
System Requirements Specification

for

Virtual Video Modeling on the Social Skills of Adults with Autism

Version 1.0 approved

For Sarah K. Howorth

University of Maine

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Virtual Video Modeling of the Social Skills of Adults with Autism

System Requirements specification

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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. The aim of this project is to teach social skills (i.e. conversational skills, handling teasing and bullying, and more). The client Dr. Howorth wants us to create a choose your adventure interface that includes videos in a Virtual Reality (VR) environment.

1.1 Purpose of This Document

This document provides an initial overview of the entire project. Key areas of design such as functional requirements, non-functional requirements, use-case modeling, system diagrams, and acceptance testing shall be covered in greater detail. Our intention is to provide a clear, detailed summarization of this project's requirements and to establish a schedule for upcoming deliverables.

1.2. References

- The PEERS Table 1.1 Overview of Curriculum for School-Based Professionals by Elizabeth A. Laugeson (1st Edition):
<https://www.routledge.com/The-PEERS-Curriculum-for-School-Based-Professionals-Social-Skills-Training/Laugeson/p/book/9780415626965>
- PEERS, *UCLA PEERS® Clinic*, Semel Institute for Neuroscience and Human Behavior. (n.d.). <https://www.semel.ucla.edu/peers>
- PEERS® application that provides users with different ways to stimulate social cognition, skills, and experiences, as well as providing users with videos and information to educate them about certain social situations. The application is available for iOS and Android users.

1.3. Purpose of the Product

Dr. Sarah 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 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 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.

1.4. Product Scope

The scope of the product is to teach social skills i.e. (conversational skills, handling teasing and bullying). Additionally, the system is designed to be able to provide users with a virtual reality (VR) interface to be able to learn social skills in an engaging way. The requirements of the system describe more precisely what the system will offer to the users.

See section 2. Functional requirements

Figure 1: System Context Diagram #1

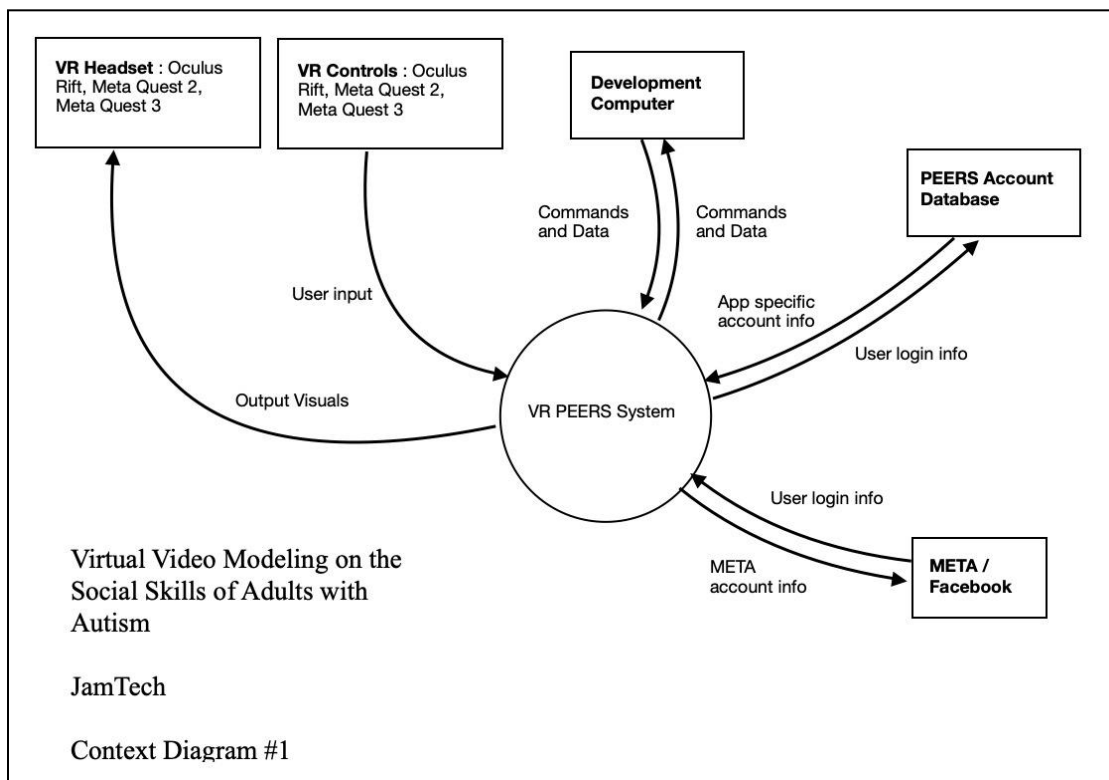
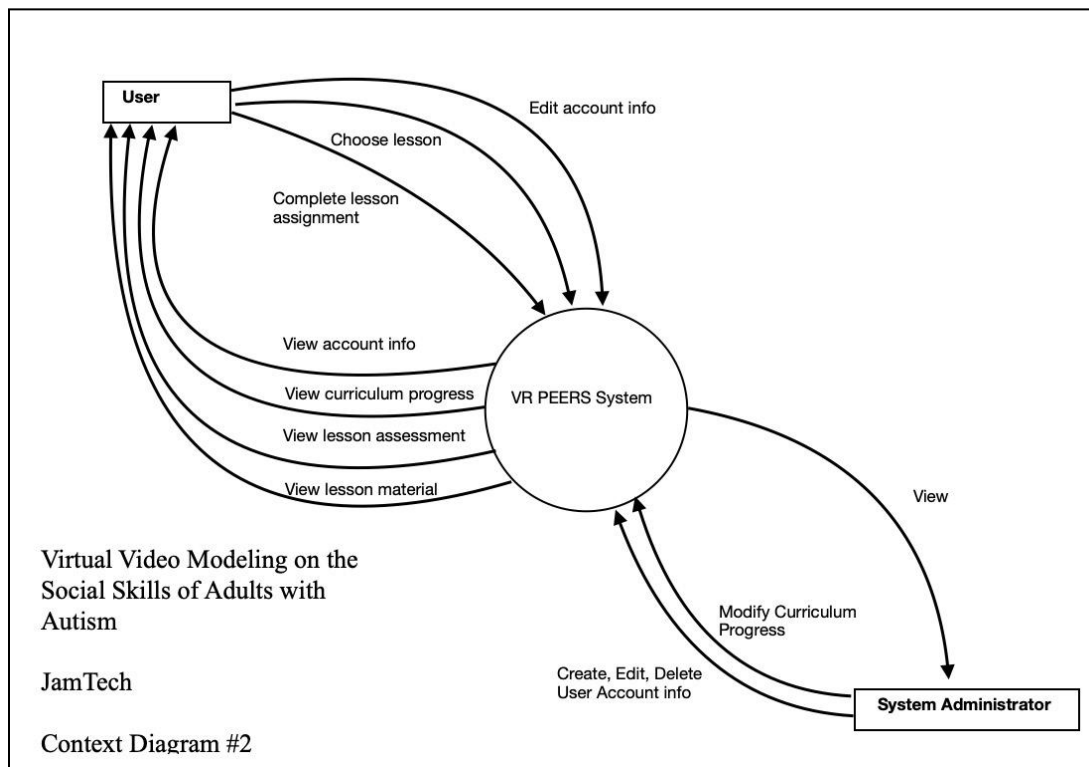


Figure 2: System Context Diagram #2



2. Functional Requirements

The functional requirements below are written with the intended purpose of what the system will offer, as well as the requirements that the system will follow to provide an interface for the user to interact with. The functional requirements are each followed by a use-case table which displays detailed information about the requirement.

Functional Requirements follow the format: FR-(unique identification number): requirement description. The priority number for each functional requirement is included in its corresponding table. The priority number 1 represents the lowest priority and 5 the highest priority.

FR-1: The system shall allow users to log into their PEERs account by entering their email and password.

Number	1	
Name	Log into PEERs account	
Summary	Allow a user to enter an email and password to log into their PEERs account	
Priority	5	
Preconditions	User must have a PEERs account	
Postconditions	User is logged in and is granted access to the rest of the application's functions	
Primary Actor	User	
Secondary Actors	Account Database	
Trigger	User selects the "Login" button	
Main Scenario	Step	Action
	1	A log-in window is displayed
	2	User enters their email and password into the text boxes
	3	User clicks the "Login" button to submit their information
	4	User is logged in
	5	User is brought to curriculum map
Extensions	Step	Branching Action
	4a	The information entered by the user does not match an account: <ul style="list-style-type: none"> - A pop-up message alerts the user that the information entered does not match an existing account, prompting them to try again
	5a	The user is new: <ul style="list-style-type: none"> - Instead of being brought to the curriculum map, the user is shown the tutorial videos first.

FR-2: The system displays the curriculum map to the user

Number	2	
Name	Display Curriculum Map	
Summary	Allows the user to view the curriculum map	
Priority	5	
Preconditions	User must be logged in	
Postconditions	User is presented with their current curriculum map	
Primary Actor	User	
Secondary Actors	Curriculum database	
Trigger	User logs in successfully, or User backs out of a lesson	
Main Scenario	Step	Action
	1	System queries database for user's current curriculum map
	2	User is shown the curriculum map

FR-3: The system shall allow the user to select a lesson from the curriculum map.

Number	3	
Name	Lesson Selection from Curriculum Map	
Summary	Allow the user to select a specific lesson from their curriculum map to enter the 'lesson overview' mode.	
Priority	4	
Preconditions	User must be logged in. User is on the Curriculum Map view.	
Postconditions	User is able to view the role-play videos within the lesson	
Primary Actor	User	
Secondary Actors	Curriculum database	
Trigger	User selects a lesson from the curriculum map.	
Main Scenario	Step	Action
	1	User selects a specific unlocked lesson: lesson overview mode is entered
	2	The lesson overview is displayed
Extensions	Step	Branching Action
	1a	User selects a specific locked lesson on the curriculum map: <ul style="list-style-type: none"> - A pop-up window displays a message alerting the user that they have not yet unlocked this lesson

FR-4: The system shall allow the user to view lesson-related video role-play examples in the VR environment.

Number	4	
Name	Viewing Role-play Videos	
Summary	User has selected a lesson, and now they are presented with a selection of videos from which the user can select to watch.	
Priority	3	
Preconditions	User is currently in 'lesson overview' mode	
Postconditions	Once all video content has been viewed, the VR quiz is unlocked.	
Primary Actor	User	
Secondary Actors	VR Peers System	
Trigger	User enters 'lesson overview' mode	
Main Scenario	Step	Action
	1	User selects a video
	2	The systems enters the 3D video scene
	3	The user watches the content of the video
	4	The user is prompted to start the next role-play video
Extensions	Step	Branching Action
	4a	If all video content has been viewed: - make the user eligible to take the quiz.

FR-5: The system shall allow users to complete lesson assessments in the VR environment.

Number	5	
Name	Complete Lesson Assessment	
Summary	Allow a user to complete a lesson assessment (quiz)	
Priority	4	
Preconditions	User must have completed a video lesson material and be in the lesson overview mode	
Postconditions	Lesson marked complete and progress is reflected in the curriculum map	
Primary Actor	User	
Secondary Actors	Curriculum Database	
Trigger	User clicks “Take the quiz” button	
Main Scenario	Step	Action
	1	Display VR immersive video
	2	Video pauses at the end
	3	Simple binary choice quiz is displayed for the user
	4	User selects answer
	5	Correct response video is displayed
	6	Assessment ends and user is returned to the lesson overview mode
Extensions	Step	Branching Action
	5a	If incorrect response is chosen, incorrect response video is displayed
	5b	User is returned to step 3

FR-6: The system shall offer a simple VR tutorial and safety warnings to new users.

Number	6	
Name	Display tutorial and safety warnings	
Summary	The system displays a simple tutorial and safety warnings to new users after logging in for the first time.	
Priority	5	
Preconditions	New user must be logged in	
Postconditions	User is brought to the curriculum map	
Primary Actor	User	
Secondary Actors	Account Database	
Trigger	New user successfully logs in	
Main Scenario	Step	Action
	1	The system displays safety warnings for the user to read before proceeding
	2	User clicks the “Continue” button
	3	The system displays a tutorial for the user to watch before proceeding
	4	User clicks the “Continue” button

FR-7: The system shall allow standard media controls for the content videos.

Number	7	
Name	Media controls	
Summary	When the system displays content videos, the media controls should follow standard conventions	
Priority	2	
Preconditions	User has selected a video	
Postconditions	User is able to interact with content videos	
Primary Actor	User	
Secondary Actors	Media content	
Trigger	Content video is played	
Main Scenario	Step	Action
	1	User clicks the video to bring up the media controls
	2	User interacts with the video using standard media controls
	3	The corresponding media control response is applied to the video
	4	The video ends
Extensions	Step	Branching Action
	1a	The user does not click the video: - Nothing happens and the video plays through uninterrupted.

2.1 Acceptance Testing

The following acceptance tests are created with the intention of thoroughly testing all of the functional requirements listed above. Each acceptance test will test one or multiple of the functional requirements, ensuring that every aspect of the program will function as expected.

The acceptance tests will be written in the following format:

Acceptance Test #ID (list of all functional requirements that will be tested):

Overview

[In depth description]

Acceptance Test 1 (1, 6, 7):

The user logs into the application using their PEERs account as a new user.

This test will ensure that users are able to successfully log into an account while also ensuring that new users will be shown safety warnings and tutorial videos upon logging in. This will also test if the standard media controls are functioning for the tutorial videos.

Acceptance Test 2 (2):

The user opens the curriculum map.

This test will ensure that the curriculum map functions and displays properly.

Acceptance Test 3 (1, 2, 6):

The user logs into the application as an existing user.

This test will ensure that users are able to successfully log into an account that has tracked their progress from previous sessions. This will also ensure that the safety warnings and tutorial videos are only displayed for new users and not existing videos. Aside from this, logging in as an existing user and checking the curriculum map will confirm whether the map has tracked the user's previous progress or not.

Acceptance Test 4 (2, 3):

The user chooses a lesson.

This test will ensure that the user is able to move between the curriculum map and the lesson overview mode easily by selecting a lesson from the curriculum map. This will also ensure that the lesson overview mode displays as expected.

Acceptance Test 5 (3, 4, 5, 7):

The user completes a lesson.

This test will ensure that the user is able to enter a new lesson and complete it while testing all of the features associated with completing a lesson. First, it will ensure that the role-play videos display properly. This test will also ensure that content videos can be interacted with using standard media controls. As for the assessment portion, this test will ensure that the assessment environment functions as expected, and that the user is able to answer the assessment questions as expected.

Acceptance Test 6 (5):

The user intentionally selects the wrong answer in a role-play scenario.

This test will ensure that the program proceeds the way it's intended to and plays the correct corresponding videos when the incorrect answer is selected.

Acceptance Test 7 (2, 3, 5):

The user exits the lesson overview to return to the curriculum map after completing an assessment.

This test will make sure the progress from completing the assessment is properly saved, and that the assessment ends when it's supposed to. This will also test to ensure that the lesson overview mode still displays properly after the assessment, and that the user is able to return to the updated curriculum map from the lesson overview mode.

3. Non-Functional Requirements

The non-functional requirements (**NFR**) are meant to display requirements that are related to the characteristics of the system. NFRs describe constraints and capabilities of the system (performance requirements, safety and privacy requirements, security requirements, and software quality attributes).

Non-Functional Requirements follow the format: NFR-unique identification number: requirement description (Priority number). The priority number 1 represents the lowest priority and 5 the highest priority.

3.1 Performance Requirements

NFR-1: The system shall display the lesson to the VR headset within 0.5 seconds, 99% of the time. (Priority 5)

NFR-2: The system shall accurately keep track of the user's curriculum progress 99% of the time. (Priority 3)

NFR-3: The system shall be able to handle up to 100 active users 95% of the time. (Priority 4)

NFR-4: The system shall be able to handle 100 login requests every 5 seconds 95% of the time. (Priority 3)

NFR-5: The system shall be able to handle the user input within 0.5 seconds 95% of the time. (Priority 4)

NFR-6: The system shall be able to update based on user actions within 0.5 seconds 95% of the time. (Priority 4)

3.2 Safety and Privacy Requirements

NFR-7: The system shall comply with the California Consumer Privacy Act (California) (Priority 4)

NFR-8: The system shall comply with the General Data Protection Regulation (European Union) (Priority 4)

NFR-9: The system shall protect user's data from unauthorized access. (Priority 4)

3.3 Security Requirements

NFR-10: The system shall be able to protect user data from attacks 99% of the time.
(Priority 4)

3.4 Software Quality Attributes

NFR-11: The system shall be able to connect to internet services 95% of the time.
(Priority 3)

NFR-12: The system shall be available to all users 24 hours a day, 95% of the time.
(Priority 3)

NFR-13: The system shall not exceed a size of 20GB. (Priority 1)

4. User Interface

See “User Interface Design Document (**UIDD**) for Virtual Video Modeling on the Social Skills of Adults with Autism” for user interface designs. Estimated availability on November 29th, 2023.

5. Deliverables

The deliverables for this project will be maintained on our central GitHub repository. Physical copies of important documents will be provided in person. In the section below, all deliverables are separated by the semester in which they will be first published. Almost all deliverables will be subject to updates and modifications over the entire year. Our GitHub repository will contain the most current versions of all deliverables; additional physical copies will be provided as requested.

Deliverables for Fall 2023 - [COS397]

Hard copies of each of the following:

- Systems Requirement Specification
- System Design Document
- User Interface Design Document

An electronic file containing the following:

- Systems Requirement Specification (**available: Nov 1, 2023**)
- System Design Document (**available: Nov 15, 2023**)
- User Interface Design Document (**available: Nov 29, 2023**)

Deliverables for Spring 2024 - [COS497]

Hard copies of each of the following:

- User Manual
- Administrator Manual

An electronic file containing the following:

** Documents hosted on Github will be updated regularly **

- | | |
|--|--|
| • Critical Design Review Document | (Estimated availability: to be announced) |
| • Code Inspection Report | (Estimated availability: to be announced) |
| • Final Project Report | (Estimated availability: to be announced) |
| • User Manual | (Estimated availability: to be announced) |
| • Administrator Manual | (Estimated availability: to be announced) |
| • All source code | (Estimated availability: to be announced) |
| • The executable program | (Estimated availability: to be announced) |
| • Any other software required for installation and execution of the delivered program. | |
| (Estimated availability: to be announced) | |

6. Open Issues

This section will cover any issues that are currently open that have not reached a conclusion, a detailed description of the issue will be available. The issues will be addressed by their target completion date.

Open issues will be tracked in our kanban board:

<https://trello.com/invite/b/erGa4KSJ/ATTI3a00e58a77e188a54783a2636c467fb372962312/jamtechs-kanban-board>

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	<i>Allison Lupien</i>	11/1/23
Jacob Michaud	<i>Jacob Michaud</i>	11/1/23
Maha Fazli	<i>Maha Fazli</i>	11/1/23
Nick Sarno	<i>Nick Sarno</i>	11/1/23
Tristan Cilley	<i>Tristan Cilley</i>	11/1/23
Sarah K. Howorth	<i>Sarah K. Howorth</i>	11/1/23

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 system requirements specifications 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	<i>Allison Lupien</i>	11/1/23
Comments:		
Jacob Michaud	<i>Jacob Michaud</i>	11/1/23
Comments:		
Maha Fazli	<i>Maha Fazli</i>	11/1/23
Comments:		
Nick Sarno	<i>Nick Sarno</i>	11//23
Comments:		
Tristan Cilley	<i>Tristan Cilley</i>	11/1/23
Comments:		

Appendix C – Document Contributions

This is the current contribution of each team member towards the system requirements specification document.

Name	% of contribution
Allison Lupien	20% [Functional Requirements, Non-Functional Requirements, User Interface, Appendix A, B, proofreading]
Jacob Michaud	20% [Context Diagrams 1&2, Functional Requirements, Non-Functional Requirements, proofreading]
Maha Fazli	20% [logo, introduction, purpose of the document, product scope, appendix b, c, open issues, proofreading, document organizing]
Nick Sarno	20% [Functional Requirement use cases, Function Requirement Acceptance Tests, proofreading]
Tristan Cilley	20% [Purpose of this Product, Context Diagrams 1 & 2, Deliverables, References, proofreading]