**SilentSignal: SSG System Specification**

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1. **Executive Summary**

This system specification document provides an in-depth overview of SilentSignal. It is a mobile application that allows users to enhance their communication skills by completing communication modules. It promises a communication platform and immersive user-friendly integration.

This document is primarily for the developers responsible for building SilentSignal. The development team should be familiar with mobile applications on iOS. Further, developers should be familiar with learning management systems.

The document is a complete reference to Silent Signals architecture, classes, and user interface design. It includes a section on the system’s threats, requirements, deployment model, and security measures.

The system’s customers are the end users, especially the students and the institution. The institution determines the project’s success by deciding whether they will require students to purchase the system.

In conclusion, this document states how the system should achieve the project’s vision. Developers should remember that this document is in regards to the MVP.

1. **Introduction**

SilentSignal, or SSG, is a mobile application designed to enhance user’s communication and perception skills. It provides a learning management system for educational institutions or users to track and complete modules.

The distinguishing feature of SSG is its communication platform. The user must complete modules to unlock the missions found in the communication platform. The modules contain information and quizzes on rhetoric dissection, cognitive biases, cultural communication, and interpersonal communication. Once the user unlocks the missions, the user can collaborate with friends or fellow users to complete the missions.

In addition, users can view a leadership board and their progress in modules. In the modules, SSG will provide users immediate feedback upon completing a quiz. For more details about SSG, view Section 4.0 of the System Proposal.

* 1. **Problem Statement / Project Vision**

SSG was created because of the demand for communication skills in the workplace and the increasing decline of social skills. SSG also seeks to address the gap in public speaking courses and communication coaching applications that often lack engagement. It provides an immersive communication training experience through a communication platform and online missions.

SSG is envisioned as a mobile application learning management system. It facilitates the instructional process for institutions by supplying users or students with ready-made content, thereby eliminating the need for communication professors to generate this material. The application highlights the need for users and institutions to track their progress. SSG fulfills this need by providing a progress bar and reports. Its features include modules, quizzes, missions, and a communication platform.

Institutions, end users, communication experts, and the development team are potential stakeholders who can benefit from SSG. Institutions can increase the number of SSG users and obtain a learning management system. Communication experts can create scholarly content and increase institutions' likelihood of adopting the system. The development team can meet the needs of the stakeholders and receive monetary benefits.

* 1. **System Capabilities**

The following sections list SSG’s functional requirements, also known as system capabilities. These are in accordance with the first version of the system. Furthermore, this section will describe the requirements by using the case name, ID numbers, and description. For more information, view Section 4 and Section 5 of the System Proposal.

1. Authenticate User with University (ID – 1): Users can access their account using their university credentials or login information.

2. Obtain One Time and Subscription Payment Card (Id – 2): The system should be able to process a one-time payment of $10 from the user and obtain payment information for a future $1 monthly subscription.

3. Track the User’s Progress (ID – 3): Users can access SSG content and view their progress.

4. Unlock Quizzes, Missions, and the Communication Platform (ID – 4): The system will verify the user’s progress to unlock quizzes, missions, and the communication platform.

5. Report the User’s Progress (ID – 5): The system provides the user and educational institution with immediate feedback upon completing each mission or quiz.

6. Send Leaderboard Notifications (ID – 6): The system sends notifications for leaderboards to encourage competition, allowing users to opt out.

7. Generate Virtual Environments (ID – 7): The system may provide interactive and dynamic environments for agencies to practice diplomatic negotiations, public speeches, or crisis management.

8. Provide Tutorial (ID – 8): The system will provide a tutorial to guide the students or end users in the communication course across the system navigation, ensuring the user interface is user-friendly and easy to learn.

* 1. **Non-functional Requirements and Design Constraints**

SSG seeks to be a user-friendly and immersive learning management system through a mobile application. This section succinctly lists and describes constraints, non-functional requirements, and feasibility concerns. For more information, view Section 1, Section 4, and Section 3 of the System Proposal.

### **2.3.1. Constraints**

* The application is limited to being mobile.
* The communication platform will require reliable network connectivity and low latency.
* User-generated content requires moderation to prevent harmful content and may create additional work for the development team.
* The educational content’s accuracy depends on the funds available to pay for experts in the field of communication for content development.

### **2.3.2.** **Non-Functional Requirements**

1. Provide Tutorial
   * The system will have a tutorial to guide users on the system navigation.
2. Ensure Error Handling
   * The system must provide feedback to the users quickly.

### **2.3.3. Additional Comments**

SSG should meet the needs of the end users. Thus, the project should prioritize client satisfaction. However, as a learning management system, the main concern is creating a secure system that complies with the Family Educational Rights and Privacy Act. To handle this correctly, SSG should consider hiring lawyers to assist with the legal and contractual aspects of the project. For more information, view Section 3 of the System Proposal.

* 1. **System Evolution**

In Version 1 MVP (Minimum Viable Product) the team will deliver the components for a learning management system. These components include user authentication, learning modules, quizzes, missions, and a communication platform. For additional information regarding the functionality of Version 1, view Section 5 of the System Proposal.

In Version 2, we will deliver further features for the communication platform. Specifically, the system will enable authenticated university students who are subscribed to a course to view other students enrolled in the same course and communicate with them through a communication platform. The difference between the communication platform in the MVP and in Version 2 is that the MVP communication platform is used to complete missions related to the content, and it can only be accessed by those who have unlocked it. However, the Version 2 communication platform is a separate entity that fosters course discussion and supports collective learning beyond specific missions.

By Version 3, SSG will introduce virtual office hours. The application will be ready to integrate video conferencing tools to enable students to interact with instructors. The components will include collaboration tools such as whiteboards and screen-sharing capabilities, a schedule and booking system, and virtual study spaces to meet with other students.

* + 1. **Version 2 Changes**

User collaboration and communication are fundamental to SSG’s vision. The following are additional capabilities for Version 2:

1. View Students

* The system must let authenticated users view other users enrolled in the same communication module/course.

2. Manage Friends

* The system must let students add each other as friends. Friends have access to the user’s chat – this does not refer to the MVP communication platform but the additional social chat feature that version 2 provides.
* The system must let students block or restrict other users and friends.
* The system must let the user delete and add friends.
* The system must display the number of friends users have.

3. Customize Profile

* The system must let users pick their profile picture.
* The system must allow users to decide whether they share their phone number and email on their profile page.
* The system must allow users to pick their profile background picture.
* The system must allow users to decide whether they appear offline or online. The system must allow this feature to be updated daily at any time.
  + 1. **Version 3 and beyond Changes**

By Version 3, SSG will expand to allow users to interact with professors, access collaboration tools, and use external partnership tools. The following are the additional capabilities of Version 3’s functionalities:

1. Authenticate User with University Credentials

* The system will allow professors and instructors to create an account. In contrast to the MVP, professors will now have more accessibility than simply receiving a report card of the student’s progress through the institution that subscribed to SSG.

2. Manage a Schedule and Booking System

* The system will partner with Microsoft’s booking system to organize schedules and manage appointments.
* The system should allow users to access the booking system and create, cancel, and essentially modify appointments.
* The system should allow users to display their schedule and allow others to request appointments on their profile page through the booking system.

3. Use Collaboration Tools

* The system should allow users to zoom for video conferencing purposes.
* The system should allow users to access whiteboards and screen-sharing capabilities in the Version 2 chat feature.
* The system should collaborate with lifeat.io to provide users with the option of a virtual study place.
  1. **Document Outline**

This System Specification document contains a detailed technical map for SSG’s system. It

Briefly summarize the constraints and requirements from the System Proposal. Then, it defines the application’s evolution, structural model, architecture design, and user interface interactions.

The section on the Structural Model provides a class diagram and metadata about the class diagrams. The section on Architecture design provides an infrastructure model. This includes two deployment diagrams, hardware, and software requirements. Lastly, the section on User-Interface outlines and provides requirements and constraints, a navigation diagram, a wireframe, and a formal output design.

1. **Structural Model** 
   1. **Model Introduction**

This section provides information regarding the system’s class diagrams and metadata. The Class Diagram section provides a UML Class Model. This includes attributes/data elements, methods/operations, and their relationships. The Metadata section provides further information and descriptions of the class data. Overall, this section specifies how these methods work together to illustrate how the system will work in its MVP stage.

* 1. **A diagram of a class

     Description automatically generatedClass Diagrams**

**Link to Class Diagram:**

<https://lucid.app/lucidchart/09bdcc59-2fbf-442e-af82-f1d67490f4bf/edit?viewport_loc=-664%2C-12%2C4303%2C2066%2CHWEp-vi-RSFO&invitationId=inv_fddcbdee-fab1-4347-b305-c9364139e4eb>

* 1. **Metadata**

This section briefly describes each class, including its visibility, abstraction, and additional information. Furthermore, it provided in-depth information about the class's attributes and operations.

ContentManager 15

Feedback 16

MissionManager 17

NotificationManager 19

PaymentManager 21

ProgressTracker 23

TutorialManager 25

User 26

# 

# **3.3.1 Content Manager**

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Description: Handles the browsing, adding, updating, and deletion of educational content.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| ContentList | A list of all the content available in the system. | yes | 1 |
| ContentType | Specifies the type of content the user will access. | yes | 1 |
| ContentDate | Records the date when the content was created. | yes | 1 |
| contentId | Unique identifies for each piece of content | yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| browseContent | Allows users to browse available content. | Yes | No |
| addContent | Adds new content. | No | No |
| deleteContent | Deletes existing content. | No | No |
| updateContent | Updates existing content. | No | No |
| getContent | Retrieves specific content by ID. | Yes | No |

# **3.3.2 Feedback**

A screenshot of a computer

Description automatically generated

Description: Collects and manages user feedback, facilitating the sending and viewing of feedback.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| Feedbacks | List of feedback entries. | Yes | 1 |
| Feedback | Feedback content. | Yes | 1 |
| FeedbackId | Unique identifier for each feedback. | Yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| sendFeedback | Sends feedback from a user. | No | No |
| viewFeedback | Views feedback for a specific user. | Yes | No |

# **3.3.3 MissionManager**

A screenshot of a computer

Description automatically generated

Description: Oversees the creation, assignment, and tracking of missions within SSG.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| MissionList | Contains a list of all the missions available in the system. | Yes | 1 |
| ActiveMission | Contains a list of all the missions the user is progressing through. | No | 1 |
| MissionArchive | Contains a list of all the missions available to the user. | No | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| checkMissionAccess | Validates whether the user has completed a module and can access the mission. | Yes | No |
| startMission | Initiates the mission. | No | No |
| getMission | Retrives the correct mission for the user. | No | No |
| assignMissionToUser | Assigns a mission to a specific user based on the selected module. | No | No |

# **3.3.4 NotificationManager**

A screenshot of a computer

Description automatically generated

Description: Manages and delivers notifications to users regarding missions, progress, and errors.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| Subscribers | List of subscribers | No | 1 |
| NotificationHistory | List of notification history entries | Yes | 1 |
| notificationType | The type of notification | Yes | 1 |
| leaderBoardId | Unique identifier for leaderboard. | Yes | 1 |
| errorId | Unique identifier for error type. | Yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| viewBoardNotification | Views leaderboard notification. | Yes | No |
| getSubscriptionNotification | Sends and displays subscription notification. | No | No |
| manageNotification | Manages notifications for a user. User can decide to turn them off or on. | No | No |
| errorNotification | Sends error notifications for quizzes or system failures. | No | No |

# **3.3.5 PaymentManager**

A screenshot of a payment manager

Description automatically generated

Description: Processes user payments, including one-time payments and subscription management.

Visibility: Protected

Is Abstract: Yes

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| paymentRecords | List of payment records. | Yes | 1 |
| paymentGateway | The payment gateway used. | Yes | 1 |
| Card | It contains the card the user will use for the monthly subscription. | Yes | 1 |
| subscriptionId | A unique identification for each subscription | Yes | 1 |
| statusId | A unique identifier for the status of the payment | Yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| processOneTimePayment | Processes a one-time payment. | No | No |
| processSubscriptionPayment | Process subscription payment. | No | No |
| cancelSubscription | Cancels a subscription payment. | No | No |
| updatePaymentMethod | Allows the user to update their payment method. | No | No |
| viewPaymentStatus | Allows the user to see the payment status. | Yes | No |

# **3.3.6 ProgressTracker**

A screenshot of a computer program

Description automatically generated

Description: Tracks and reports on user progress in modules, quizzes, and communication platform usage.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| moduleCompletetionStatus | Module completion status. | Yes | 1 |
| quizCompletionStatus | Quiz completion status. | Yes | 1 |
| platformUsageStats | Platform usage status . | Yes | 1 |
| moduleId | A unique identifier for the modules. | Yes | 1 |
| platformId | A unique identifier for the communication platform. | Yes | 1 |
| progressId | A unique identifier for the progress of the user. | Yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| trackModuleCompletion | Tracks the completion of a module for a user | Yes | No |
| trackQuizCompletion | Tracks the completion of a quiz for a user | Yes | No |
| trackCommunicationPlatformUsage | Tracks the usage of the communication platform. | Yes | No |
| calculateProgress | Calculates the overall progress of a user. | Yes | No |

# **3.3.7 TutorialManager**

A screenshot of a computer

Description automatically generated

Description: Provides and manages tutorials to guide users on how to use the system.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| Tutorials | A list of the tutorials | No | 1 |
| tutorialId | A unique identifier for each tutorial. | Yes | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| displayTutorial | Displays a specific tutorial. | Yes | No |
| skipTutorial | Skips the current tutorial, | No | No |

# **3.3.8 User**

A screenshot of a computer

Description automatically generated

Description: Manages user’s information, authentication, and interactions with SSG.

Visibility: Public

Is Abstract: No

**Attributes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Read Only?** | **Multiplicity** |
| username | The user’s name. | Yes | 1 |
| userId | A unique identifier for the user. | Yes | 1 |
| password | The user’s password. | Yes | 1 |
| email | The user’s email or school email. | Yes | 1 |
| universityCredentials | The user’s university credentials. | Yes | 1 |
| progress | User’s progress tracker | No | 1 |
| paymentCardInfo | The user’s card information. | No | 1 |

**Operations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Is Query?** | **Is Polymorphic?** |
| createAccount | Creates a new user account. | No | No |
| signIn | Authenticates users with their username and password. It may also authenticate it with university credentials. | No | No |
| signOut | Signs the user out and saves all progress. | No | No |
| joinMission | Allows the user to join a mission. | No | No |
| viewProgress | Displays user’s progress. | Yes | No |
| retakeQuiz | Allows the user to retake a quiz. | No | No |
| retrieveProgress | Allows the user to obtain their progress. | No | No |
| leaveMission | Allows the user to leave a mission. | No | No |
| reportIssue | Allows the user to report and issue. | No | No |

1. **Architecture Design**
   1. **Architecture Overview**

SSG will utilize a cloud-based PaaS or SaaS architecture to provide scalable and flexible services to users. Instead of managing servers and network infrastructure, the focus will be on developing and deploying applications seamlessly. The architecture will follow a modular design to accommodate evolving IT requirements. The system will comprise different layers, including the application, business logic, and data storage layers.

The following section will detail the infrastructure model, hardware and software requirements, and the security plan. One can find information on the deployment diagrams in the Infrastructure Model Section. The Hardware and Software Requirements Section will cover the requirements for the system. Lastly, the Security Plan will detail the components, threats, and controls.

* 1. **Infrastructure Model**
     1. **Deployment Diagram 1 – Architecture Overview**

**A diagram of a cloud service

Description automatically generated**

<https://lucid.app/lucidchart/fcc0079e-74a1-4b0b-ad56-62605b60bae1/edit?viewport_loc=-85%2C-82%2C1022%2C1125%2C0_0&invitationId=inv_d2e775cf-b37c-484b-a638-b25f5f88eb9a>

* + 1. **Deployment Diagram 2 – Nodes and Artifacts**

**A diagram of a computer flowchart

Description automatically generated**

<https://lucid.app/lucidchart/6e35f5a0-a25d-46b1-a3dd-84d2e2c5868e/edit?viewport_loc=-1678%2C-1887%2C3269%2C3607%2C0_0&invitationId=inv_2892e607-a2b9-4e97-9f6b-99254c5cfbc6>

* 1. **Hardware and Software Requirements**

The following section will discuss the hardware and software components of the system’s architecture. This will also include the hardware and software requirements.

* + 1. **Hardware Components**

SSG will not require additional hardware other than MacBooks.

1. Web Server: SSG will need a cloud-based hosting service. This should allow the system to rescale quickly according to the demands of the growing database. Recommendations include Amazon Web Services, Microsoft Azure, or Google Cloud Platform.

2. Database Server: It is recommended that the system uses managed database services like AWS, Azure, or Google Cloud.

3. Backup Database Server: SSG should use AWS as it has many services.

The users will also need to update their devices to install this application.

* + 1. **Required Software Components**

To implement SSG and iOS environments, a MacBook will be needed for testing and development. Further, SSG will need to run the latest version of Xcode. This includes the iOS software development kit, tools, compilers, and frameworks to develop the code. Further, Visual Studio Code will be needed. To design wireframes and prototypes, the developers may also use Lucid Chart.

* 1. **Security Plan**
     1. **Security Overview**

As a learning management system, SSG has access to critical user information. SSG's top priority is to handle this information adequately to ensure SSG meets FERPA, the Family Education Rights and Privacy Act.

This section categorizes threats into physical, network, application, file, and user security. The risks that must be considered are:

**Loss or theft:** The user may lose their phone, or their phone might be stolen. This could result in unauthorized access to information.

**Eavesdropping:** Individuals may be able to gain access to the application if eavesdropping occurs.

**Data Breaches:** Data breaches may result in violations of FERPA.

**Vulnerability:** The application must not be susceptible to any attacks as the information it contains must follow FERPA.

**Stolen User Credentials:** Another user can access the application if the user’s credentials are stolen.

**Unauthorized Access to Accounts:**

**Leakage User Personal Information and Privacy Violation:** Since SSG needs personal user information to create an account and identify other users, any leaks in SSG may cause legal implications.

* + 1. **Security Plan**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Components/Threats** | **Physical** | **Network** | **Application** | **File** | **User Security** | **User Security** | **User Security** | **User Security** |
|  | **Loss or Theft** | **Eavesdropping** | **Data Breaches** | **Vulnerability** | **Corruption** | **Stolen User Credential** | **Unauthorized Access to Accounts** | **Leakage User Personal Information and Privacy Violation** |
| **User Phone** | **1** |  |  |  |  |  |  |  |
| **Internet Connection** |  | **2** |  | **4** |  |  |  |  |
| **Application Cloud Service** |  |  | **3** | **4** | **5** | **6** | **7** | **8** |

**Controls:**

1. Two factor authentication through the universities log in page.

2. Cryptographic protocol to encrypt data sent over the internet.

3. Limited access to data and data encryption.

4. Penetration testing.

5. Recovery plan.

6. Recovery plan, Backup plan, Data Deletion plan.

7. Confirm log in session.

8. Request user permission for access to private information.

1. **User-Interface** 
   1. **User-Interface Requirements and Constraints**

SSG must provide a user-friendly application for users. The interfaces should present information in a manner that ensures that the sequences of actions to achieve a task are as simple as possible.

The Window Navigation Section will illustrate this. The UI Wireframes section will detail this in depth by showing how the user screen will look. Lastly, the Formal Output section will detail the design layout for reports.

## **5.1.1 SSG’s Guiding Principle/ Requirements**

* As the system evolves to version three and other services are added, the services should appear on a hamburger menu.
* Navigation should not surpass three clicks.
* The application’s interface should illustrate an academic environment. It should be minimalistic. However, when a user accesses a mission, the application’s interface should be black and green, stimulating a hacker’s environment.
* The application should have confirmation pop-ups when a user is asked to make a significant decision.

## **5.1.2 SSG’s User-Interface Limitations**

* SSG’s user interface is only for Apple devices.
* The application is in English.
* The user can’t customize their profile in the MVP. The user will have this feature available in Version 3.
* The application will have a limited screen size.
  1. **Window/Screen Navigation Diagram**

The following section describes the flow of SilentSignal’s UI components. It provides a navigation diagram and wireframes. Further, additional comments are provided in the subsequent section.

## **5.2.1 Additional Comments**

The diagram shows the normal flow of the interfaces the user will experience. One detail the developers must remember is that although the Landing 2.0 page provides users with two options they may access, the UI is essentially the same for both options. The exception is that the options menu at the bottom will have myPersonal Work instead of mySchool. The purpose of this division is to allow users to organize their selected communication modules by those which are mandatory for their academic institution and those they selected for personal reasons. For simplicity, the diagrams do not repeat the wireframes for the second section.

### **5.2.2 Diagram**

A diagram of a computer system

Description automatically generated

<https://lucid.app/lucidchart/34a3e503-bd26-48bb-8c31-6fae78662ae4/edit?viewport_loc=-8650%2C-1063%2C10536%2C5059%2C0_0&invitationId=inv_548d0fce-2c18-4ecc-931d-3c327619a3ff>

* 1. A screenshot of a wireframe

     Description automatically generated**UI Wireframes**

A screenshot of a wireframe

Description automatically generated

https://lucid.app/lucidchart/34a3e503-bd26-48bb-8c31-6fae78662ae4/edit?viewport\_loc=-772%2C-968%2C4936%2C2370%2C0\_0&invitationId=inv\_548d0fce-2c18-4ecc-931d-3c327619a3ff

### **5:3.1. Landing Page**

A line drawing of a rectangular object

Description automatically generated

This Landing Page is the first screen the users will see when they open SilentSignal. It contains a photo that illustrates the application’s logo. After 1.5 seconds, the page will move users to the sign-in form.

### **5:3.2. Log In Page**

A screen shot of a login form

Description automatically generated

The Login page allows users to select whether they are signing in or signing up. If users sign up, they will be redirected to a different page. Upon clicking sign in, they will be redirected to the home page. If users forget their password, they will be redirected to a different page. Further, the password must be user-selected and should be of at least 6 characters. It must include numbers, letters, and a special character. Further, the email should be the school email.

### **5:3.3. Landing 2.0 Page**

A screenshot of a phone

Description automatically generated

This diagram is the first page the user sees after signing in. The user can select schoolwork, where they will access modules assigned by their institution, or the user can select personal work, where they will access content they personally select. Upon clicking on schoolwork or personal work, the user will be directed to the home page.

### **5:3.4. mySchool**

A screenshot of a cell phone

Description automatically generated

Upon clicking mySchool, a button located at the bottom of the screen, the user will be directed to their University selected courses. Upon clicking on a course, the user will be directed to the assignments for that course.

### **5:3.5. Class Page**

Screens screenshot of a computer

Description automatically generated

The user will view this screen after having selected a course from mySchool. Here, the user can find the content assigned to them by the professor or institution. The system will mark each assignment as done or not done. Further, the user can scroll by sliding up to see all the homework assigned to them.

### **5:3.6. Reading**

Screens screenshot of a computer screen

Description automatically generated

The user can access readings provided by the professor and institution in this section. They can scroll down to finish the reading. Further, the progress bar will show the reader where they are in the reading. Lastly, the back button will redirect them to the class page, where they can find information on all their assignments.

### **5:3.7. Module Quiz**

A screenshot of a computer

Description automatically generated

This screen allows the user to take a quiz. The user may choose to leave the quiz at the risk of losing their progress. However, the user will see a popup allowing them to confirm whether they want to leave and what the risk of doing so is. On the left, the user can find a bar from which they can jump to a different question. Further, there is a next button allowing the user to move to the next question.

### **5:3.8. Quiz Exit**

A screenshot of a message

Description automatically generated

Upon clicking the exit button, the user will view this pop up. The user can leave the page and risk losing all their work or the user may select cancel and continue to the quiz.

### **5:3.9. Quiz Submit**

A screenshot of a computer

Description automatically generated

Upon clicking enter, the user will see this pop-up. This form allows the user to verify whether they want to submit it. If they click submit, they will be redirected to a leaderboard page, where they can see how they scored compared to others. If they click cancel, the user will stay on the quiz page. Further, if the user does not submit in time, the system will submit the quiz for them.

### **5:3.10. Quiz Leaderboard**

Screens screenshot of a quiz test

Description automatically generated

Upon submitting a quiz, the user will be directed to this page to see how their score affected their position on the leaderboard. The user can also click next to see the quantity of questions skipped, answered correctly, and answered incorrectly.

### **5:3.11. Quiz Report**

Screens screenshot of a test

Description automatically generated

This page lets users see how many questions they answered correctly, incorrectly, and skipped. Further, it allows the user an option to retake the quiz or exit the page. If the user exits the quiz, they are redirected to the class page. This page also allows the user to return to the quiz leaderboard page, where they can see how their score affected their position on the leaderboard.

### **5:3.12. Quiz Report: Exit Confirmation**

Screens screenshot of a quiz test

Description automatically generated

This page allows users to confirm whether they want to exit the quiz. If they decide to exit, they will be directed to the class page. If they cancel, they will remain on the quiz report page.

### **5:3.13. Quiz Retake**

A screenshot of a quiz

Description automatically generated

This page notifies the user that they must retake the module if they failed the quiz 3 times. Further, it gives the user the option to retake the module or exit to the class page. This page must only appear after the user has failed the quiz 3 times.

### **5:3.14. Mission**

A screenshot of a phone

Description automatically generated

This page allows the user to complete a mission. The task the user must complete in the mission will be outlined above the platform. Further, as the user completes the mission, the system must mark the task off as done. In addition, developers must remember that the format of the mission is dynamic. It occurs through a communication video platform whereby the system will detect that the user has completed the mission. However, the nature of the mission is diverse and abstract. At the bottom of the screen, the user must be able to view their progress.

### **5:3.15. Chat: Contacts**

A screenshot of a chat

Description automatically generated

This screen allows the user to chat with their contacts. By clicking the add button, users will be redirected to a page where they may add other users to their contacts. Further, users can search for contacts. Further, if the user clicks on a contact, they will be redirected to the Chat: communication page, where they may talk to that contact.

### **5:3.16. Chat: Communication**

A screenshot of a computer

Description automatically generated

In this screen, the user may text their contact.

### **5:3.17. Add Contact**

A screenshot of a login form

Description automatically generated

In this page, the user may add a contact. If the user clicks submit, the system will save their contact and redirect them to the Chat: contacts page. However, when the user clicks exit, the system will redirect the user to a pop-up where they can confirm their choice.

### **5:3.18. Add Contact: Exit Confirmation**

A screenshot of a computer

Description automatically generated

After clicking exit on the Add Contact page, the user will be directed to this screen. This pop-up allows users to confirm whether they want to exit the page. If they exit the page, they will lose all their work. However, if they press cancel, the user will remain on the Add Contact page.

### **5:3.19. Search**

A screenshot of a cell phone

Description automatically generated

This page allows the user to search for additional communication topics to study. If the user clicks on a topic, they will be directed to the Search: add page. If the user clicks the delete button, they can delete courses they no longer want to subscribe to.

### **5:3.20. Search: Add**

A screenshot of a phone

Description automatically generated

When the user clicks on a topic in the Search page, they will be directed to this page. Here, the user may click the add button to add the topic. Alternatively, the user can return to the Search page.

### **5:3.21. Home Page**

A screenshot of a phone

Description automatically generated

When the user clicks on the home page at the bottom of the screen, they will be directed to this page. In this page, the user should find information regarding recently released communication modules.

### **5:3.22. Search: Delete Confirmation**

A screenshot of a phone

Description automatically generated

When the user is on the Search page and has clicked on the delete button, the user will be directed to this page. This page allows users to confirm whether they want to delete their selected module. If the user clicks delete, then the module will no longer appear in their selected courses on the search page. However, if the user selects cancel, then the communication module will remain on the search page.

### **5:3.23. Leader board**

A screenshot of a mobile game

Description automatically generated

When the user clicks the leaderboard button at the bottom of this screen, they will be directed to this page. This page lists the users with the highest scores on the quizzes.

### **5:3.24. Forgot Password**

A screen shot of a phone

Description automatically generated

When the user clicks the forgot password button on the Login page, they will be directed to this page. This page allows the user to input their email. The system will send the email a code, which the user can input in this section to access their account.

### **5:3.25. Notifications Screen**

A group of boxes with different symbols

Description automatically generated with medium confidence

When the user clicks notifications on the Account Settings Screen, they will be directed to this page. This page allows the user to select whether they want to receive notifications. If the user presses the back button, they will return to the Account Settings Screen.

### **5:3.26. Sign Up Form**

A screenshot of a login form

Description automatically generated

When the user clicks the signup button on the Log In Page, they will be directed to this page. The user must fill this information out using their university credentials to access the university content. Otherwise, the user can create a personal account outside of their institution. Further, the user must input credit or debit card information and agree to the subscription fee to proceed to the next page.

### **5:3.27. Account Settings Screen**

A screenshot of a screen

Description automatically generated

When the user clicks on the Settings button on the Landing 2.0 page, they will be directed to this section. Each button leads the user to a separate page. Further, by pressing the back button, the user can return to the Landing 2.0 page. If the user selects the Sign Out button, then the SSG will direct the user out of the system and back to the user’s iPhone home screen.

### **5:3.28. Payment Screen**

A close-up of a payment form

Description automatically generated

When the user clicks okay, they will be directed back to the Account Settings Screen. Further, the user may cancel payment anytime by clicking cancel payment on the text below SSG. Upon canceling payment, the user will no longer have access to their account until they enter their payment information again.

* 1. **Reports: "Formal Output" Design**

n/a

1. **Appendices**

N/A

* 1. **Glossary**

**Cognitive biases** – a systematic pattern of deviation from norm or rationality in judgment.

**Family Educational Rights and Privacy Act (FERPA)** – a federal law that protects the privacy of student education records.

**Interpersonal Communication** – communication between two or more people.

**Learning Management System** – a software application or web-based technology used to plan, implement, and assess a specific learning process.

**Metadata** – data that provides information about other data.

**Multiplicity** – the number of instances of one entity that can be associated with one instance of another entity.

**Polymorphism** - allows objects of different classes to be treated as objects of a common superclass.

**Read-only** - allows data to be viewed or accessed but not modified.

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* 1. **Supporting documentation**

N/A