User Interface Design Document

for

Virtual Video Modeling on the Social Skills of Adults with Autism

Version 1.0 approved

For Sarah K. Howorth

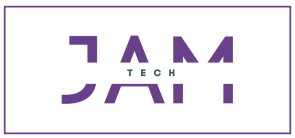
University of Maine

Dec 4, 2023

Prepared by JamTech:

Tristan Cilley, Allison Lupien, Nick Sarno,

Jacob Michaud, Maha Fazli



Virtual Video Modeling on the Social Skills of Adults with Autism
User Interface Design Document

Table of Contents

1 . Introduction

This is a two-semester (**Fall 2023 - Spring 2024**) computer science capstone project to complete the requirements of a capstone experience at the University of Maine. 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 was written by Dr. Elizabeth Laugeson.

The following description comes from the website for the UCLA PEERS® Clinic,

> "The Program for the Education and Enrichment of Relational Skills (PEERS®) is world-renowned for providing evidence-based social skills treatment to preschoolers, adolescents, and young adults with autism spectrum disorder (ASD), attention deficit/hyperactivity disorder (ADHD), anxiety, depression, and other socio-emotional problems." (PEERS®, 2023)

The curriculum has already been converted into a PEERS® mobile application on iOS. The mobile app contains information, video role-play examples, and practice questions to help users learn social skills. Dr. Howorth is interested in creating the next evolution of the PEERS® app. She believes that users can learn social skills (eg; communication, humor, dating etiquette, etc) more effectively through a VR interface as it provides a more private, immersive and engaging experience. This capstone project aims to create a proof-of-concept VR experience that can be used to solicit funding for further research.

1.1 Purpose of This Document

This document shall serve as a guide to the application's user interface and visual design. The document will cover the following topics: user interface standards, user interface walkthrough, and data validation. The primary audience of this document includes our client, Dr. Sarah Howorth, and ourselves, JamTech. The secondary audience includes the professor of our capstone course, Dr. Laura Gurney, and anyone interested in learning more about the project.

1.2 References

This section includes a list of documents and other media related to this project. Our documentation is maintained on our GitHub repository in the Deliverables directory. We used Figma to design the user interface; both links are below.

- JamTech.(2023) . *Figma*, https://www.figma.com/file/Iosmhnt2IlNk7ggfHybAt9/PEERS?type=design&node-id=0%3A1&mode=design&t=sEC0nLgmgZfr62xM-1
- JamTech. (2023). *Miro,* https://miro.com/app/board/uXjVNShE4HY=/?share_link_id=215448921420

- PEERS® (2023) *UCLA PEERS® Clinic,* Semel Institute for Neuroscience and Human Behavior. https://www.semel.ucla.edu/peers
- 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
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). GitHub repository, https://github.com/VoloVita/SeniorCapstone/tree/main/Deliverables
- Tristan Cilley, Allison Lupien, Nick Sarno, Jacob Michaud, Maha Fazli. (2023). System Design Document (SDD)

2 . User Interface Standards

This section focuses on the standards chosen for the design of this application, encompassing logical choices such as layout and design principles, common components like menus and screens, and visual aspects including colors and fonts. These standards will be consistently applied throughout the user interface design of the entire application.

To see the flow from one screen to another, please see ***Figure 1.0*** in the JamTech SDD, ***Software Architecture/Flow Diagram***, which details the different screen areas. For visual aids for each of the screen areas, as well as explanations of each, please see ***Section 3: User Interface Walkthrough***, below.

Logical Choices:

1. Keeping titles and pop up displays centered.
2. The curriculum map is on the home screen because the curriculum map in the original PEERS® app was also the home screen, and because it's the largest navigation menu in the program. The curriculum map will be horizontal because there is more horizontal space in VR.
3. The screens will not be cluttered in order to avoid overstimulating the user, especially because it's easier to overstimulate users with a crowded screen in virtual reality, so we took that into account.

Common Components:

1. The white bar at the top with the title will remain the same, except the title will change as needed.
    a. The map icon will be there if the user is not in the curriculum map to return the user to that screen. This was taken from the original PEERS® app.
4. All of the lesson layouts will be the same
    a. Popup window prompting for more information, video carousel, questions in the quizzes, etc.

Visual Aspects:

1. The default background color for the application will be [Linear gradient (FFFFFF, B03EBA, 5F2065)] and the color for the buttons will be [BF3CAA].
2. Each lesson in the curriculum map will be assigned a unique color.
3. Within the lessons, the background color will vary depending on the color assigned to the lesson being viewed
4. Within the lessons, the color for the buttons will vary depending on the color assigned to the lesson being viewed.
5. The pop-up windows displayed when viewing lessons on the curriculum map will be [Linear gradient ((7D7EF0,2F2F94)]
6. The default text color throughout the program will be white
    a. The text in the login input boxes will be gray for contrast
    b. The text in the screen titles will match the pop-up windows when viewing lessons.
7. We will use the font [San-serif font "Inter"] for all of the text.
8. The map icon to return to the curriculum map in the top left-hand corner of the screen will be shaped like a zig-zag to match the design shape of the curriculum map that shows on the curriculum map screen.
9. The curriculum map will be shaped in a zig-zag to make better use of the space, and also in reference to the curriculum map designed in the original PEERS® app.

2.1 Accessibility and Inclusive Design Elements

Our application design prioritizes accessibility and inclusivity through diverse video content and by addressing the needs of users with visual, hearing, physical, or mental impairments. The following section outlines the features we intend to implement to meet our goals of accessibility and inclusion.

Visual impairment: (dyslexia / color blindness)

1. High contrast colors will be utilized throughout the project, especially with text against a background with color.
2. Color blindness mode
3. Text-to-Speech will be available for textual information such that a screen reader would be able to be used

Hearing impairment:

1. Video will have high quality clear audio
2. The user will be able to adjust the audio up or down for those who are sensitive or hard of hearing
3. An option for subtitles will be available on video content for those hard of hearing

Physical impairment:

1. The user will be able to navigate throughout the application with only one remote for anyone with one hand or limited mobility in their hands
2. The user will be able to use the software while sitting down for users with mobility issues
3. Haptic feedback will be used to confirm a click

Intellectual impairment:

1. The app is designed for people with diverse cognitive abilities.
2. Text-to-speech will be included for users who are non-readers.

Other functionality for different communities:

1. The system will eventually be available in different languages
2. Content will not be gender specific, sexual-identity specific, or race specific
3. Universal icons will be utilized for ease of use and any icon that is unique will be explained in the tutorial.
4. A tutorial will be provided for users who do not know how to use the technology

3 . User Interface Walkthrough

This section of the document serves as a comprehensive introduction to the project's user interface (UI) design. It begins with a general overview of the various UI views incorporated in the project, accompanied by a navigation diagram (***see Figure 1***). Each mock-up screenshot is individually presented with a summary, navigation details, and explanations of buttons, text-fields, or other UI objects.

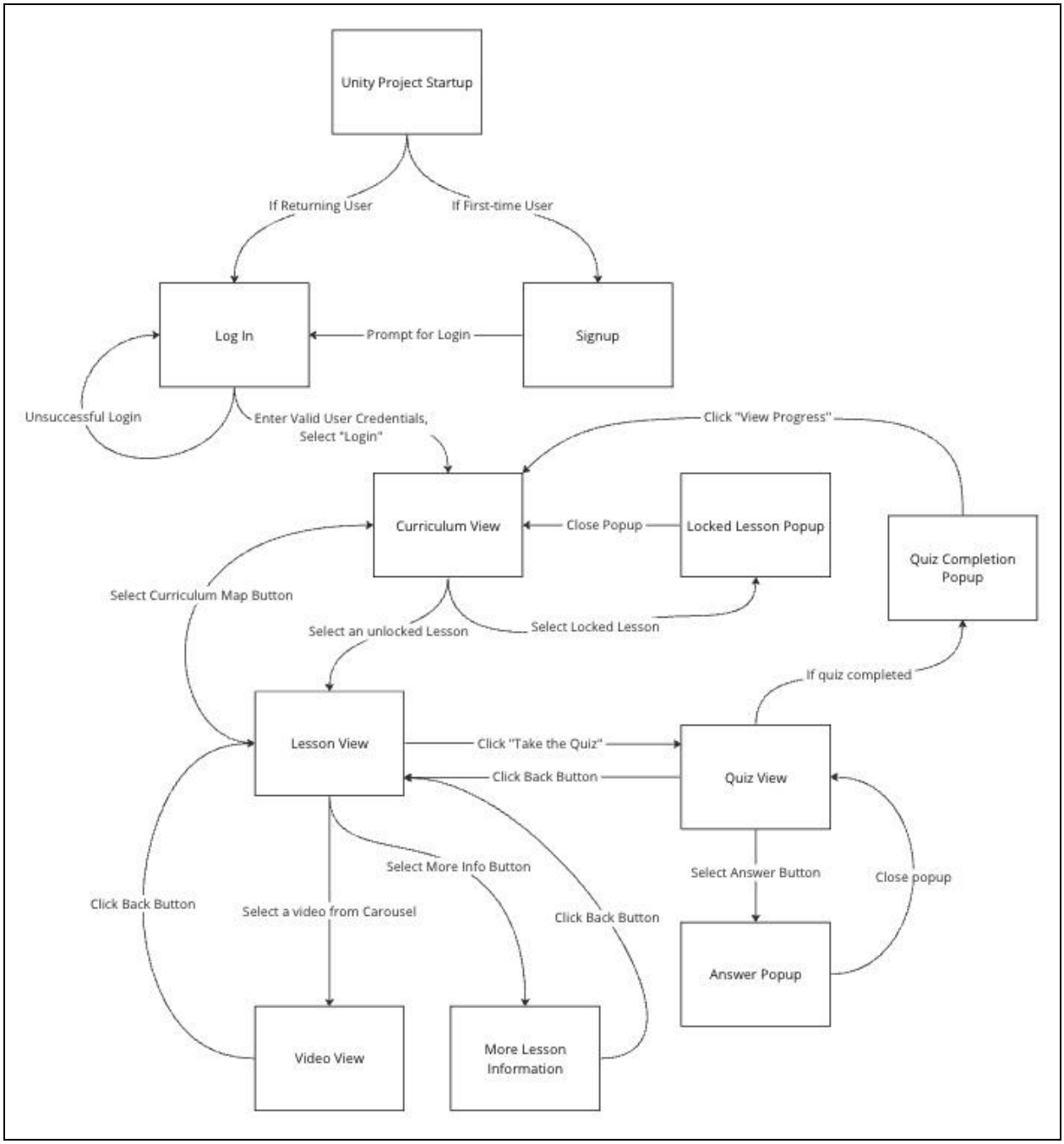


Figure 1 UI Navigation: *A detailed flow diagram depicting how a user is expected to use UI elements to navigate through the project.*

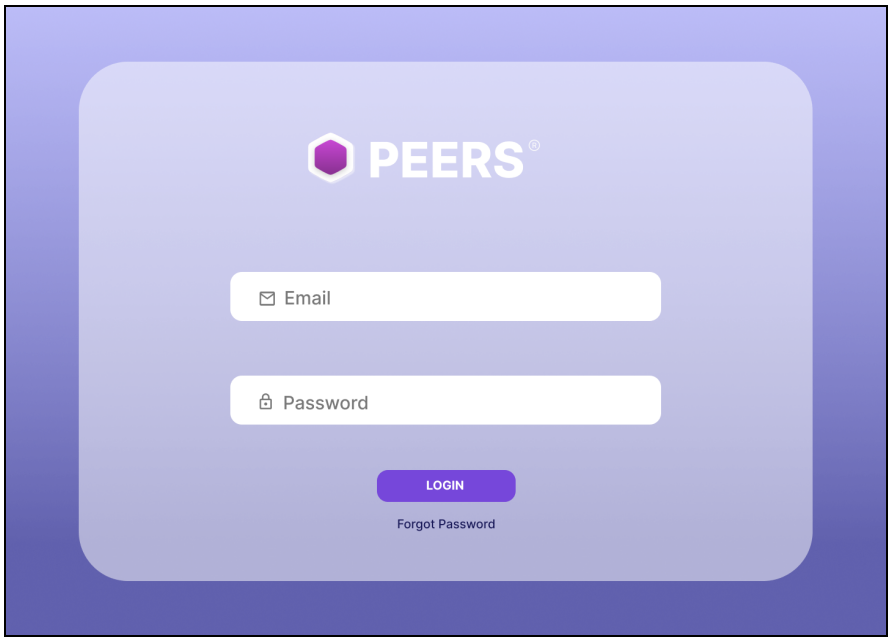


Figure 2 Login Page: *The User opens the application, they view the login page and enter their email and password.*

Summary:

The login page is the first view the user is presented with after opening the application. In order to proceed to the curriculum map, the user must first enter their account information and log in.

Navigation guide:

Once the user enters their account information and logs in by clicking the 'login' button, they will be brought to the tutorials section and then to the curriculum map, alternatively they can go straight to the curriculum map depending on if they are a new or returning user . If the user has forgotten their password, they can click the "forgot password" link and enter their email address associated with their account and instructions on how to reset their password.

Breakdown of components:

The login page contains a distinct box with the PEERS® logo at the top, two input boxes for text and a login button. The two text boxes have 'email' and 'password' written inside to indicate what information they require. There is also a "forgot password" link below the "login" button.

Database:

User login information, including emails and passwords, is stored in the user info database. Emails are stored as strings and passwords are stored as hash values.

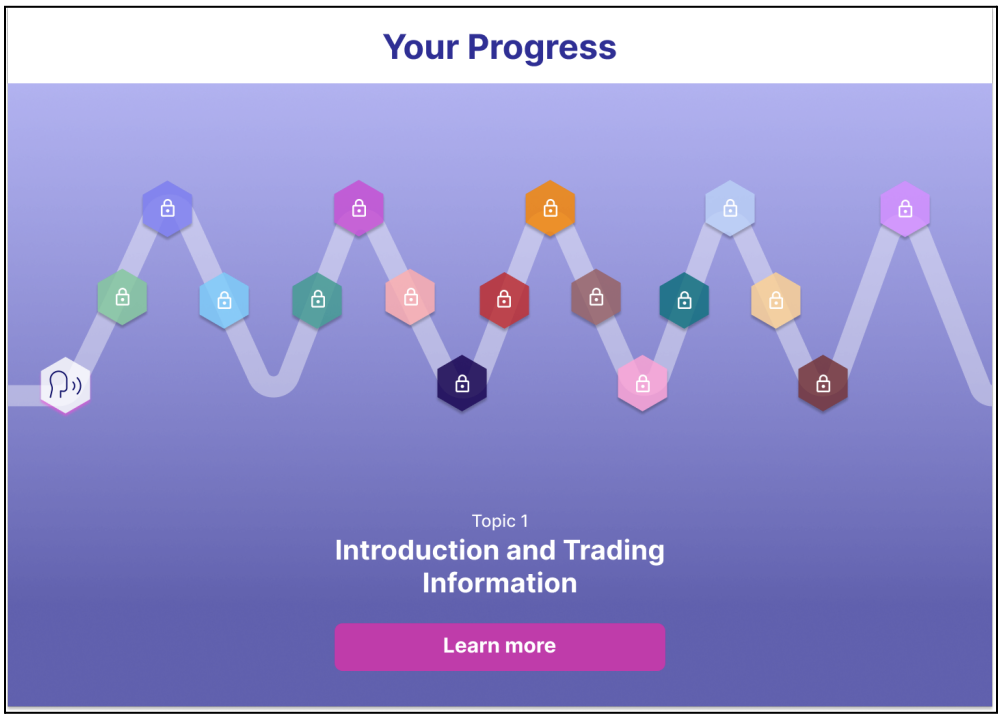


Figure 3 Curriculum map: *The home screen of the application depicting a map in the shape of a zig-zag with the user's current lesson progress.*

Summary:

The curriculum map is an extended head's up display that allows the user to look around themselves in the virtual reality environment to see the map. This will be the home screen of the application, allowing the user to access lessons and information while also telling them how much progress they have made.

Navigation guide:

Since this curriculum map functions as the home page, the user will be able to reach this screen in a multitude of ways. The user may enter their account information on the login page and click the 'login' button to reach this page or they may click the curriculum-map-shaped icon in the top left-hand corner displayed in any other screen to return. By clicking on any of the lessons visible within the screen, the user will bring up a pop-up window for that lesson, personalized to whether or not it has been unlocked yet. The user can choose which lesson they would like to interact with by clicking it, and then by clicking on the 'Learn More' button at the bottom of the screen, the user can access the lesson display page for that particular lesson.

Breakdown of components:

This screen includes a zig-zag shaped trail going from left to right with several multi-colored hexagons at the peaks, troughs, and middles of every zig or zag to represent lessons. Each hexagon has either a lock symbol in the middle to indicate the lesson is still locked or a personalized icon to represent the content of the lesson in a visual. Below the map, the topic number and lesson title of the last lesson interacted with by the user is displayed. If the lesson is unlocked, there is a 'Learn More' button, and if the lesson is locked, there is a lock symbol and text that reads 'Not yet unlocked' in place of that button.

Database:

The user's progress through the curriculum map is tracked by the data element userCurriculumProgress, which is an integer stored in the User Info Database. The integer represents the lesson number the logged in user is currently on, in other words the most recent unlocked lesson. All lessons before this number are displayed as unlocked and all lessons after are displayed as locked.

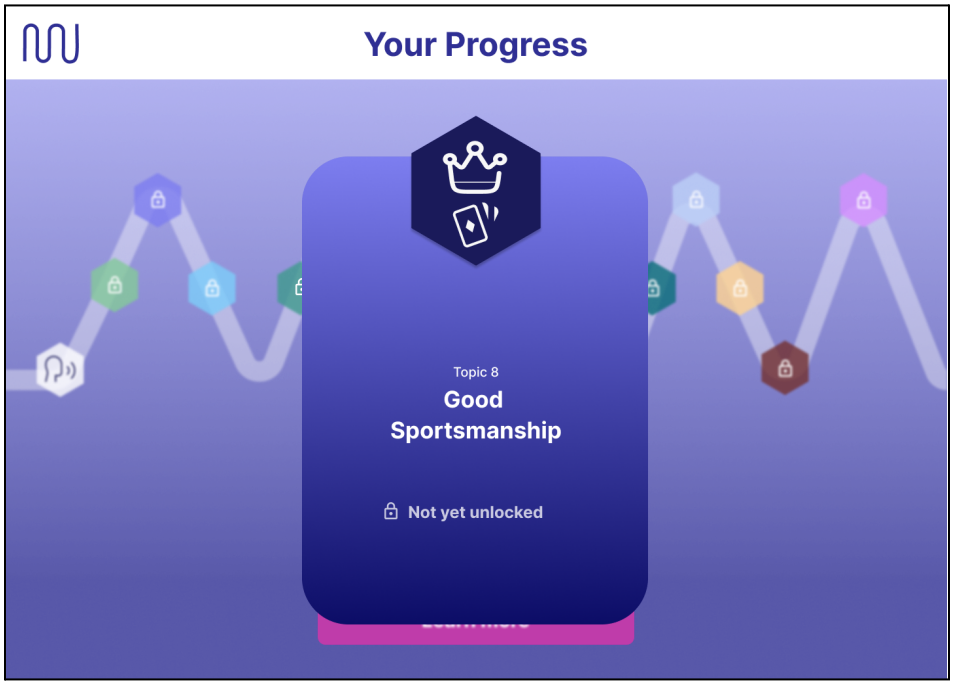


Figure 4 Locked Lesson Selection: *If the user clicks on a locked lesson this screen will pop up notifying the user the name and number of the topic along with a message that shows the lesson has not been unlocked.*

Summary:

From the curriculum map, the user can click on any lesson to be brought to the current lesson display. If this lesson is still locked the display will indicate that the lesson is 'not

yet unlocked'. The user cannot enter the lesson view when it is locked, but can return to the curriculum map.

Navigation guide:

To navigate to a locked lesson the user can point the cursor at a locked lesson on the curriculum map and click. Once the locked lesson is displayed the user can return to the curriculum map by using the cursor to click on the curriculum map icon that looks like a curled zig-zag in the upper left hand corner.

Breakdown of components:

In the locked lesson display, the icon, topic number and title of the lesson are displayed as well as a lock icon and text to indicate that the lesson is locked. The user cannot continue to the lesson view. The only navigation options available from this view is to return to the curriculum map by clicking on the curriculum map icon in the upper left corner.

Database:

This UI view does not involve a query to the database. The locked/unlocked status of a lesson is established by querying the User Info Database for the userCurriculumProgress data element. This happens each time the curriculum map is rendered. The type of pop-up, locked or unlocked, depends on the current state of the curriculum map.

(UI Walkthrough continues on following page)

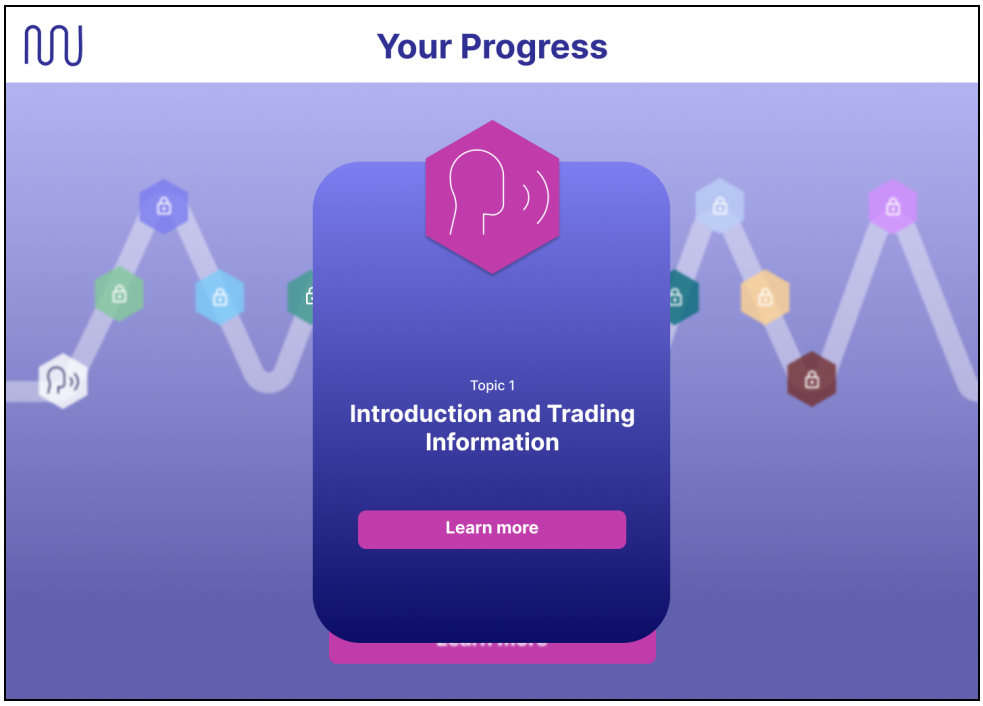


Figure 5 Current Lesson: *If the user clicks on the current lesson they are on, this screen will pop up displaying the lesson they have clicked on followed by a learn more button.*

Summary:

From the curriculum map, the user can click on any lesson to be brought to the current lesson display. If this lesson is unlocked the display will include a button reading 'Learn more' that when clicked allows the user to access the lesson content.

Navigation guide:

To navigate to an unlocked lesson display the user can point the cursor at an unlocked lesson on the curriculum map and click. Once the unlocked current lesson is displayed, the user can return to the curriculum map by using the cursor to click on the map icon in the upper left hand corner, or continue to that lesson's lesson display view by using the cursor to click on the Learn more button.

Breakdown of components:

In the unlocked lesson display, the icon, topic number, and title of the lesson are displayed as well as a button that reads 'Learn more'. The user can navigate to the lesson view via the learn more button. Additionally, the user can navigate back to the curriculum map by clicking on the curriculum map icon in the upper left corner.

Database:

This UI view does not involve a query to the database. The locked/unlocked status of a lesson is established by querying the User Info Database for the userCurriculumProgress data element. This happens each time the curriculum map is rendered. The type of pop-up, locked or unlocked, depends on the current state of the curriculum map.

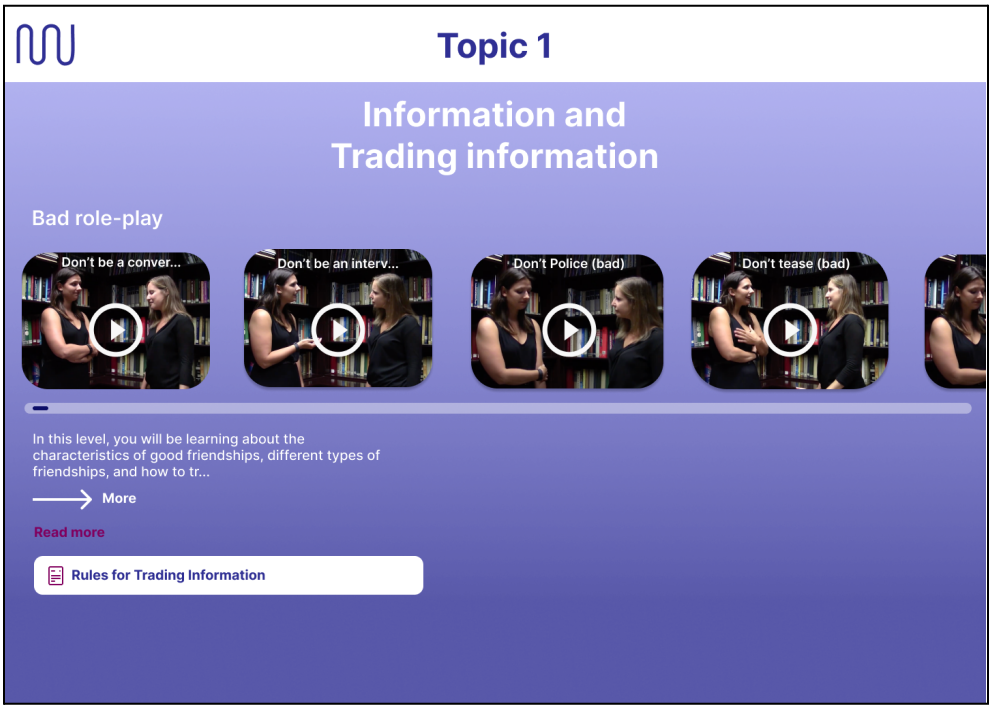


Figure 6 Lesson Display: *The lesson displays the content of the specific lesson including videos and a general description.*

Summary:

When a user clicks on a 'Learn more' button for a lesson, they are directed to the lesson display that originally shows bad-role play videos, a general description that can be expanded, and a button to see more content rules. The user can look down to see more lesson content.

Navigation guide:

The user can navigate to a lesson display by using the cursor to click on a 'Learn More' button from either a current lesson view or from the current lesson displayed on the curriculum map. The user can navigate back to the curriculum map by using the cursor to click on the curriculum map icon in the upper left corner. The user can look down to see more content like more videos and the quiz.

Breakdown of components:

On a lesson display the user is shown the title bad-role play is followed by a series of videos that showcase different examples of bad-role play in the following topic, followed by a description of what will be addressed in this lesson. The word “more” when clicked provides an extended description of the lesson. The read more section has a rules button that when clicked provides a more detailed rules and explanation of the topic. Lastly, the user can look down with the headset to see more lesson content and navigation options.

Database:

The title, labels, text information, and video thumbnails displayed in this view are all stored in the Lesson Content Database in a LessonContent object. The text information is stored in the data element lessonInfo which is formatted text. The thumbnail images for each video are contained in the data object, VideoContent. All lesson content is queried from the database each time the user enters the lesson view.

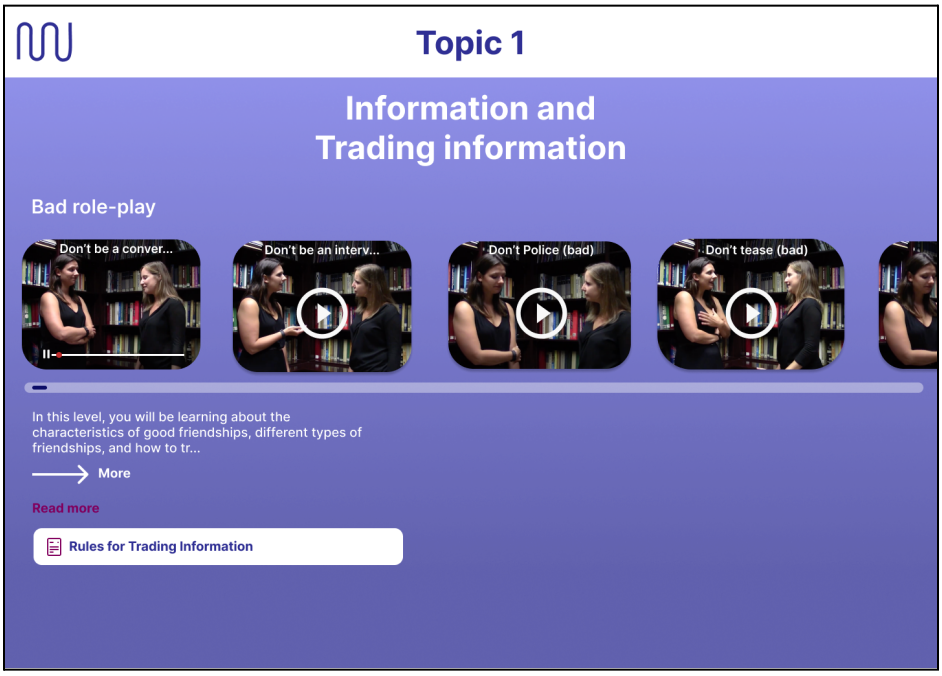


Figure 7 Video Being Played: *The user can click on a video in the lesson content to play the video.*

Summary:

The user has a variety of videos that they can choose to watch being displayed on the lesson view. Once the user clicks the video they want to watch, the YouTube video begins to play. The user then is provided with multiple options to enlarge the video, play/pause, and adjust the volume. The user exits back to the lesson view after the video is finished.

Navigation guide:

To navigate this view, the user must first put their cursor on the video they would like to watch, and then click the rear trigger button on the VR controller to play the video. They then have the option to pause the video by putting their cursor on the pause button in the bottom left and clicking the rear trigger button. The user can also place their cursor on the video slider, click with the rear trigger, and drag to skip to a specific time in the video. The user may also navigate their cursor to the volume slider and click the rear trigger button and drag to the desired volume.

Breakdown of components:

The video view has a pause/play button, a volume slider, a video slider, and a fullscreen button. The title of the video is displayed at the top in white text if the user is not in fullscreen mode.

Database:

When a thumbnail is clicked, the associated video file is queried from the VideoContent object in the Lesson Content Database.

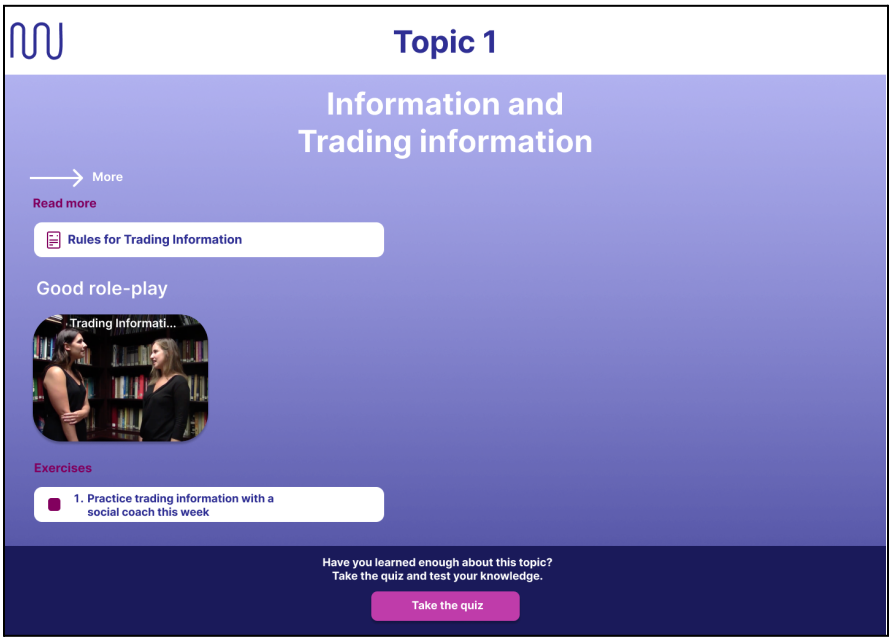


Figure 8 Additional Content: *If the user looks down they will be able to see the rest of the lesson view and lesson content including the good role-play videos, exercise and button to start quiz.*

Summary:

The exercises portion of the lesson view has multiple activities that the user can do in real life in order to improve their skills related to the current lesson. The exercises tab contains check boxes that can be filled in once the user completes the corresponding task. Once all exercises for a lesson have been completed, the “Take the Quiz” button lights up and is able to be clicked on.

Navigation guide:

In order to navigate this section of the app, the user must place their cursor on the exercises tab and click the rear trigger button, this will bring up all of the exercises for the lesson. Once in this view, the user can move their cursor over any checkbox they have completed, and again click the rear trigger button to fill in the check box. Once the user is done checking the desired boxes, they can move their cursor to the back button that is in the top left corner of the exercises tab. Once all exercises are completed the user can move their cursor to the “Take the Quiz" button and click the rear trigger button to enter the quiz view.

Breakdown of components:

There are varying buttons for the check boxes, and purple text fields to the right of them for the corresponding amount of exercises a given lesson has. There is a white“Take the Quiz” text field within a pink button located at the bottom of the page. Before completing all exercises the “Take the Quiz” text field and associated button are a darker more transparent color, and are non interactable.

Database:

The data used to create this view is already available from the first query to the Lesson Content Database which occurred when the user first navigated to the lesson view. (See Figure 6)

(UI Walkthrough continues on following page)

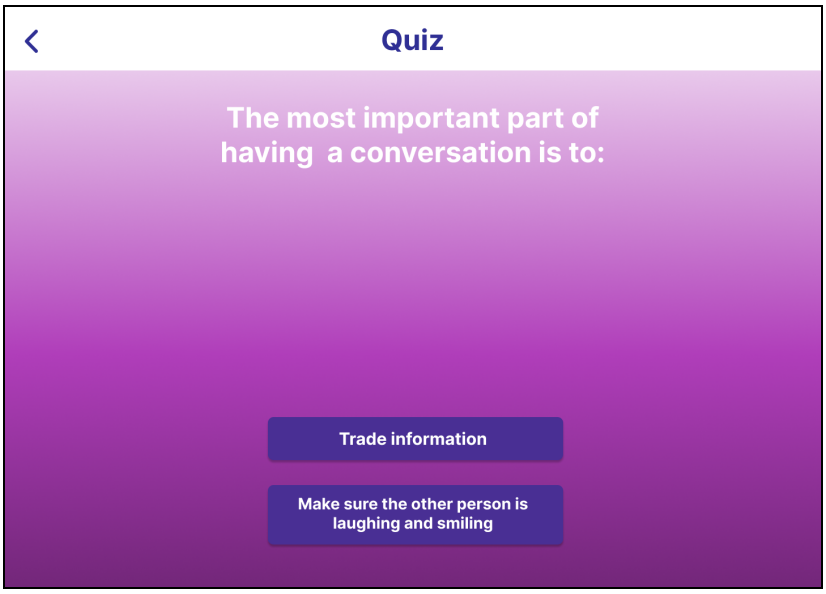


Figure 9 Quiz: *When the user clicks on take quiz they will be taken to the quiz view and they are displayed with a prompt and two choices. If the user has decided they are not ready to take this quiz the arrow on the top left will take them to the lesson view.*

Summary:

The quiz view displays a question in white text at the top of the screen, and two purple boxes that have answers in white text. The boxes can be clicked on to answer the question, and a resulting prompt will appear displaying either “correct answer” or “incorrect answer”. There is also a back arrow to navigate back outside of the quiz view.

Navigation guide:

To navigate this view, the user must aim their cursor at the button that contains the answer they would like to choose, and click down the rear trigger on the VR controller. Once the user has done this for both questions a prompt will appear for them to return to the curriculum view, which they will again press the rear trigger button to activate. If the user does not want to take the test, they may navigate their cursor to the back arrow in the top left corner of the view and press the rear trigger button to return to the lesson view.

Breakdown of components:

There are two buttons on the bottom of the view that can be clicked to answer the question, and one button in the top left that can be clicked to return the user to the lesson view. There is one text field at the top of the screen reading “Quiz”, one text field below that reading the question, and two different text fields within the two answer buttons that display each potential answer.

Database:

The quiz prompts, answers, and results are all stored in a QuizContent object in the Lesson Content Database. Upon successful completion, the userCurriculumProgress integer is incremented in the User Info Database to reflect the user's progress.

4 . Data Validation

The following offers a detailed breakdown of each data item that can be entered into the project. Table 1 provides specific information about data items, including data types, size limits, boundary cases, and allowable formats. Notably, this project requires very few data items from the user, aside from those necessary for login and authentication.

Table 1: Data Validation

Data item	Data type	Limits	Allowable format(s)
username	string	64 bytes	Must be an email Cannot exceed 64 characters
password	string/hash	128 bits / 16 bytes	Must be at least 8 characters long Must include - At least 1 number - At least 1 uppercase letter - At least one special character Cannot exceed 16 characters
name	string	35 bytes	Cannot exceed 35 characters Only include letters

Appendix A – Agreement Between Customer and Contractor

Upon signing off the agreement between customer and contractor, the customer (Sarah K. Howorth) and contractor (JamTech) agree on the content described in this document, mainly what the product under development is and how it will be developed. In the case of future changes to this document, the document must be re-read and reviewed then approved by all parties through updated signatures and dates.

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	12/4/23
Jacob Michaud	Jacob Michaud	12/4/23
Maha Fazli	Maha Fazli	12/4/23
Nick Sarno	Nick Sarno	12/4/23
Tristan Cilley	Tristan Cilley	12/4/23
Sarah K. Howorth	Sarah Howorth	11/28/23

Customer Comments:

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 interface design document 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	12/4/23
Comments:		
Jacob Michaud	Jacob Michaud	12/4/23
Comments:		
Maha Fazli	Maha Fazli	12/4/23
Comments:		
Nick Sarno	Nick Sarno	12/4/23
Comments:		
Tristan Cilley	Tristan Cilley	12/4/23
Comments:		

Appendix C – Document Contributions

This is the current contribution of each team member towards the user interface design document.

Name	% of contribution
Allison Lupien	20% [References, UI walkthrough description, UI Standards, Data Validation]
Jacob Michaud	20% [UI descriptions, Accessibility and Inclusive Design Elements]
Maha Fazli	20% [UI mockups & Explanations]
Nick Sarno	20% [User Interface Standards, Accessibility and Inclusive Design Elements]
Tristan Cilley	20% [Introduction, Purpose, Fig 1, Accessibility]