User Guide

for

Virtual Video Modeling on the Social Skills of Adults with Autism

Prepared by JamTech:

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Virtual Video Modeling of the Social Skills of Adults with Autism

User Guide

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1. INTRODUCTION

This is a project for Dr. Sarah Howorth on virtual video modeling of the social skills of adults with autism. Dr. Howorth is the director of the PEERS® Lab at UMaine and our primary client for this capstone project. The PEERS® curriculum, a formal process for teaching social skills, was written by Dr. Elizabeth Laugeson. Our client's project proposal outlined a request to make the curriculum available in a virtual reality environment. The JamTech team consists of five students enrolled in a two-semester computer science capstone course at the University of Maine during the Fall 2023 - Spring 2024 semesters. Each team member has volunteered for a specific team role, which allows for assignments to be delegated to everyone on the team. The intended audience of this document is our client, Dr. Sarah Howorth, and our capstone professor, Dr. Laura Gurney, as well as any future users of the PEERS® VR application.

1.1 PURPOSE OF DOCUMENT

This document provides the user with a comprehensive guide to using our application. It includes explanations of all relevant features, operations, errors, and instructions pertaining to PEERS® VR.

1.2 REFERENCES

- PEERS®. (2021). PEERS® (version 1.1.0) [Mobile app]. Apple Store OR Google Play. https://play.google.com/store/apps/details?id=com.peersclinic.peers&hl=en_US&gl=US
- PEERS (2023) UCLA PEERS® Clinic, Semel Institute for Neuroscience and Human Behavior. https://www.semel.ucla.edu/peers
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). GitHub repository, https://github.com/VoloVita/PeersVR_Capstone/tree/main/Documentation/Deliverables
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). System Design Document (SDD), version 1.0
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). Systems Requirement Specification (SRS), version 2.0
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). User Interface Design Document (UIDD), version 1.0
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2024). Code Inspection Report (CIR), version 1.0
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2024). Administrators Manual (AM), version 1.0
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). GitHub repository, https://github.com/VoloVita/PeersVR_Capstone/tree/main/Documentation

1.3 OVERVIEW

This system aims to teach social skills to adults with autism in a more engaging and immersive environment than the existing PEERS® mobile application. This User Guide aids users in understanding and interacting with the system. This document is intended to guide both new users and laymen as well as serve as an official user guide for the project.

1.4 HOW TO USE THIS DOCUMENT

The intended use of this document is to provide the user with a comprehensive guide on how to use our application. This document includes explanations of all relevant features, operations, errors, and instructions pertaining to PEERS® VR. Section 1 of this document is mainly an overview of the project, its related documents, and how it can be used. Section 2 is the system overview, which discusses the background of the project as well as the basic operations of the system. Section 3 provides a detailed explanation on how the user interacts with the system. Section 4 will outline any error messages that might be encountered, as well as give a diagnosis and suggest recovery procedures.

All the sections in this document complement each other as they help enhance the reader's understanding of the application, from a general overview of the project to specific usage instructions on how to operate the system. By the end of this document, the user will have all the necessary knowledge to use this application.

1.5 RELATED DOCUMENTS

All related documents can be found in the [GitHub repository](#) in the deliverables directory.

Table 1. Document: *This table contains the name and author of each document created so far during the development of this project, as well as the date it was completed and the date it is issued or given to the client.*

Num	Title	Author	Date	Issued
1	System Requirements Specification	JamTech	11/27/2023	5/3/2024
2	Systems Design Document	JamTech	11/15/2023	5/3/2024
3	User Interface Design Document	JamTech	12/4/2023	5/3/2024
4	Critical Design Review Document	JamTech	12/15/23	5/3/2024
5	Code Inspection Report	JamTech	3/23/2023	5/3/2024
6	Administrator Manual	JamTech	4/15/2023	5/3/2024

2. SYSTEM OVERVIEW

Anyone can use this application, but PEERS® VR's target demographic and user base are adults with autism and educators. The system was designed to be run by an administrator in a research-based setting with a participant acting as the user. The application can be run from the Unity editor or a VR headset. To run in Unity, the program's source code must be downloaded from Github and opened as a Unity Project. In this scenario, an administrator or third party viewer can monitor the user through the connected computer. This application must be loaded onto the headset as an executable file to use only a VR headset. Though it is possible to expand the content in this application, no regular updates or maintenance are needed.

To use this application, the user progresses through multiple educational lessons teaching and demonstrating content pertaining to social skills through both written word and roleplay example videos. After viewing the content of the lesson, the user can take a quiz to proceed with the remainder of the lessons.

The application is designed to work with VR hand-held remotes, and is not compatible with newer VR headsets that employ hand-recognition software. Our program utilises either the right or left remotes' trigger to select any buttons or drag through scroll boxes, and the remotes' joystick as an additional scrolling mechanism. Outputs for our application include the VR headset's visual experience and the audio output of the roleplay videos.

Anyone can use our application with a VR headset, but it's recommended that users sit down to avoid dizziness or nausea and to take breaks to avoid eye strain.

3. INSTRUCTIONS

In this section, we've included instructions for every step when using our application, including the individual operations, descriptions of each, warnings or errors if there are any, and a detailed procedure for the user to follow for each operation. These operational instructions assume a system administrator has already completely set up the program to run in Unity. Any operational instructions that reference headset mechanics or adjustments refer to the Meta Quest 2 headset specifically.

Operation: Running the application from Unity w/ VR Headset

Description: Assuming the system administrator has properly set up and configured the program and a compatible VR headset is connected via QuestLink, running the application is as simple as playing the scene in the Unity Editor.

Cautions/Warnings: Please take stock of your surroundings and sit comfortably before running the application.

Probably Errors & Causes: If Unity produces warnings or errors in the editor console window, please inform the system administrator.

Procedures:

    Precheck 1: The PEERS® VR source code has been successfully downloaded and configured by the system administrator

    Precheck 2: The Unity Project has been launched from Unity Hub using a compatible editor version

    Precheck 3: Meta Quest Link application has been launched.

    Precheck 4: VR headset is connected to computer via USB-C

    Running the Program: At the top of the Unity Editor there are controls for running, stopping, and pausing the scene (**see figure 1**). Select the play arrow to play the project.
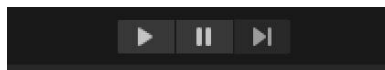

Figure 1. Play and Pause: run and pause the scene.

Operation: Opening the application from executable on headset

Description: Using the Oculus headset to locate and launch the Peers VR application.

Cautions/Warnings: The application may be located in the "unknown applications" section of the apps on the device because it has not been published.

Probably Errors & Causes: N/A

Procedures:

    Locating the App: Assuming the application has already been put on the headset through developer mode, it should now be located in the app's tab of the headset. If you still cannot

see the application, it is likely in the "unknown apps" section which can be accessed by selecting the filter at the top and then selecting "unknown applications".

Launching the App: After locating the app, launching it is as simple as clicking on the icon for the application and then selecting the "launch app" option.

Closing the App: To close the application, press the meta button on the right controller to open the menu and select the "quit" option.

Operation: Using VR safely

Description: When using a VR Headset, it is important to be aware of your surroundings and sit in a stable chair.

Cautions/Warnings: Check for pets, other people, furniture, or other inanimate or animate objects that may obstruct your experience.

Probably Errors & Causes: N/A

Procedures:

Check Surroundings: If you are seated in a chair that can spin or swivel, please fully extend your arms away from you and spin slowly to ensure that you will not collide with your environment during the operation.

Operation: Movement within the VR scene

Description: Using the Oculus headset controls to adjust the user's physical location within the scene.

Cautions/Warnings: Make sure to be seated and within the Oculus Guardian boundaries

Probably Errors & Causes: It is possible to stand inside or behind the floating view panels. To correct this, either move backward in the scene or restart the application.

Procedures:

(Meta Quest 2 Safety Manual: https://www.meta.com/quest/safety-center/quest-2/#manuals)

Moving: Use the analog stick on the left controller to move in any direction,

Turning: Use the analog stick on the right controller to turn by flicking it left or right, and use the Oculus headset to look around within the scene.

Operation: Adjusting VR headset volume

Description: Using the Oculus headset controls to adjust the auditory output from the headset.

Cautions/Warnings: N/A

Probably Errors & Causes: If the headset volume controls are not working as expected, please consult the headset's safety manual for possible solutions.

Procedures:

(Meta Quest 2 Safety Manual: https://www.meta.com/quest/safety-center/quest-2/#manuals)

Watch the tutorial as your headset loads or consult the headset's manual for specific instructions. Each headset will have volume controls at a different location with different

methods of functionality, so the procedure for adjusting the volume will be unique to the user's headset.

Operation: Adjusting VR headset focal point
Description: Using the Oculus headset controls to adjust the visual focal point of the VR lens.
Cautions/Warnings: N/A
Probably Errors & Causes: If the headset focal adjustment controls are not working as expected, please consult the headset's safety manual for possible solutions.
Procedures:
(Meta Quest 2 Safety Manual: https://www.meta.com/quest/safety-center/quest-2/#manuals)
    Watch the tutorial as your headset loads, or consult the headset's manual for specific instructions. Each headset will have focal adjustment controls at a different location with different functionality methods, so the procedure for adjusting the lens will be unique to the user's headset.

Operation: Selecting a lesson within the curriculum view
Description: Using the controller to select a lesson from the curriculum view.
Cautions/Warnings: N/A
Probably Errors & Causes: If Unity produces warnings or errors in the editor console window, please inform the system administrator.
Procedures:
    Horizontal scrolling within curriculum view: Use the front trigger on the left or right controller to select the curriculum view background or the scroll bar at the bottom of the panel and move your controller back and forth to scroll through the curriculum icons.
    Selecting Lesson: Use the front trigger on the left or right controller to select one of the lesson icons on the panel. Then use the front trigger to select the "Learn More" button.

Operation: Navigating the Lesson view
Description: Using the controller to interact with the Lesson view.
Cautions/Warnings: N/A
Probably Errors & Causes: If Unity produces warnings or errors in the editor console window, please inform the system administrator.
Procedures:
    Selecting the curriculum view back button: The curriculum view button is located in the upper right-hand corner of the lesson panel.

Figure 2. Curriculum Button: The curriculum navigates
back to the curriculum view

Use the trigger on the front of the right or left-hand controller to select the button to navigate back to the curriculum view.

Scrolling vertically in the lesson view: There are a few different ways to scroll vertically through the lesson view:

    a. Point a controller at the scrollbar on the right side of the panel, and then click and hold the corresponding front trigger button while moving your hand up and down.

    b. Point a controller at the background of the panel, then click and hold the corresponding front trigger button while moving your hand up and down.

    c. Push the analog stick of the right hand forward to scroll up and back to scroll down.

Scrolling through the videos horizontally: There are a few ways to scroll horizontally through the video content:

    a. Point a controller at the horizontal scrollbar under the video thumbnails, then click and hold the corresponding front trigger button while moving your hand left and right.

    b. Point a controller at the background between the video thumbnails then click and hold the corresponding front trigger button while moving your hand left and right.

    c. Push the analog stick of the right-hand left to scroll left and right to scroll right.

Operation: Completing lesson exercises

Description: Within the lesson view, the user may engage in exercises that pertain to the current lesson.

Cautions/Warnings:

Probably Errors & Causes: If Unity produces warnings or errors in the editor console window, please inform the system administrator.

Procedures:

    Locate the purple checkbox and prompts towards the bottom of the lesson panel. Aim the right controller at the area with these prompts and once hovered over, press the rear trigger button on the right controller. Once the user has read and or completed the exercises, locate the "X" in the top right corner of the pop up panel. Aim the right controller at the "X" and once hovering over, press the rear right trigger button to return to the lesson view.

Operation: Viewing more lesson info.

Description: Within the lesson view the user may view more information describing the current lesson.

Cautions/Warnings:N/A

Probably Errors & Causes: If Unity produces warnings or errors in the editor console window, please inform the system administrator.

Procedures:

    More info or read more: When on the lesson view for a particular lesson, locate the "more info" button, which is located just below the non-example role-play video content, or the "read more" button, which is located just below the "more info" button. Aim the right controller at the button, and once hovering over it, press the rear trigger button on the right controller. You should now see a panel containing more information about the lesson. When finished reading, locate the "X" in the top right corner of the popup screen, hover over it, and press the rear trigger button on the right controller.

Operation: Navigating the video view

Description: After selecting the desired video, learn how to watch the video, pause and play, seek through to a specific timestamp, and return to the lesson view.

Cautions/Warnings: Audio warning: if the video is too loud or too quiet, you may want to adjust the headset volume, or if running from unity on a computer, adjusting the computer volume.

Probably Errors & Causes: If Unity is producing warnings or errors in the editor console window, please inform the system administrator.

Procedures:

    Back button: In order to return to the lesson view, locate the back arrow button in the top left corner of the video view panel. Aim your right controller at the arrow and once hovered over, press the rear right trigger button on the right controller to return to the lesson view.

    Multimedia controls: Upon entering the video view, the video selected should begin to play automatically. If the user wishes to pause the video, aim the right controller anywhere within the video that is playing. Once hovering over the video press the rear right trigger button on the right controller to pause the video. In order to resume the video, repeat the same process.

    If the user wishes to skip to a specific time stamp in the video there is a scroll bar below the video that is being displayed. Aim the right controller at the scroll bar and press and hold the rear right trigger button on the right controller, then drag the scrolling point left or right to the desired timestamp location by aiming the controller. When the desired location has been selected, release the rear right trigger button to jump to that timestamp.

Operation: Navigating the quiz view

Description: Taking a lesson quiz

Cautions/Warnings: Exiting out of the quiz view before answering both questions will not save your progress or unlock the next lesson.

Probably Errors & Causes: If Unity is producing warnings or errors in the editor console window, please inform the system administrator.

Procedures:

Back button: In the top left corner of the panel, a back arrow is displayed that can be aimed at with the right controller. Once you are hovering over the arrow, press the right rear trigger on the right controller to return to the lesson view.

Quiz question and answers: At the top of the Quiz view, there will be a question for the user to answer. After reading the question, there are two possible answers at the bottom of the quiz view to choose from. To select an answer, aim the right controller at the desired answer and press the rear right trigger button on the right controller. A prompt will appear telling the user whether they got the correct answer. To continue to the next question aim at the continue button at the bottom of the prompt and again press the rear right trigger button.

4. REFERENCE SECTION

This section will cover error messages the user may receive while using the application and the recovery procedures for resolving them. Some of these error messages can only be resolved by editing the source code opening the project in the Unity Editor. The system administrator should be contacted in both cases to fix the problem.

4.1 ERROR MESSAGES AND RECOVERY PROCEDURES

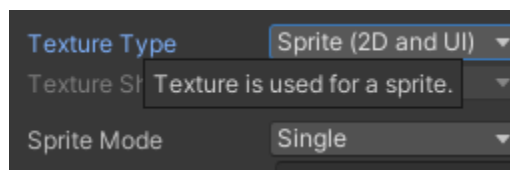**Error:** Thumbnails not set to 2D or Sprite

*Figure 3. Thumbnail Texture Type Source: Selecting the
Sprite (2D and UI) option.*

Recovery Action: At the bottom of the Unity window is an area for viewing the project's files. In that view, navigate to the folder that contains the thumbnail images. Select one or many image(s) and then open the inspector panel. At the top of the inspector panel, open the drop-down menu for Texture Type and select the 'Sprite (2D and UI)' option. Finally, scroll down to the bottom of the inspector window and select the Apply button.

Error: File path is Null
Recovery Action: The lesson text content, quiz text content, videos, and video thumbnails are all accessed via file paths, which are stored in their corresponding JSON files. If the file paths are not correctly written, then when the program tries to load the thumbnail image, a NullReferenceError will be produced (Fig 4). The JSON file should contain relative file paths like the one below
Example of Thumbnail path:
        "Assets/JamTech_Assets/PeersVideosContent/topic_1/thumbnails/PEERS - Don't be an interviewer (bad).jpeg"

*Figure 4. NullReferenceException: The error message displayed
when there is a missing link between objects in the scene.*

Appendix A – Agreement Between Customer and Contractor

Upon signing off the agreement between the customer and contractor, the customer (**Sarah K. Howorth**) and contractor (**JamTech**) agree on the content described in this document.

By typing one's name under the signature column and giving the date, the individual signs this document.

Name	Signature	Date
Allison Lupien	*Allison Lupien*	04/24/24
Jacob Michaud	*Jacob Michaud*	04/24/24
Maha Fazli	*Maha Fazli*	04/24/24
Nick Sarno	*Nick Sarno*	04/24/24
Tristan Cilley	*Tristan Cilley*	04/24/24
Sarah K. Howorth	*Sarah K. Howorth*	04/25/24

Customer Comments: Thank you for building a wonderful system to help individuals practice these skills privately. I look forward to a demonstration in which the audio can be heard.

Appendix B – Team Review Sign-off

This is the team review sign off meaning that all current team members of JamTech (Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud and Maha Fazli) have fully reviewed and read the User Guide and do agree with the content and format included in the document.

By typing one's name under the signature column and giving the date, the individual signs this document.

Name	Signature	Date
Allison Lupien	*Allison Lupien*	04/24/24
Comments:		
Jacob Michaud	*Jacob Michaud*	04/24/24
Comments:		
Maha Fazli	*Maha Fazli*	04/24/24
Comments:		
Nick Sarno	*Nick Sarno*	04/24/24
Comments:		
Tristan Cilley	*Tristan Cilley*	04/24/24
Comments:		

Appendix C – Document Contributions

This is the current contribution of each team member towards the User Guide.

Name	% of contribution
Allison Lupien	20% [Introduction, Instructions, Organization and Formatting]
Jacob Michaud	20% [Instructions, Reference Section]
Maha Fazli	20% [Introduction, Instructions, Organization and Formatting]
Nick Sarno	20% [System Overview, Instructions, Organization and Formatting]
Tristan Cilley	20% [Instructions, Reference Section]