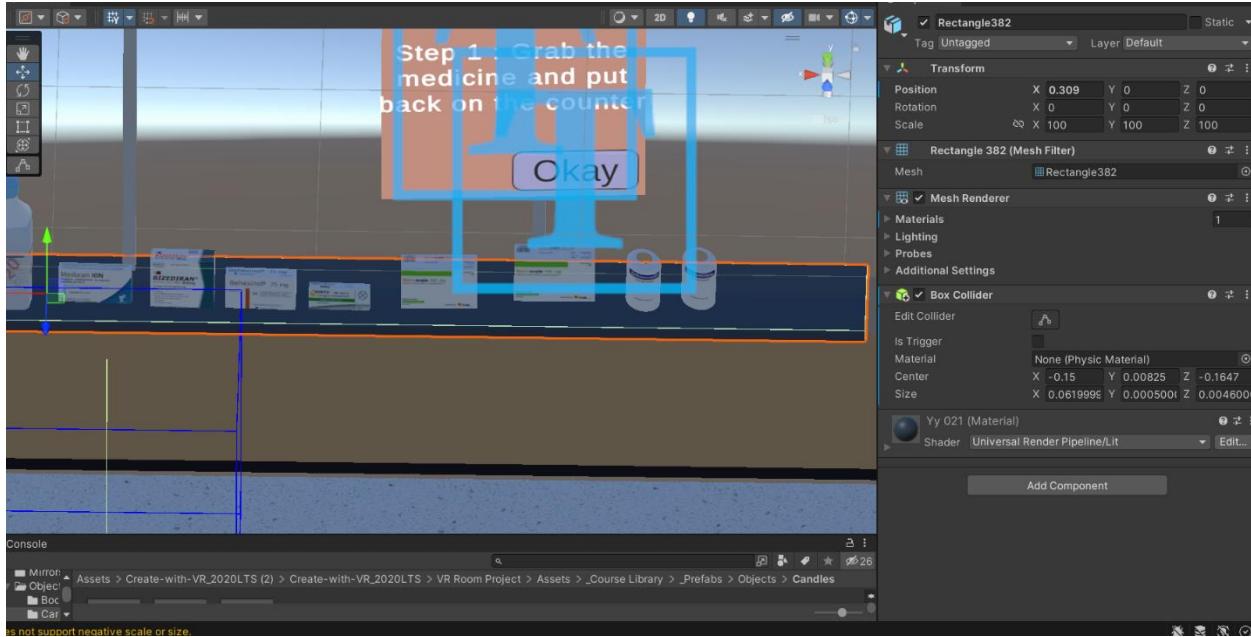


Figure 18 : Collider Setting of counter

As a result, when the user grabs the Medical Bottle, and place it above the stray it will not falling down because of the plane indicating it is set up well.

III. Crumbled paper

Similar to the Medicine Boxes and Bottle , the steps to develop interaction events with the crumbled paper is as follows:

“Sphere Collider component” is added to the crumbled paper objects to make sure they are not going under the floor and make sure that the Is Trigger is disabled.

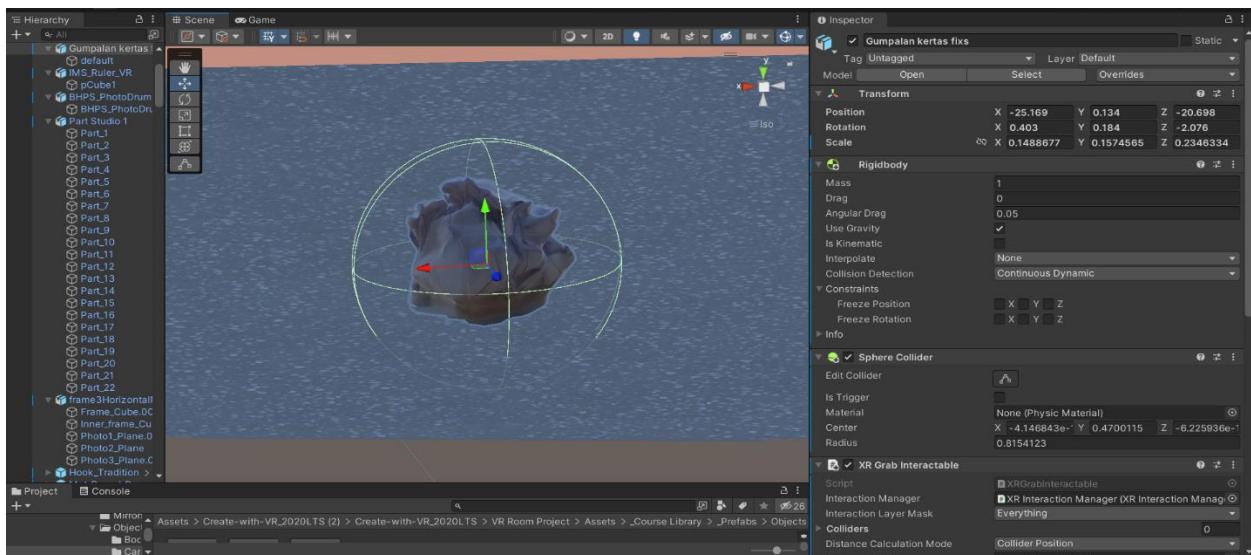


Figure 19 : Grabbable Setting of Crumpled paper

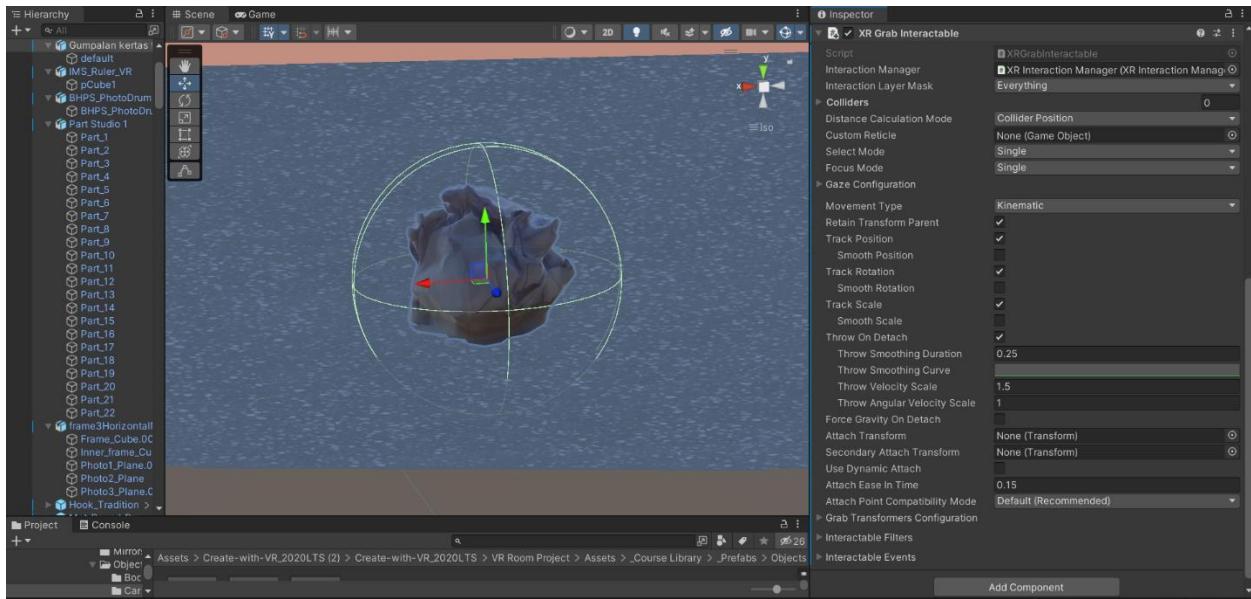


Figure 20 : Grabbable Setting of Crumpled paper

The XR Grab Interactable component is added to the crumpled paper. The Movement Type is set to "Kinematic".

As a result, the user will successfully grabs the crumpled paper as on figure below:



Figure 21 : Overview

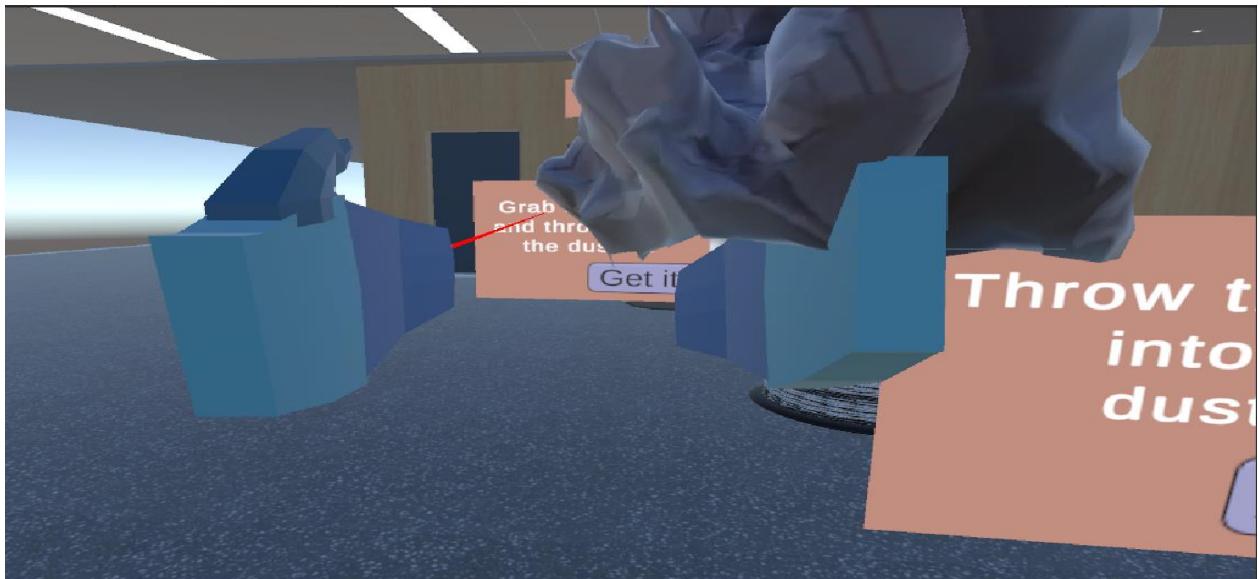


Figure 22 : Overview

IV. Foolscap paper

Similar to the previous , the steps to develop interaction events with the foolscap paper is as follows:

“Box Collider component” is added to the foolscap paper objects to make sure they are not going under the floor and make sure that the Is Trigger is disabled.

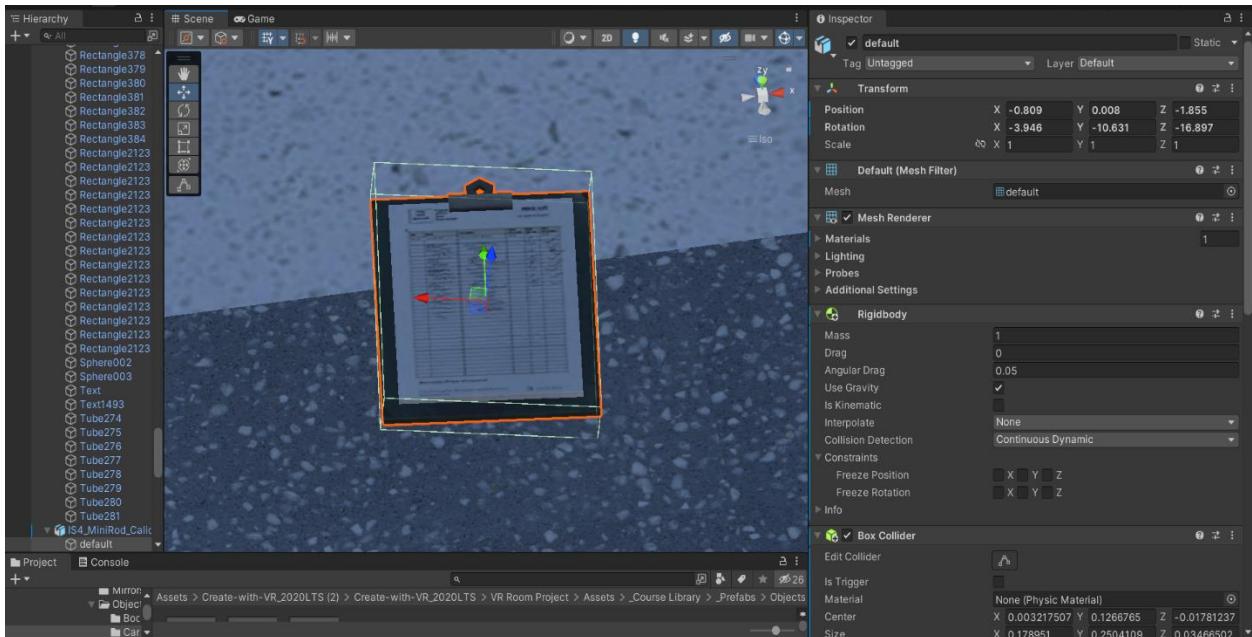


Figure 23 : Grabbable Setting of Foolscap paper

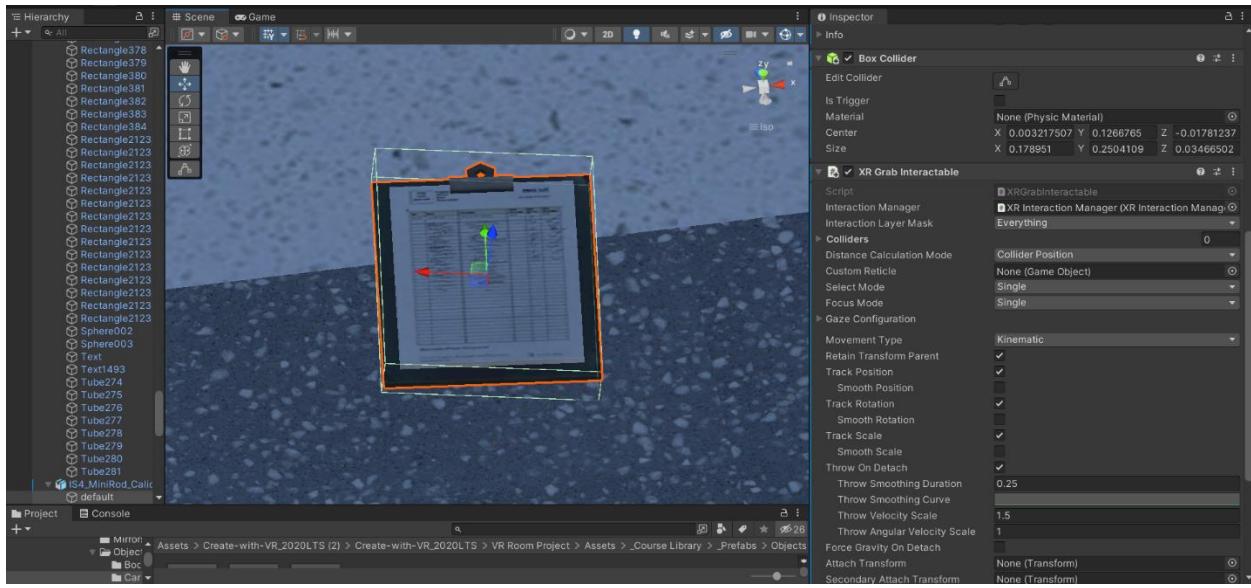


Figure 24 : Grabbable Setting of Foolscap paper

The XR Grab Interactable component is added to the foolskap paper. The Movement Type is set to "Kinematic"

As a result, the user will successfully grabs the foolscap as on figure below:



Figure 25 : Overview



Figure 26 : Overview

All crumbled paper and foolscap paper applied a Plane as a child of the Empty GameObject to make sure they will not falling down because of the plane indicating it is set up well.

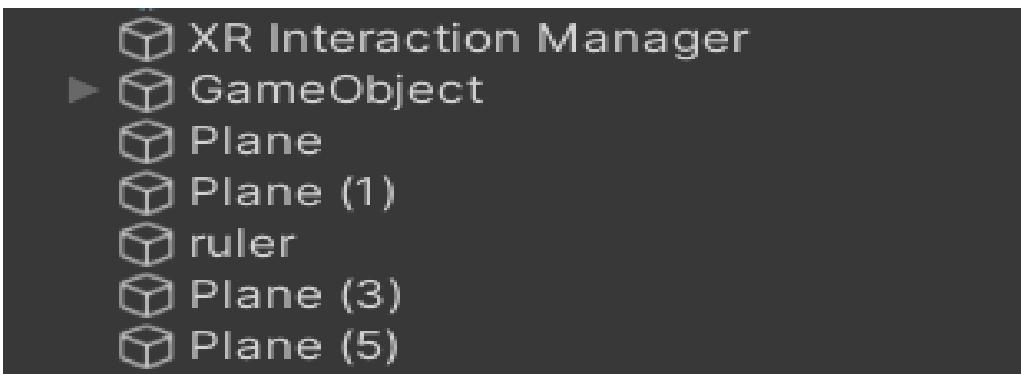


Figure 27 : Plane Setting

V. Photo frame

Similar to the previous , the steps to develop interaction events with the frame photo is as follows:

“Box Collider component” is added to the frame photo objects to make sure they are not going under the floor and make sure that the Is Trigger is disabled.

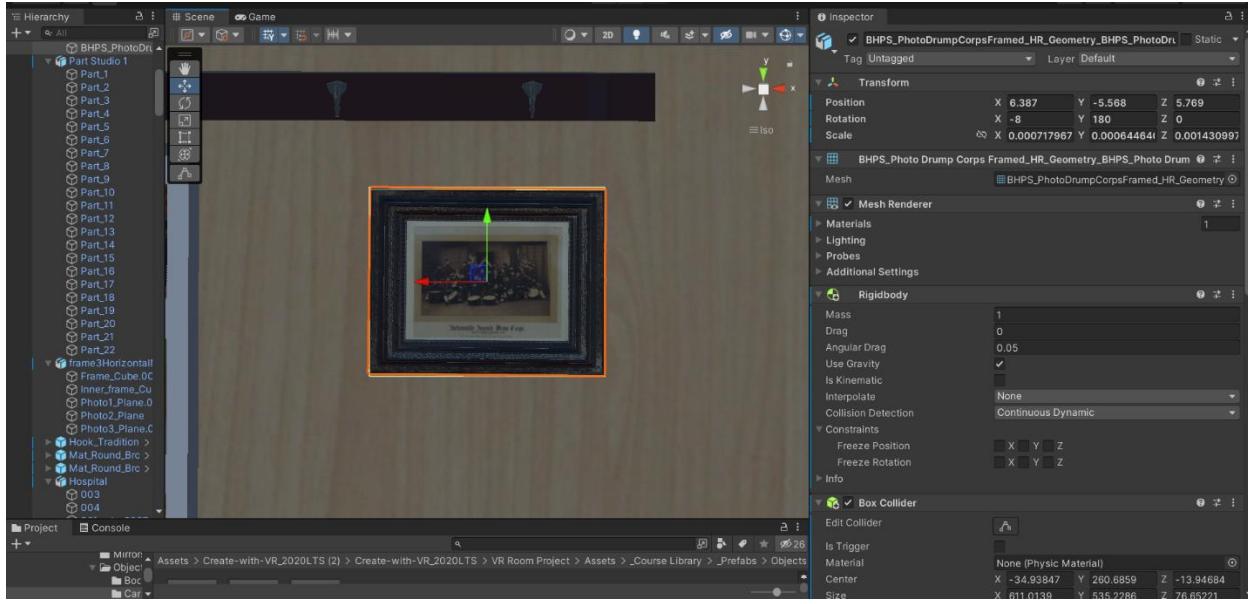


Figure 28 : Grabbable Setting of Photo frame

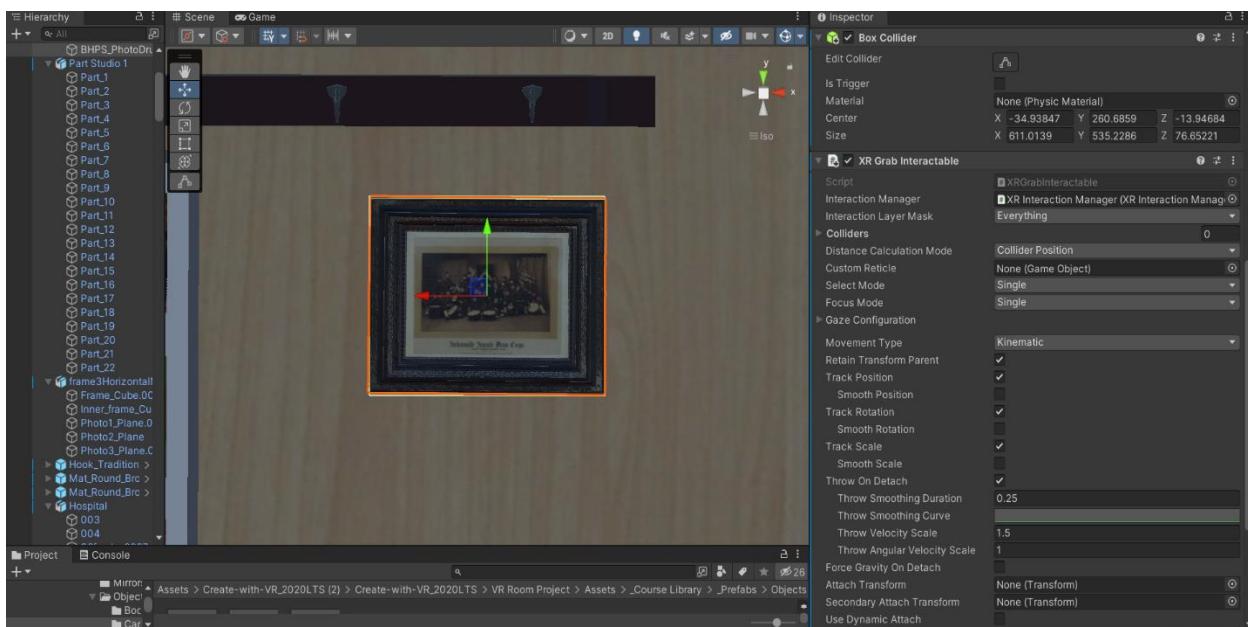


Figure 29 : Grabbable Setting of Photo frame

The XR Grab Interactable component is added to the frame photo. The Movement Type is set to "Kinematic"

As a result, the user will successfully grab the frame photo as on figure below:

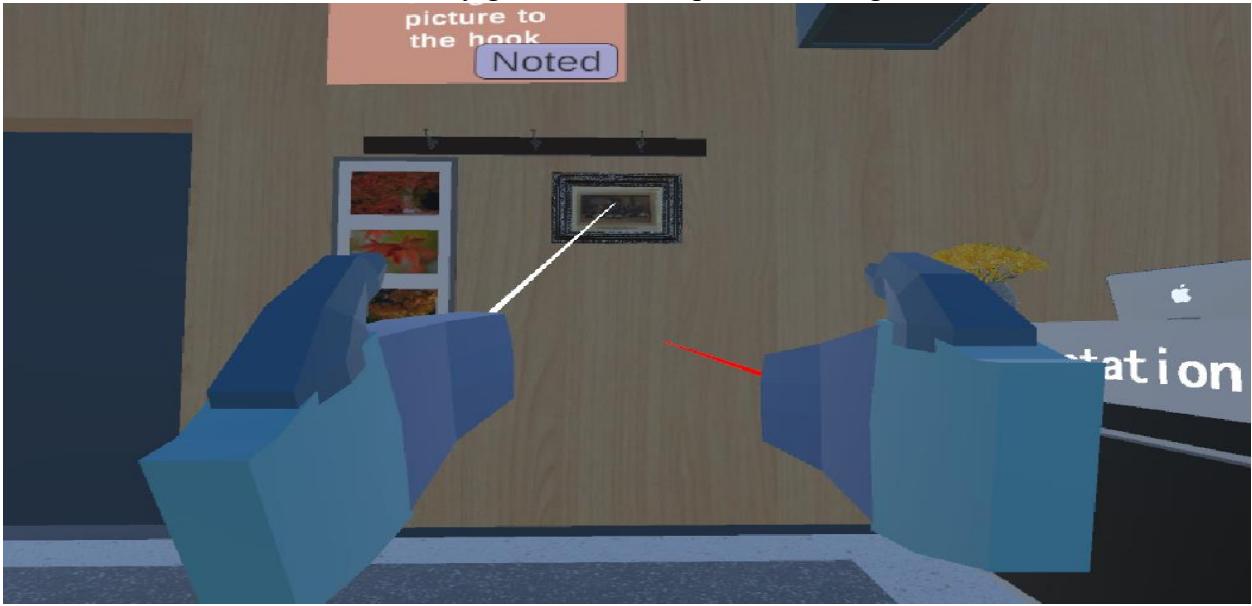


Figure 30 : Overview

VI. Photo frame

Similar to the previous , the steps to develop interaction events with the frame photo is as follows:

“Box Collider component” is added to the frame photo objects to make sure they are not going under the floor and make sure that the Is Trigger is disabled.

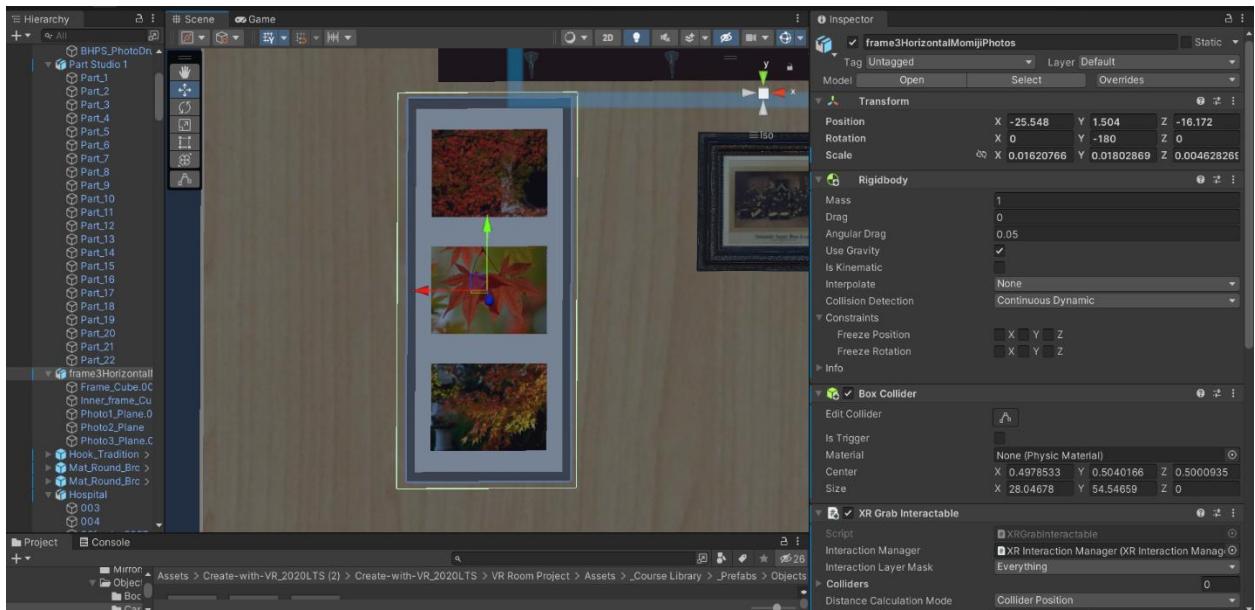


Figure 31 : Grabbable Setting of Photo frame

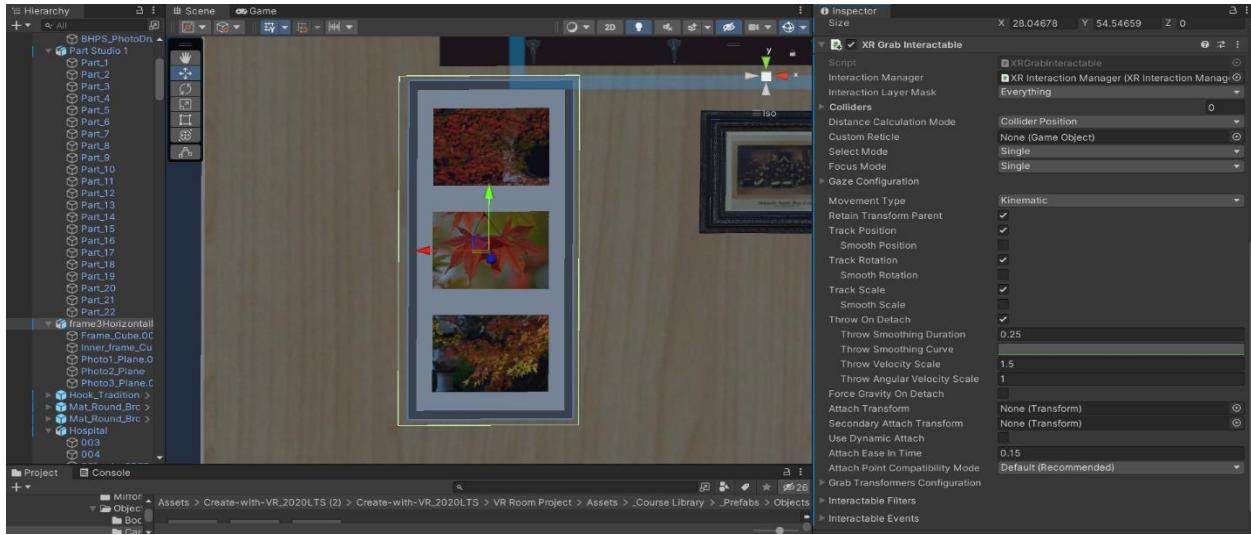


Figure 32 : Grabbable Setting of Photo frame

The XR Grab Interactable component is added to the frame photo. The Movement Type is set to "Kinematic".

As a result, the user will successfully grabs the frame photo as on figure below:



Figure 33 : Overview

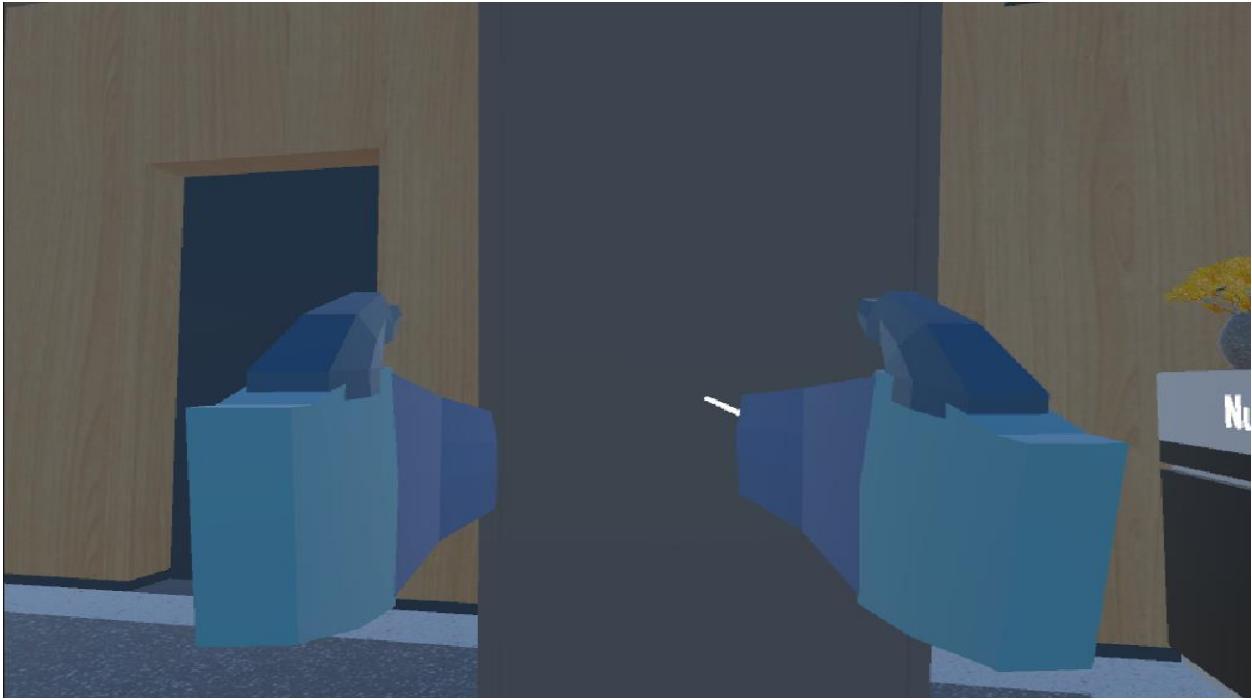


Figure 34 : Overview

VII. Mask

Similar to the previous , the steps to develop interaction events with the mask is as follows:

“Box Collider component” is added to the frame photo objects to make sure they are not going under the floor and make sure that the Is Trigger is disabled.

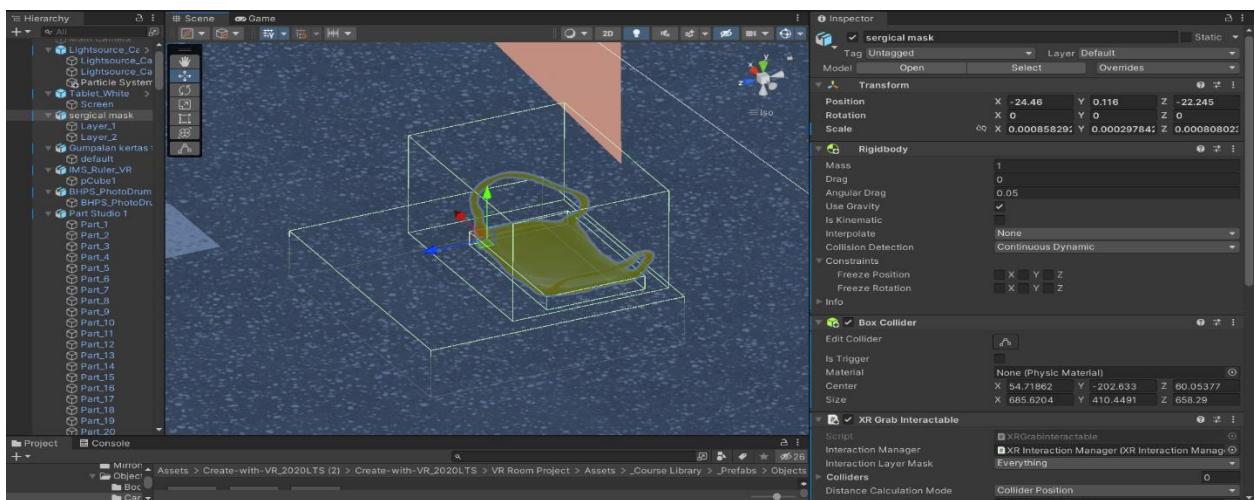


Figure 35 : Grabbable Setting of mask

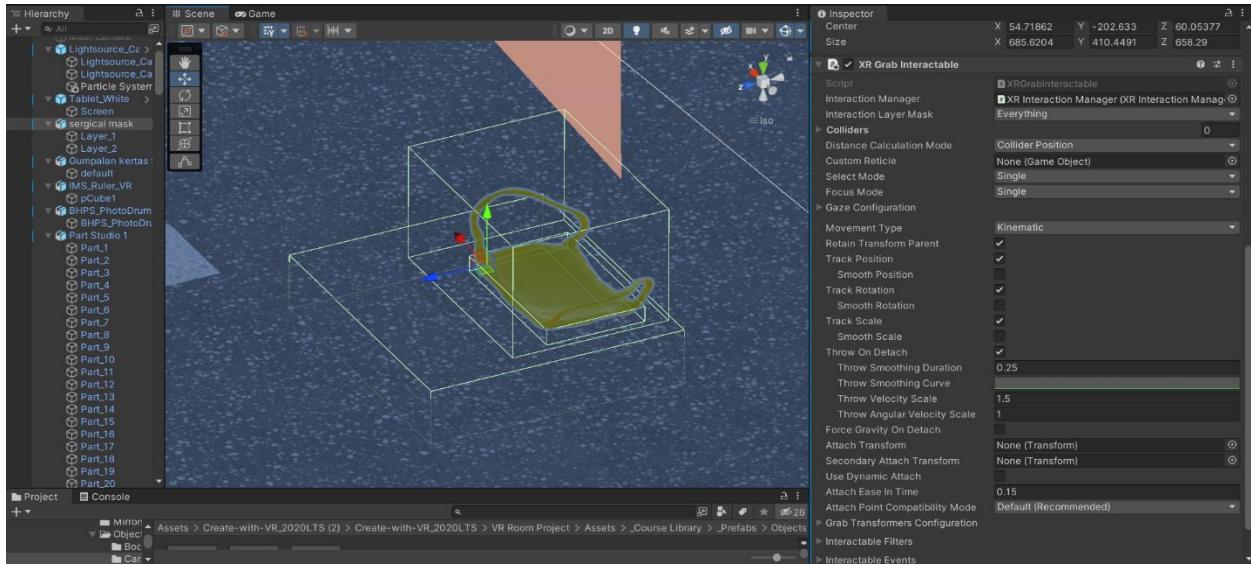


Figure 36 : Grabbable Setting of mask

The XR Grab Interactable component is added to the mask. The Movement Type is set to "Kinematic"

As a result, the user will successfully grabs the frame photo as on figure below:



Figure 37 : Overview



Figure 38 : Overview

For mask i have applied a Plane as a child of the Empty GameObject to make sure they will not falling down because of the plane indicating it is set up well.

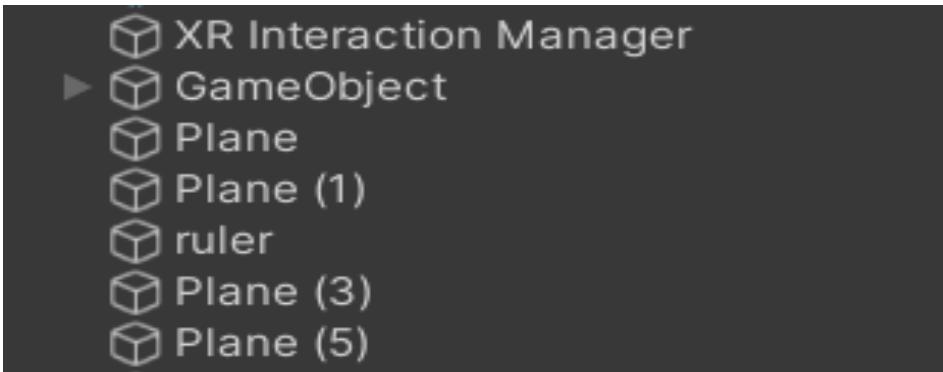


Figure 39 : Plane Setting

b. Ray Interactor for UI & Teleport

Users need to press “T” key to rotation on the left-hand controller or “Y” key for the right-hand controller. The button can only be selected using the ray interactor. As shown in the figure, the button is selected by the ray interactor, and after clicking it, the UI will disappear.



Figure 40 : Overview



Figure 41 : Overview

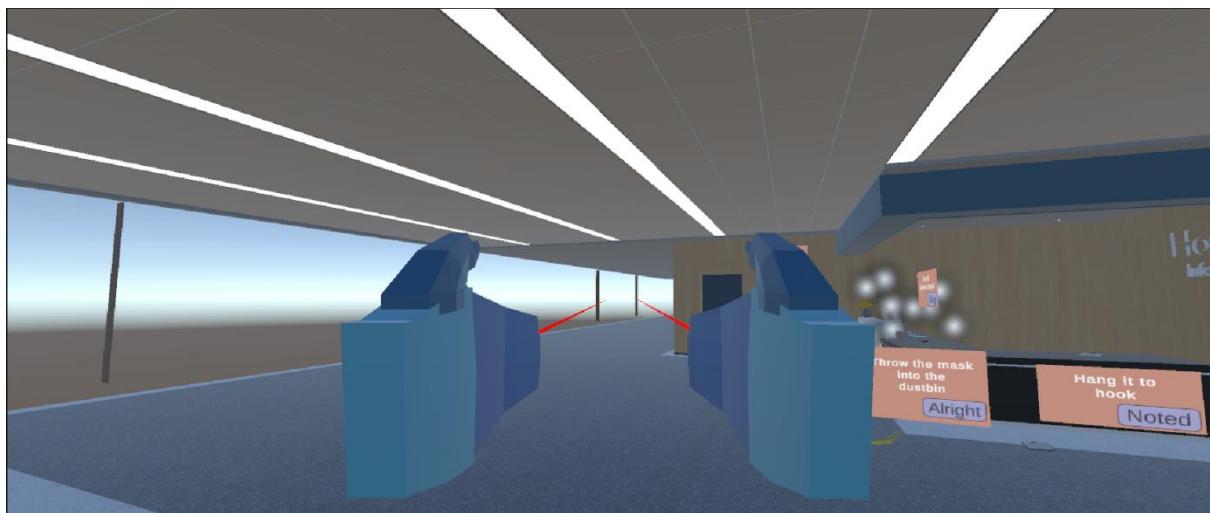


Figure 41 : Overview

After that, the ray interactor activates for teleportation. Users can point the ray interactor to a specific area they want to teleport to and press the "G" key. After pressing "G," users can teleport to that area as shown in the figure.

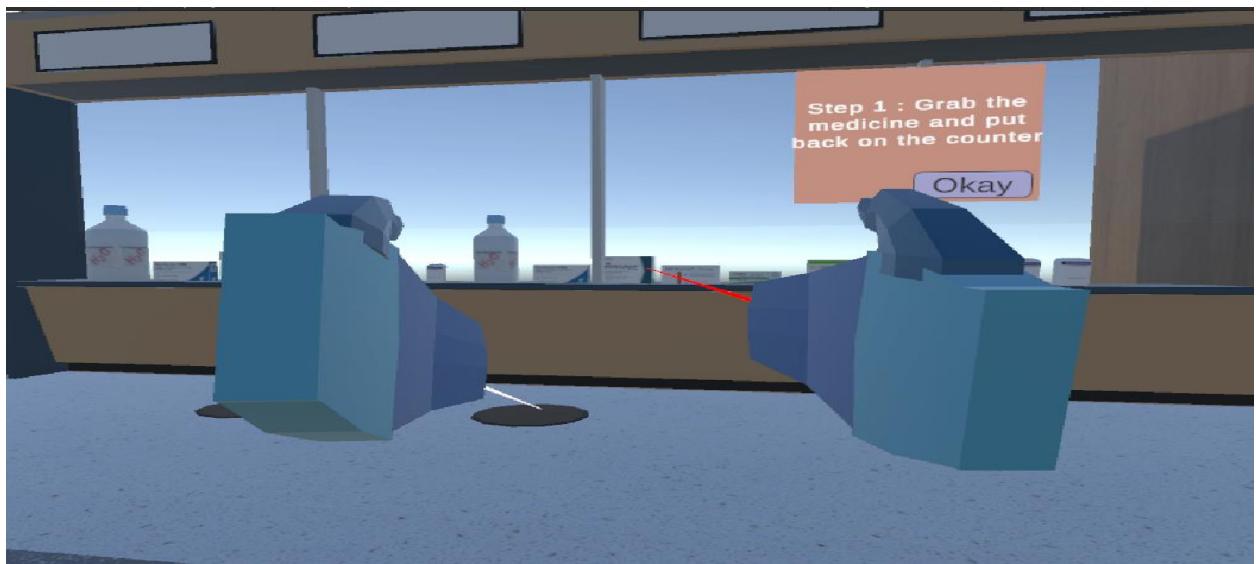


Figure 42 : Before teleportation



Figure 43 : After teleportation

To activate the ray interactor, I add component on left hand controller and right hand controller which is XR Ray Interactor (using Raycasts), Line Renderer, and XR Interactor Line Visual.

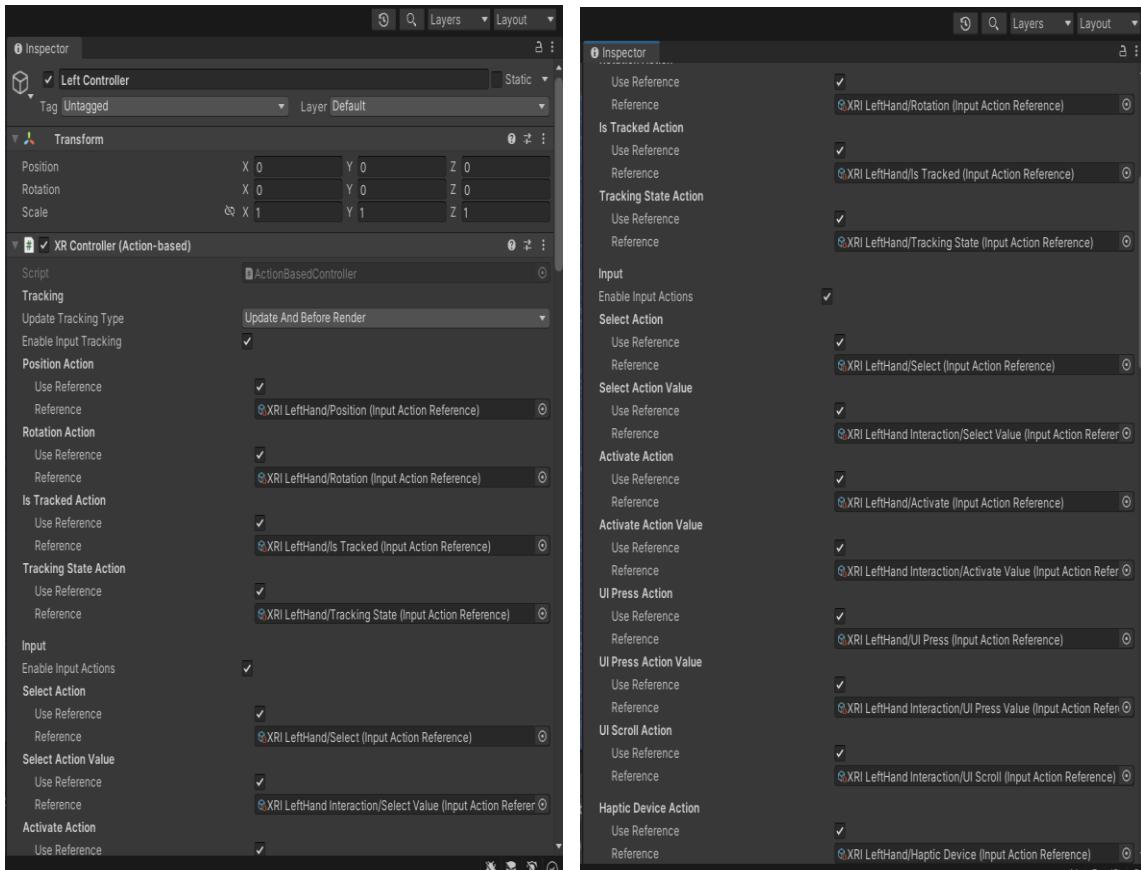


Figure 44 : Left right hand controller setting

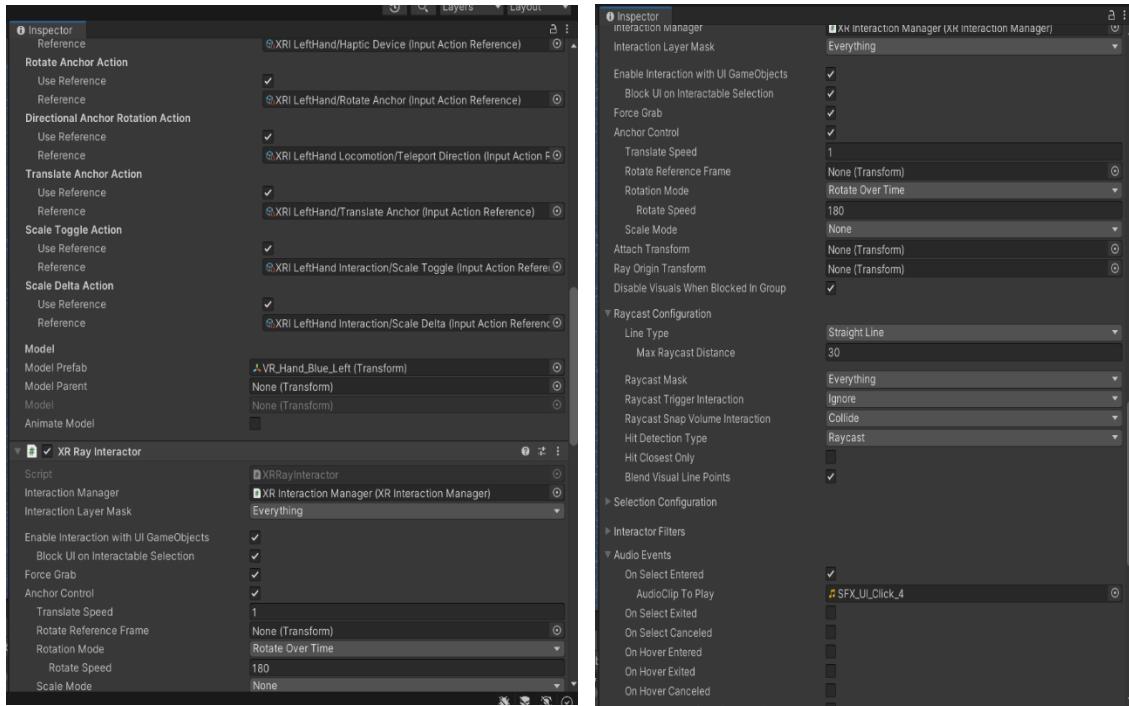


Figure 45 : Left right hand controller setting

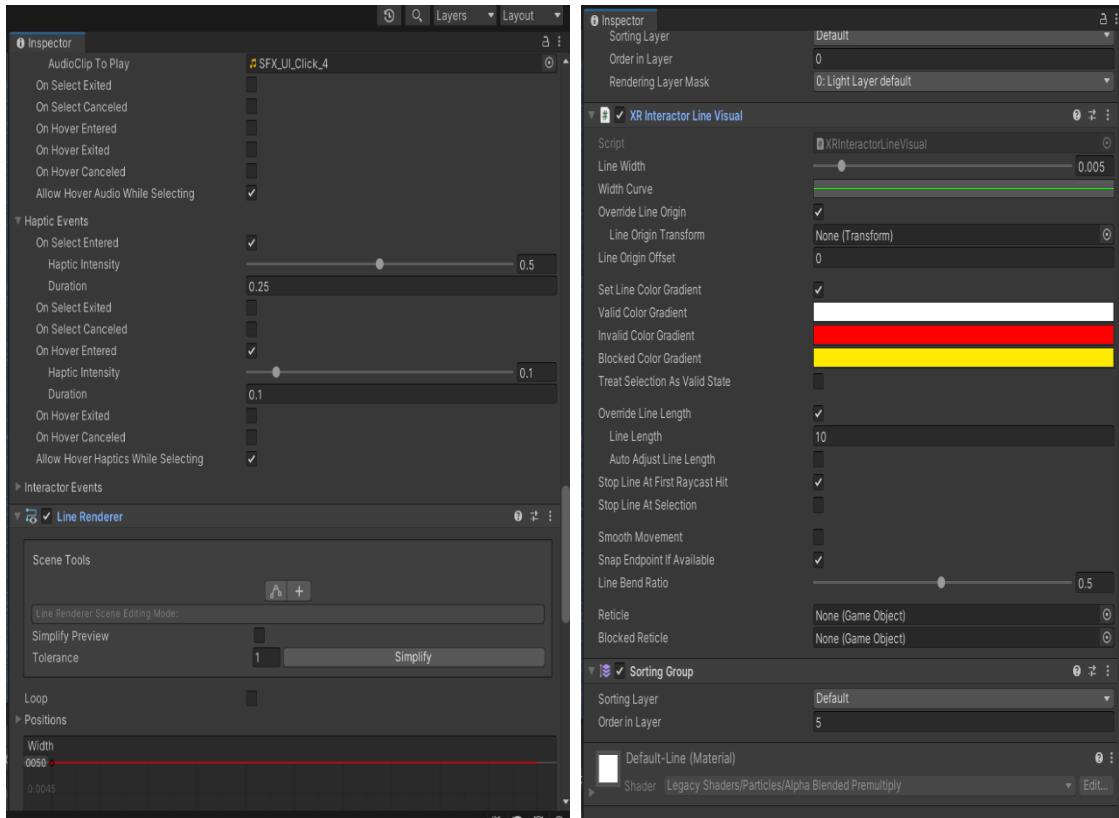


Figure 46 : Left right hand controller setting

Set the Interaction Match Orientation “Target Up and Forward” and Teleport Trigger “On Select Exited” for all teleportation areas.

Teleportation area :

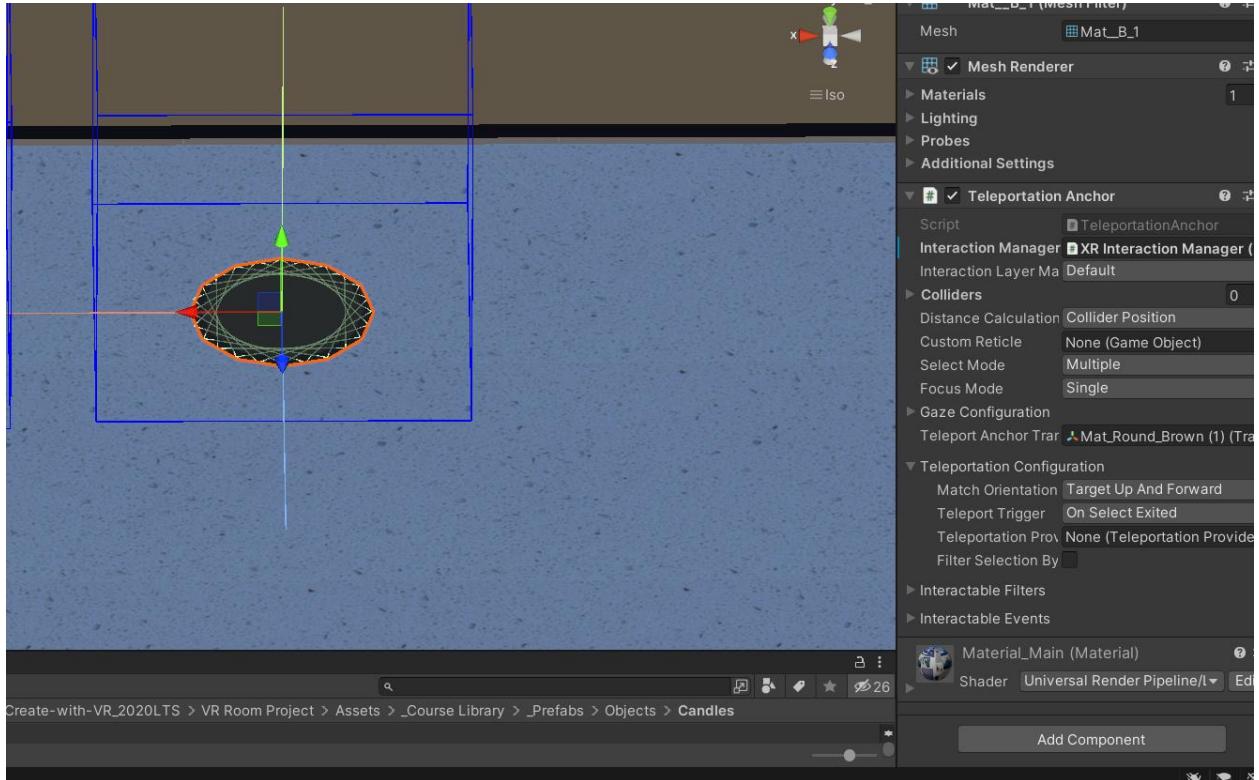


Figure 47 : Teleportation area setting

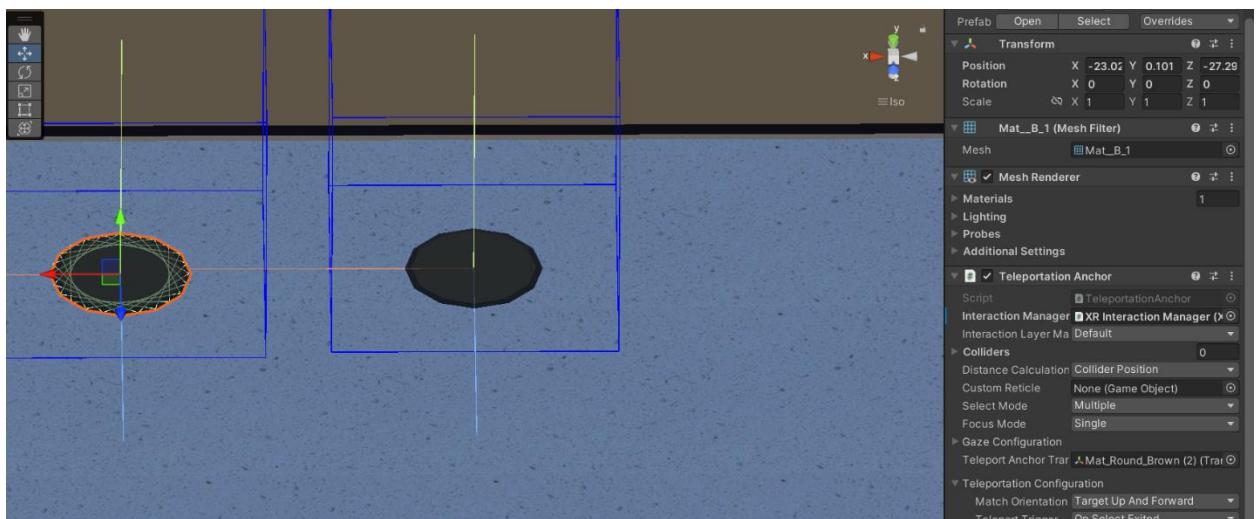


Figure 48 : Teleportation area setting

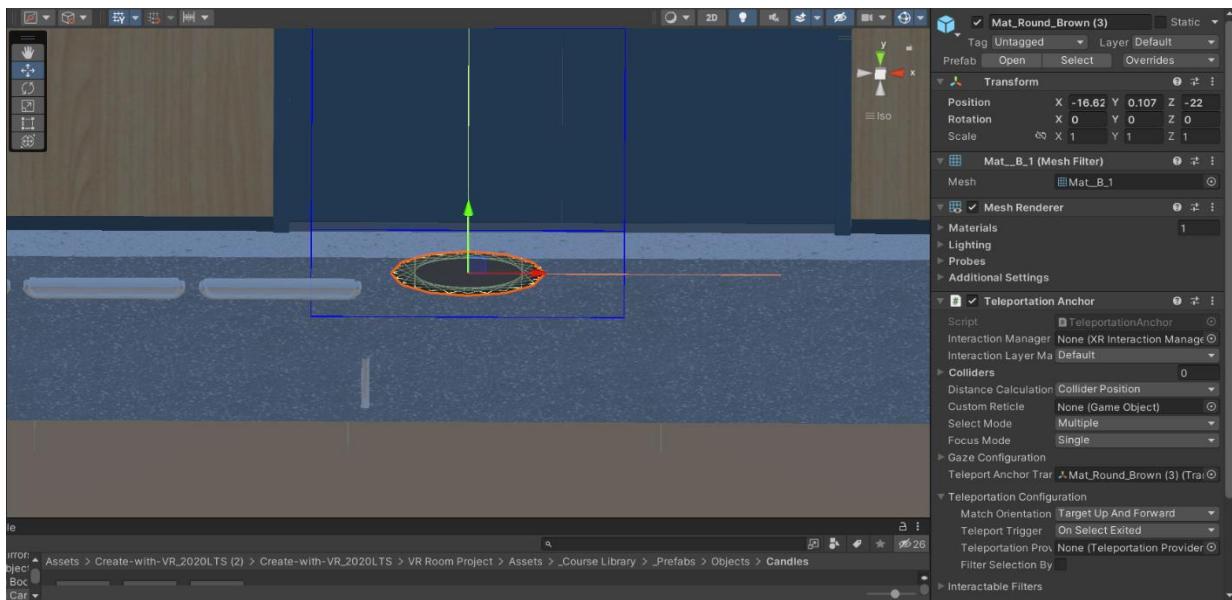


Figure 49 : Teleportation area setting

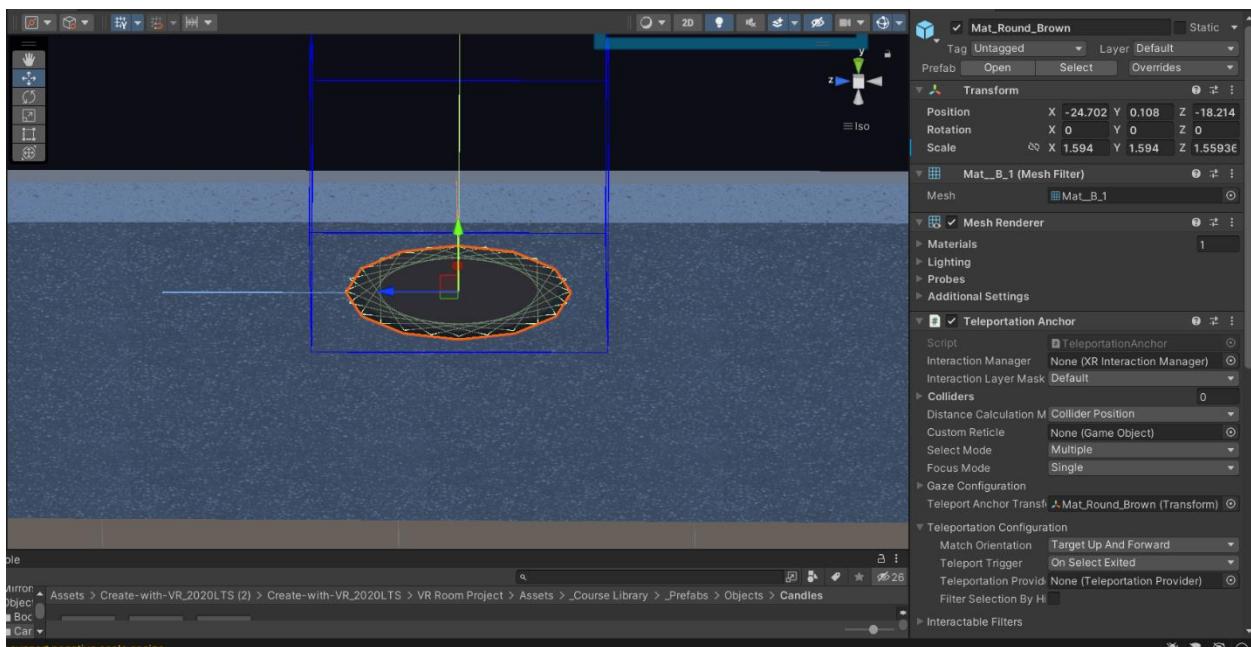


Figure 50 : Teleportation area setting

c. Haptic and Audio Feedback

I apply the haptic and audio feedback on my module. Here is the step-by-step to set up:

1- Haptic Feedback When Hovering:

- Expand the Haptic Events in XR Ray Interactor components.
- Enable the On Hover Entered event.
- Set the haptic intensity to 0.5 and the duration to 0.25

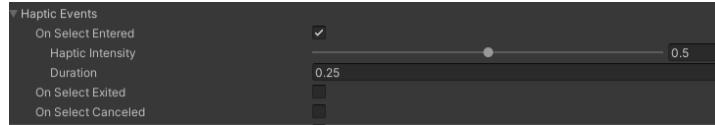


Figure 51 : Haptic Setting When Hovering

2- Haptic Feedback When Grabbing:

- Enable the On Select Entered event in XR Ray Interactor components.
- Set the haptic intensity to 0.5 and the duration to 0.25

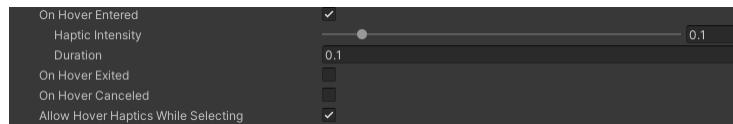


Figure 52 : Haptic Setting When Grabbing

3- Audio Feedback When Grabbing:

- Expand the Audio Events in XR Ray Interactor components.
- Enable the On Select Entered events.
- Drag the sound effects to the AudioClip To Play field.

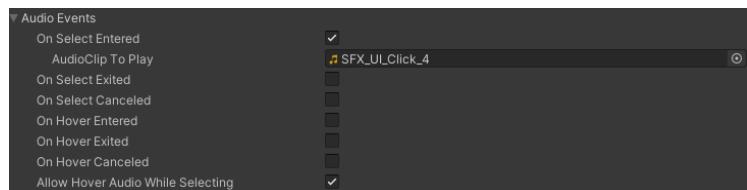


Figure 53 : Audio Feedback When Grabbing

d. Particle system with Spatialize Audio

In my module, I have 1 particle system with spatialized audio which is on Candle.

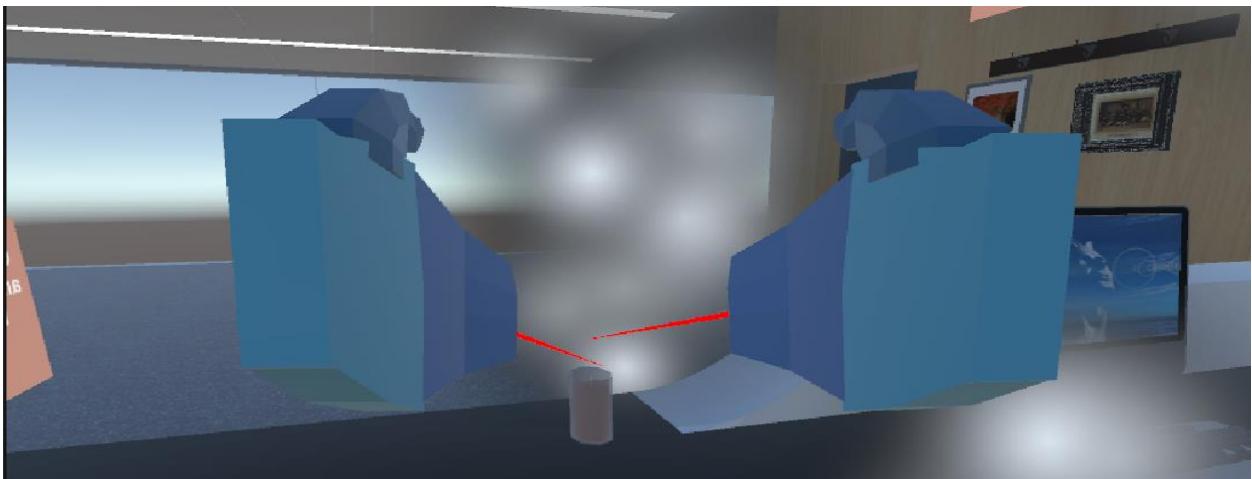


Figure 54 : Particle system of candle

1- Add Audio:

- I added an Audio Source component to the particle candle objects in the Inspector.
- For the candle objects, I dragged a wind sound effect into the Audio Source.



Figure 55: Audio Source component of candle

2- Audio Setting:

- I enabled the Play On Awake option for Audio Sources so the sounds start playing when the scene starts.
- I enabled the Loop setting to make the sounds repeat continuously.
- I turned the audio into 3D spatial audio. This makes the sound louder as the user gets closer to the source and quieter as they move away.
- I set the Spatial Blend to 1 to fully enable 3D audio. In the 3D Sound Settings, I set the Min Distance to 1 and the Max Distance to 500. This controls how the volume changes with distance.

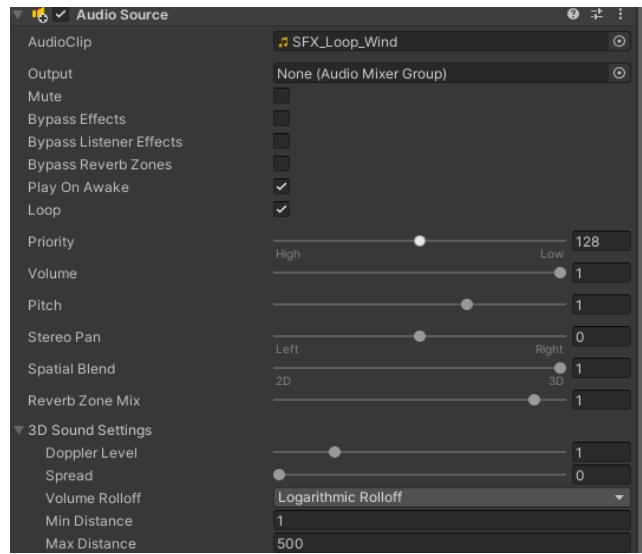


Figure 56: Audio Settings for the candle

Now, when the scene starts, the wind audio will played

e. Video/Audio – Turn On//Off

To make the tablet play a video, follow these steps:

- 1- Add the Play Video Script to the screen object, which is a child of the television.
- 2- Expand the Video Clips section and set the list Size property to 1.
- 3- Drag the video into Element 0, as shown in the figure below.

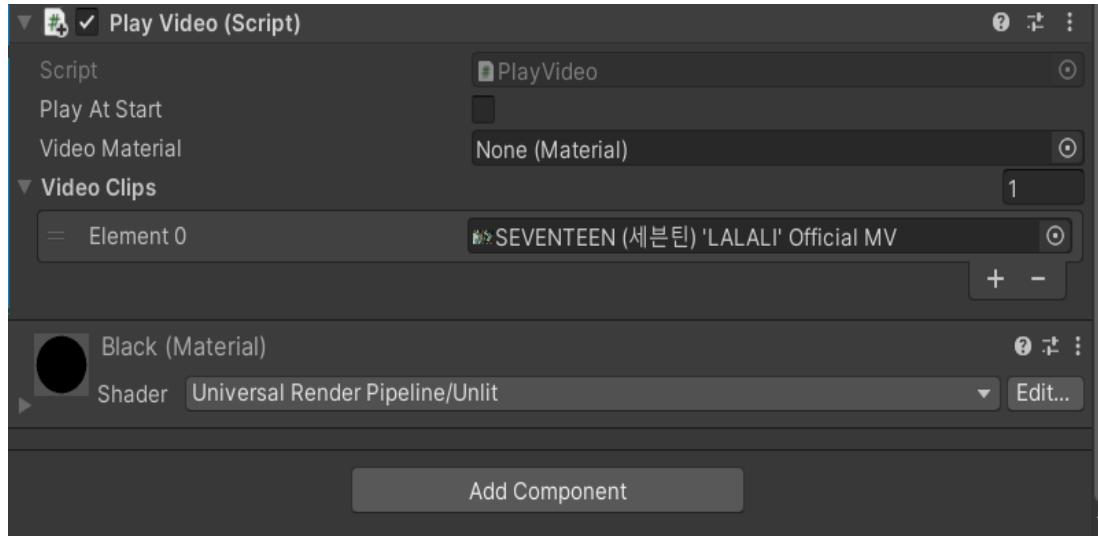


Figure 57: Play Video Setting

- 4- To control the tablet with button , expand Interactable Events in the XR Grab Interactable Component.
- 5- For the Activated event, drag and drop the screen object into the empty slot

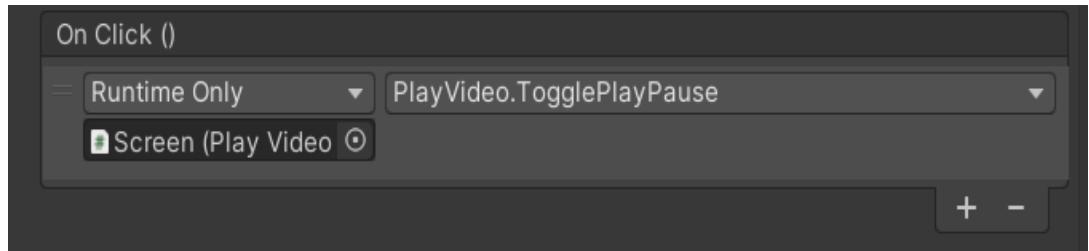


Figure 58: Play Video On Click

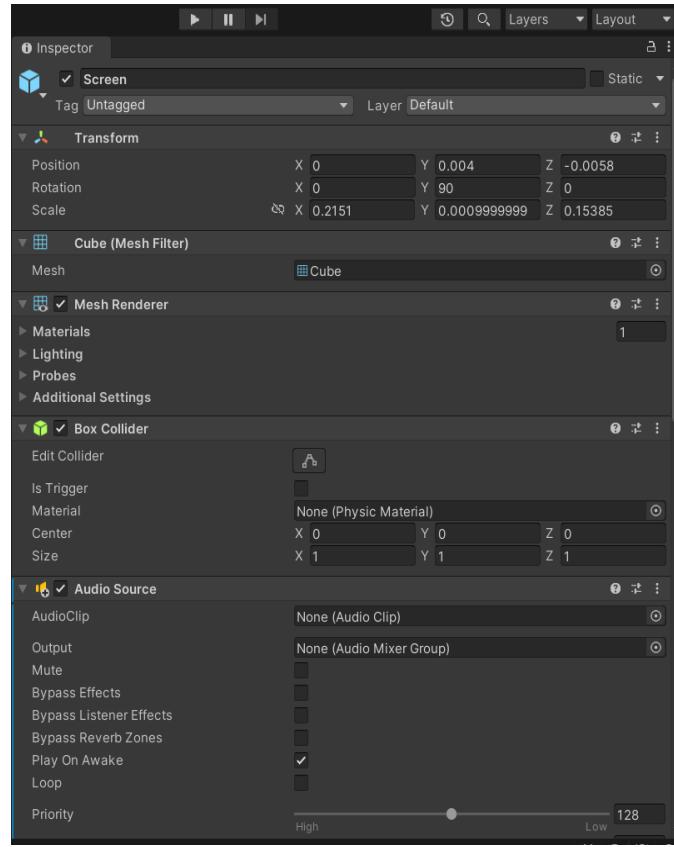


Figure 59: Screen Setting

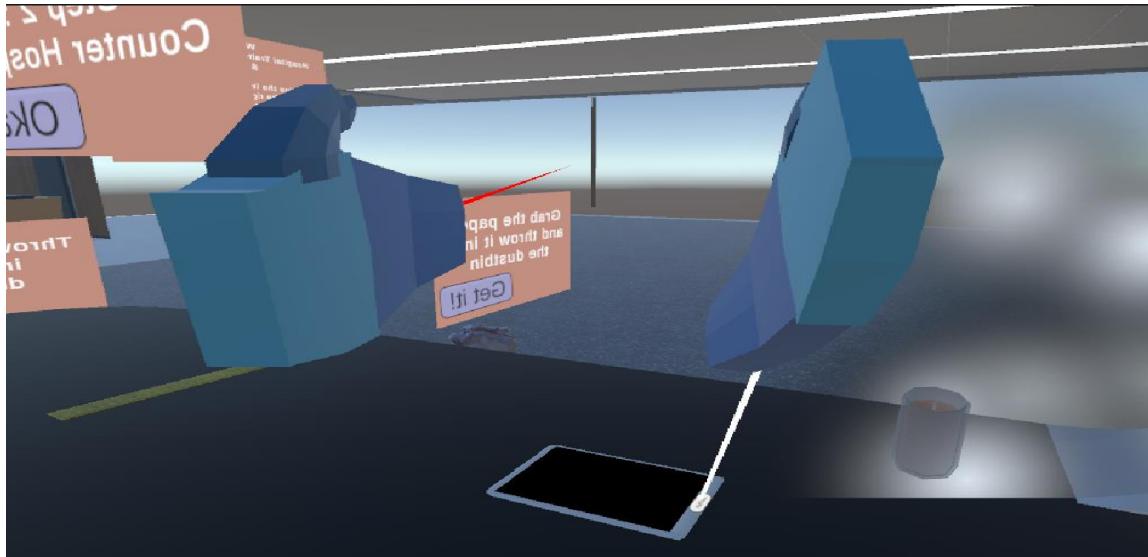


Figure 60: Button not press

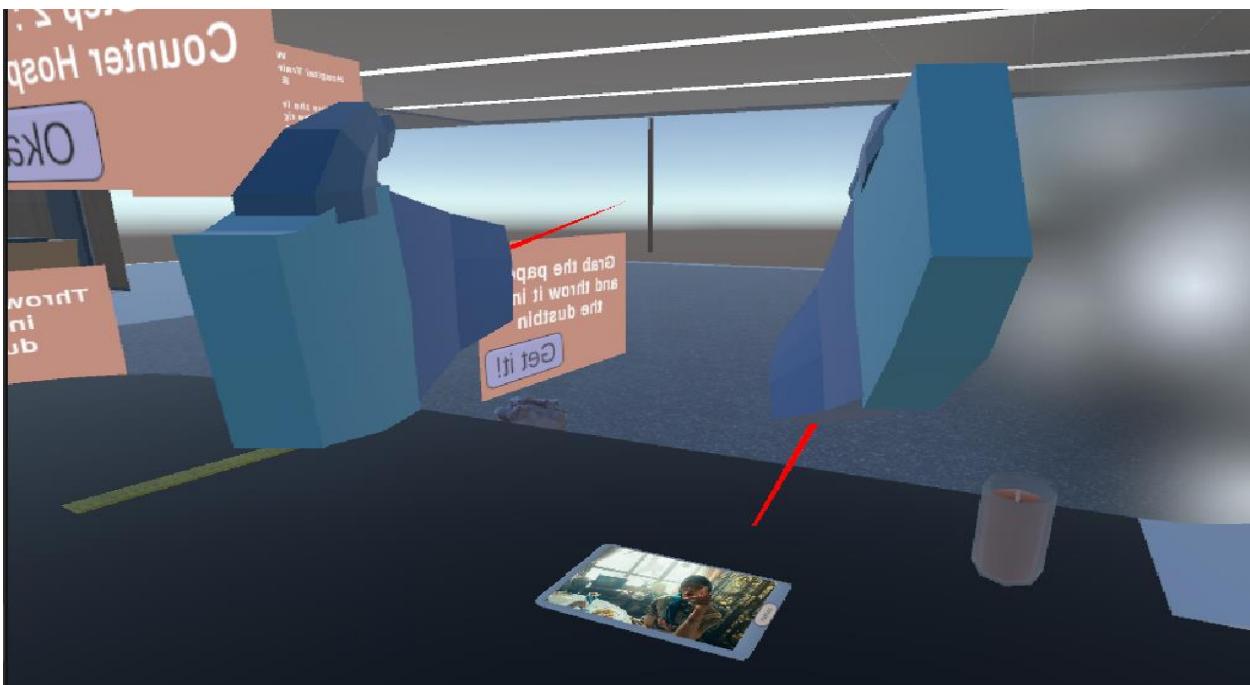


Figure 61: Button press and video playing

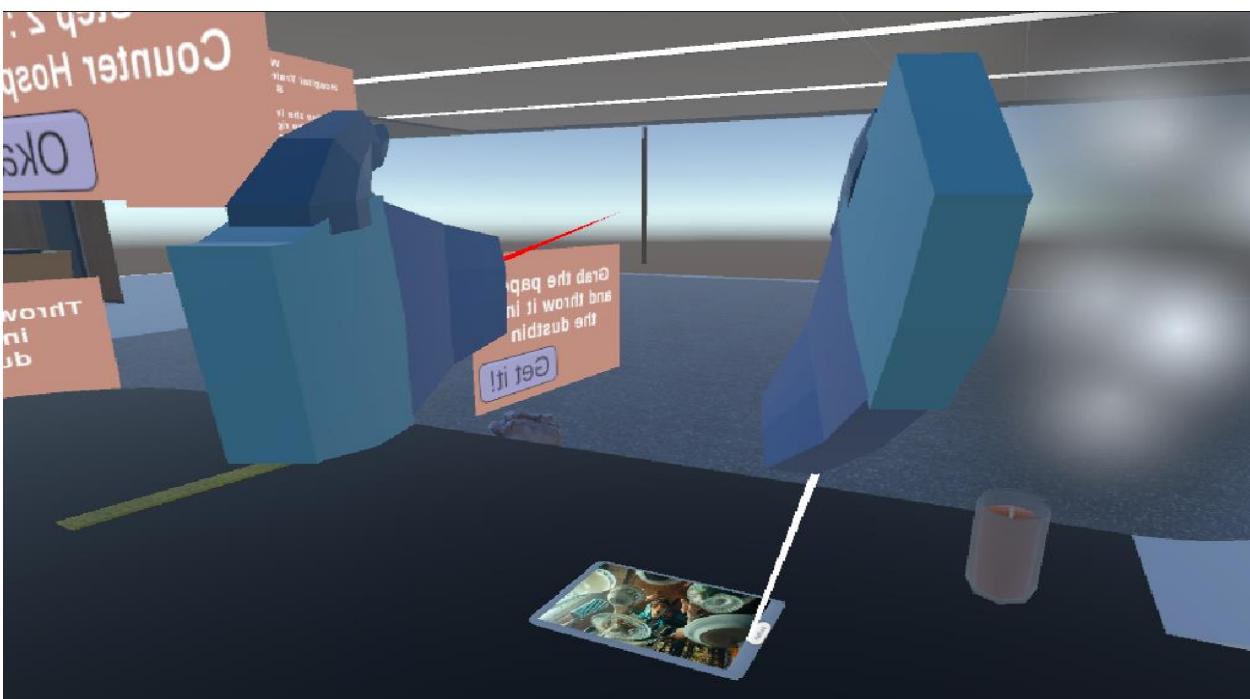


Figure 62: Button press for pause the video pause

Now, when the user clicks the button, the video on the tablet will toggle between playing and pausing.

5. Instructional UI

I. Welcoming background

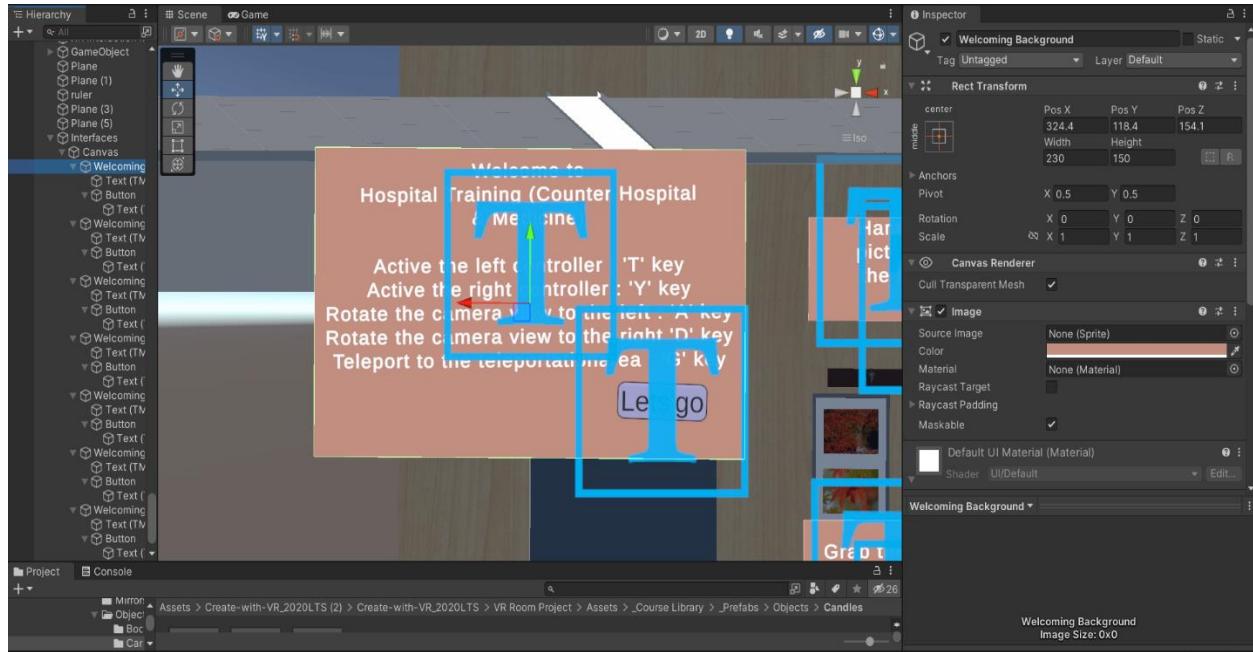


Figure 63: Welcoming background setting

II. Text (TMP)

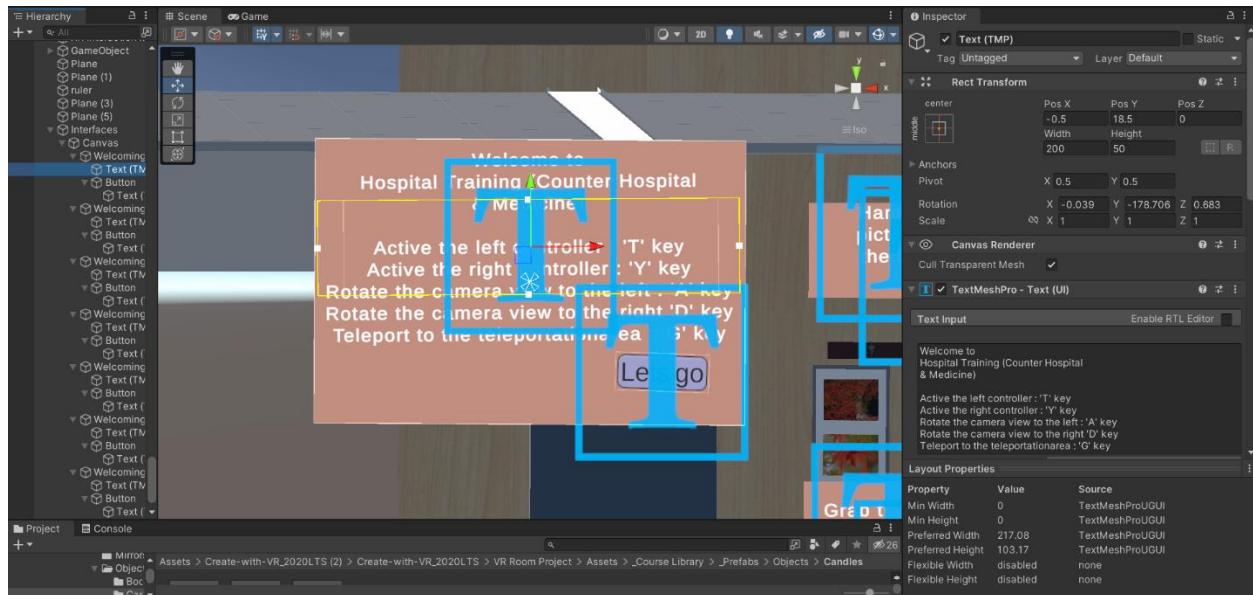


Figure 64: Welcoming background text setting

III. Button

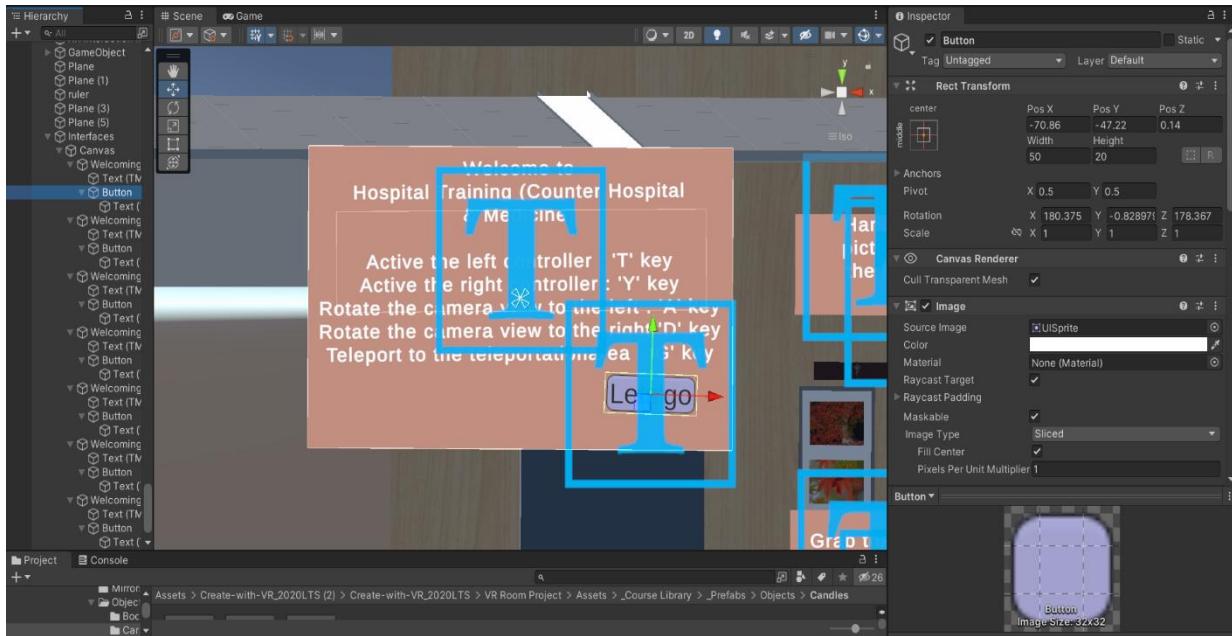


Figure 65: Welcoming background button setting

IV. Text (TMP)

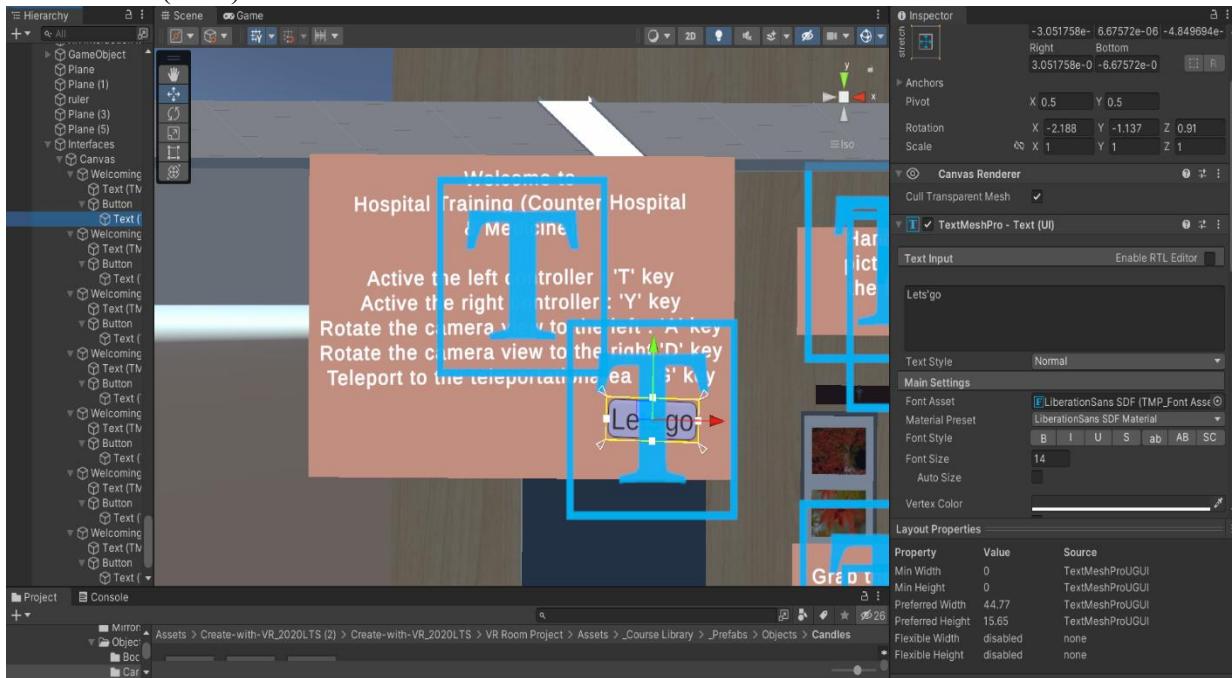


Figure 66: Welcoming background button text setting

6. Sockets obey physics

For the Sockets obey physics I have developed 5 Sockets that we can hang two frame picture, and foolscap paper on the hook, one for crumbled paper and one for mask is inside into the dustbin

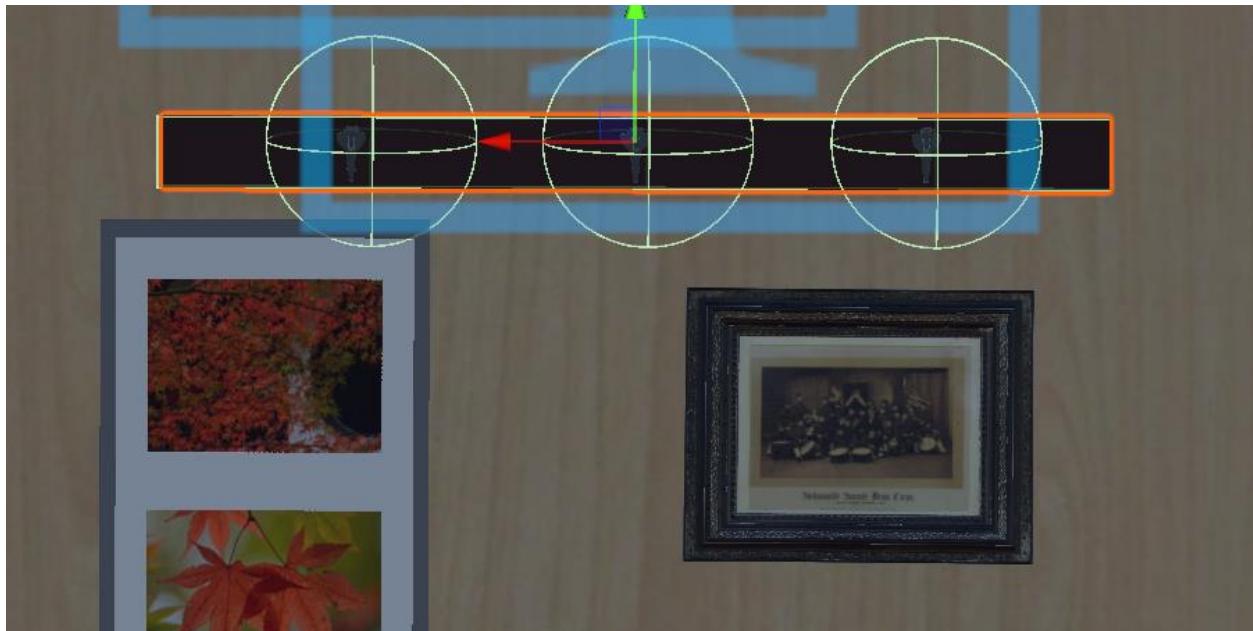


Figure 67: Socket

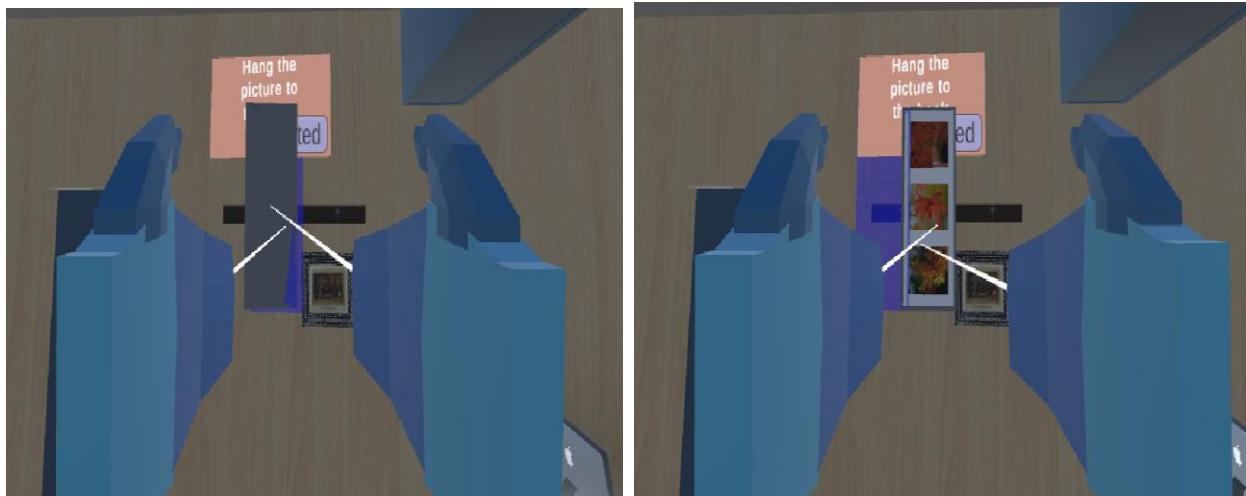


Figure 68: Grabbable into socket photo frame

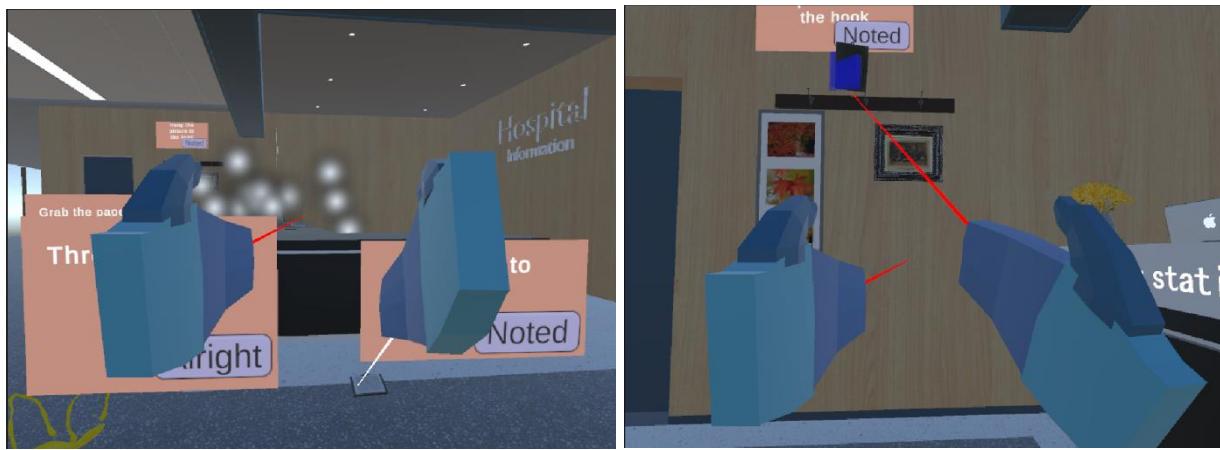


Figure 69: Grabbable into socket folkscape paper

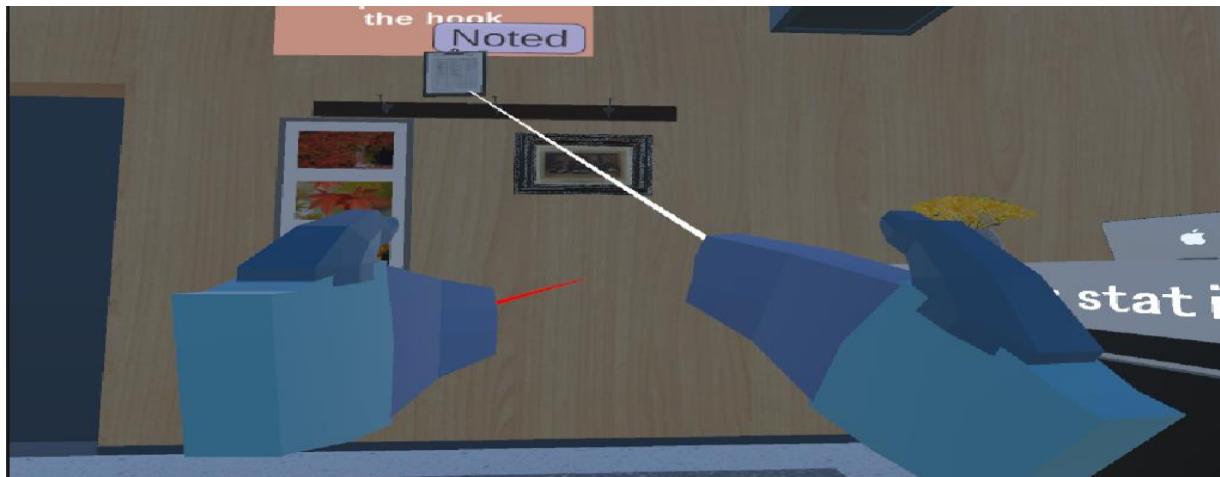


Figure 70: Grabbable into socket folkscape paper



Figure 71: Grabbable into socket photo frame

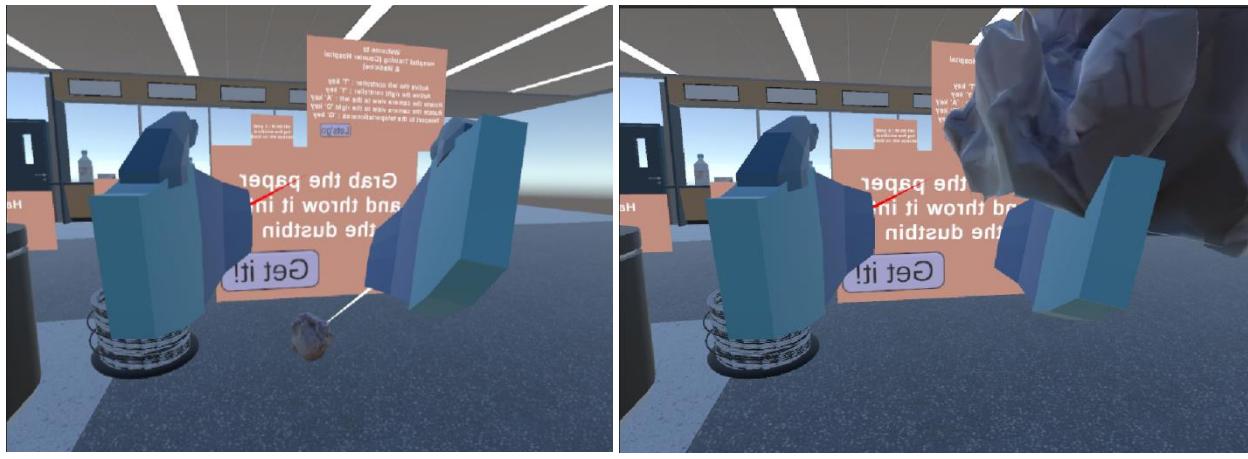


Figure 72: Grabbable socket crumbled paper into dustbin



Figure 73: Socket crumbled paper into dustbin



Figure 74: Grabbable socket mask into dustbin

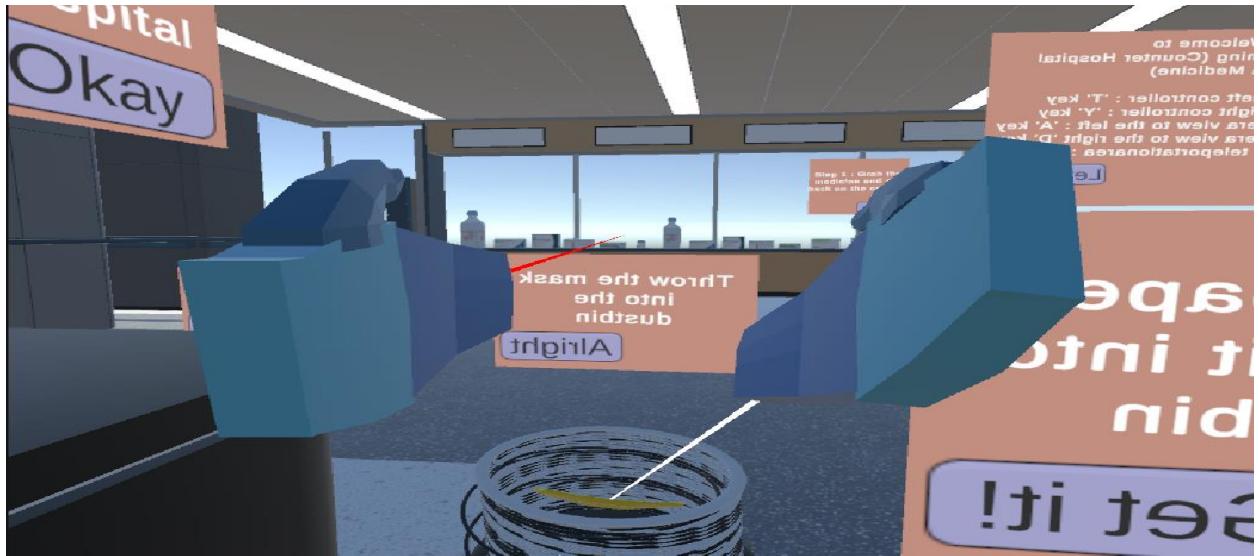


Figure 75: Socket mask into dustbin

I created an Empty GameObject as a child of the Hook object. Then I added the “Sphere Collider” and “XR Socket Interactor component” to it, as shown in the figure below.

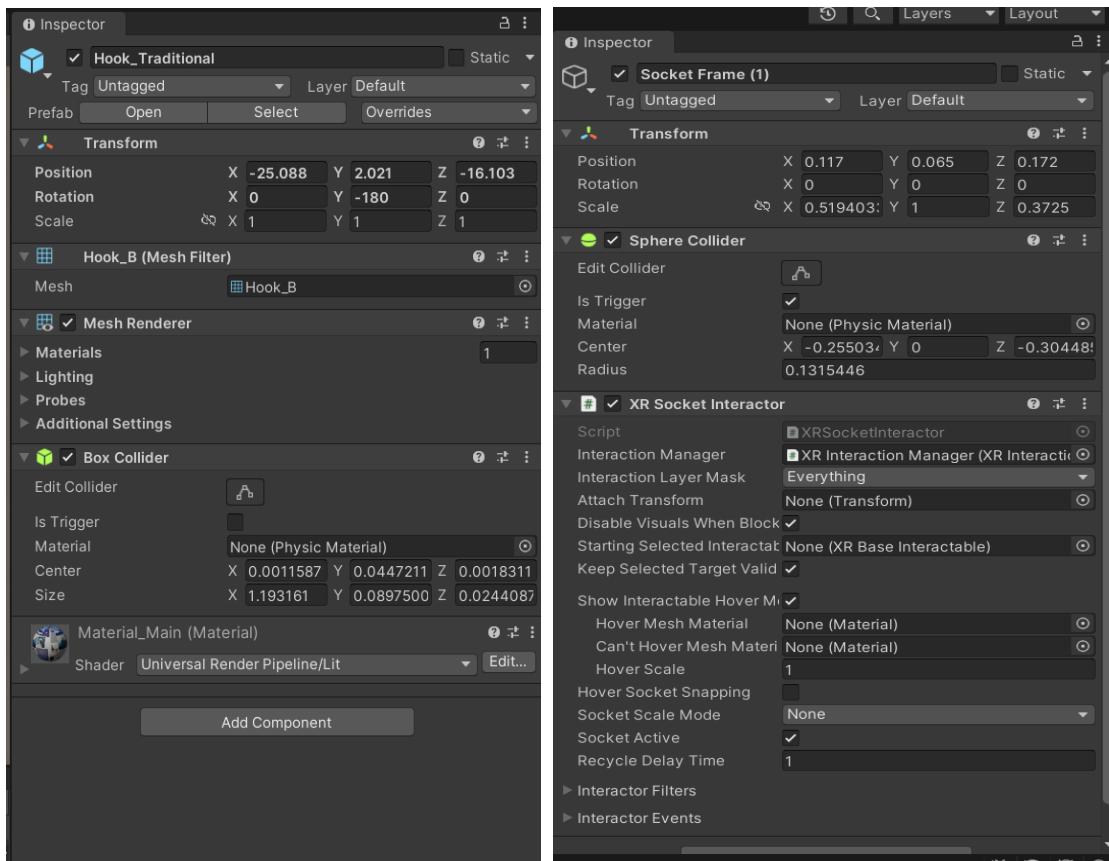


Figure 76: Socket hook setting

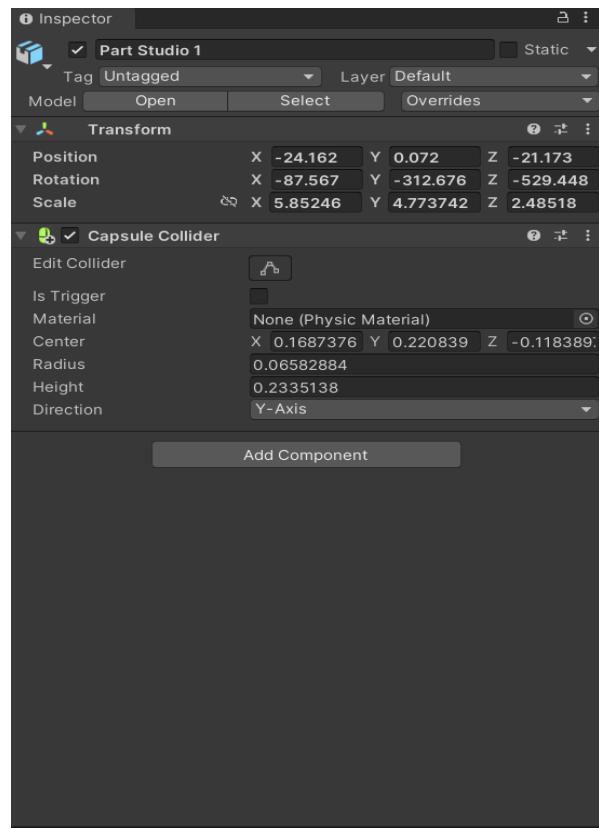


Figure 77: Socket setting dustbin

7. User Manual

VR Application User Manual

Welcome to [TRAINING COUNTER HOSPITAL AND MEDICINE – Module #1]

Thank you for choosing our VR Application! This user manual is designed to help you get started and make the most of your virtual reality experience.

1. Getting Started

1.1 Installation

- Download it from Oculus Store, <https://www.meta.com/help/quest/articles/headsets-and-accessories/oculus-rift-s/install-app-for-link/>.
- Follow the steps on your screen to install it.

1.2 Launching the Application

- Put on your VR headset and connect it to your laptop through the “Mobile Hotspot”.
- Find the app named as “Assignment 3” in your VR library or in your laptop.
- Click on the Assignment 3 in the VR library or the .exe file in your laptop to open it.

2. Navigation and Controls

2.1 Main Menu

- Use your VR controllers to move through the main menu “Welcoming Background UI”.
- Read the Instructions on this UI screen then point at “Let’s go” to start.

2.2 Controller Usage

- **Activate Ray:** Press Shift + B for the left-hand controller or Spacebar + B for the right-hand controller.
- **Activate Reset UI Canvas:** Press Shift + N for the left-hand controller or Spacebar + N for the right-hand controller.

- **Teleportation:** Point the ray at a teleport area and press the "G" key to move there.
- **Interaction:** Use the ray to click on buttons and other UI elements.

Action	Control Key
Move Forward	'W' Key
Move Backward	'S'
Move Upward	'E' Key
Move Downward	'Q' Key
Move To the Left	'D' Key
Move To the Right	'A' Key
Activate The Left Controller	'T' Key
Activate The Right Controller	'Y' Key
Control The Hands	'R' Key
Rotate The Camera View to The Left	'A' Key
Rotate The Camera View to The Right	'D' Key
Activate Left Hand Toggle Ray	Shift + B
Activate Right Hand Toggle Ray	Spacebar + B
Activate Reset UI Canvas	Shift + N
Activate Reset UI Canvas	Spacebar + N
Rotate Controller	Hold The Middle Mouse Button
Teleport To the Teleportation Area	'G' Key

The Table below shows the control keys for each action in Module:

3. Exploring Features

3.1 Key Features Overview

- **Interactive Medical Training:** Practice get medicine, on counter, throw rubbish and socket equipment things.
- **Tablet Control:** Use a button to play and pause videos on a tablet.
- **Direct Control:** Grab nearby objects directly with hands.
- **Teleportation:** Move around the room by pointing at teleport spots and pressing a key.

4. Settings and Customization

4.1 Adjusting Preferences

- Open the Reset UI screen by pressing Shift + N for the left-hand controller or Spacebar + N for the right-hand controller.
- Adjust audio settings like volume and sound effects.
- Multiple UI screen with different options.

5. Safety Guidelines

5.1 Health and Safety Recommendations

- Take regular breaks to avoid getting tired or dizzy.
- Make sure your play area is free of obstacles to avoid accidents.

6. User Tips

6.1 Enhancing Your Experience

- Make sure your VR headset is set up correctly for accurate tracking.
- Use good-quality headphones for better sound.
- Adjust your VR headset so it fits well.

7. Support and Feedback

7.1 Contact Information

For help or to give feedback, contact us:

- **Email:** alyaaasyakirah@gmail.com
- **Phone:** +60 11-57737726

We hope you have a great experience with our VR application. Enjoy your training and feel free to reach out if you need any assistance. Thank you for choosing us!