

# Requirements Specification

Team Shining Sky

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# 1. Introduction

Native Americans living in tribal communities lack access to things such as economic opportunity, well-funded education, and youth programs [1]. Youth feel a disproportionate, negative impact from these unfortunate realities, leading to higher rates of suicide, depression, anxiety, and substance abuse [2]. Behavioral and mental health resources are scarce in tribal communities, and where they do exist, there is often a negative stigma associated with using the services [3].

Oftentimes, tribal communities do not have the resources to pay for large-scale programs and projects and must rely on aid programs or, in the case of the Hopi community, academic research labs. These labs develop new technologies as part of their research and provide their services to the community in need largely at no or minimal cost. While it is not an industry that aims to generate any profit, it brings a lot of value to communities in need by helping them address social issues that create a large disadvantage for their citizens.

The client, Dr. Vigil-Hayes, and her research lab Community Aware Networks and Information Systems (CANIS) are one of these research labs and have been working with the Hopi community to address the youth mental health crisis, as well as a few other projects. While the Hopi community is relatively small at about thirteen thousand people, CANIS lab's goal is to take the products developed for the Hopi community and genericize them to be usable by any other tribal communities who would be interested. Dr. Vigil-Hayes' research focuses largely on asynchronous networking and creating useful network infrastructure that does not rely on a constant internet connection, so projects partnering with tribal communities like the Hopi where connectivity is often spotty give her a relevant real-world environment to conduct her research in. There is also the added tangible benefit of being able to use some of the resources she obtains to complete her research to also help a community that needs it. In addition, the end result is a product that can be offered to other communities and make a technological impact for North-American tribes.

## 2. Problem Statement

Currently, the CANIS lab has made some progress on the Hopi youth mental health crisis through one of their research ventures, the ARORA project, shown in the abstract below in Figure 2.1. The project currently consists of a mobile app and supporting server. The ARORA app aims to provide youth users on the Hopi reservation access to mental and behavioral health resources and gives them the ability to fill out mood reports to track their feelings and progress. While testing the app with members of the Hopi community, Dr. Vigil-Hayes was informed of a desire to integrate the ARORA project with an upcoming mentorship program created by the Hopi community. To do this, they would need ARORA to be expanded to include some of the new desired features and an additional app to provide software support for the mentorship program, which led to the creation of this project. The mentorship app project represents a way to boost the efficacy of both the ARORA project and the new mentorship program by allowing them to work in tandem.

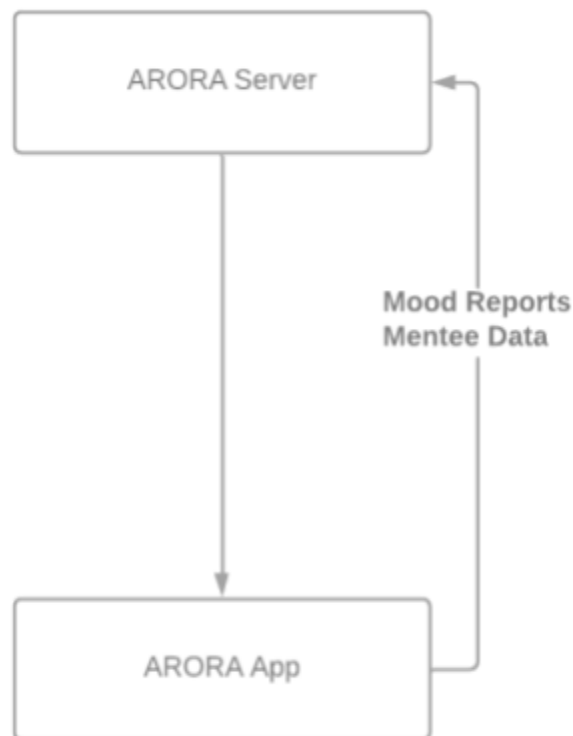


Figure 2.1: Current State of the ARORA Project

To satisfy the new idea for expansion, the ARORA project would need a way to provide the following systems that are not yet implemented:

- Mentors need a system to communicate with youth mentees.
- Mentors need a system that allows them to field anonymous questions from mentees.
- Mentors need a system that allows them to view mentee mood reports so that they know when to reach out.

While the ARORA project currently provides a youth mental health app for the mentees to use, there is currently nothing in place to work with mentors. This is the key issue for the ARORA project at this time, and expansion of the project as desired depends on the implementation of these core systems.

### 3. Solution Vision

Based on the scope of the needed features, the envisioned solution is an additional mobile app that integrates into the existing ARORA project. The mentorship app will serve as a companion for the existing ARORA app, connecting through the ARORA server and allowing the mentorship program to interact with the resources and users already present in the ARORA project. It will provide the following major features:

- Anonymous Question/Answer System
- Chat and Emailing
- Mentor/Mentee Meeting Scheduling
- Mood Report Display
- Mentor Authentication
- Server Management
- Database Management

The mentorship app, however, will not function as a standalone product. To interact with the ARORA server and by extension the associated youth mental health app, additional minor modules will need to be developed for the other two portions of the project. The youth app will need an add-in that allows users to send anonymous questions into the system, which the client has chosen to develop themselves, and the server itself will need some extra backend to handle transferring the data it already stores on things like mentee information and mood reports to the mentorship app. Figure 3.1 below provides an abstract view of what the ARORA project will look like once the solution is integrated into it.



Figure 3.1: ARORA Project With Solution Integrated

This solution will meet the new needs of the ARORA project and allow it to connect with the Hopi mentorship program, as shown in Figure 3.1. Creating an additional app to add to the system makes the most sense, as the functionality required would unnecessarily bloat the existing youth mental health app and essentially result in two apps worth of functionality being crammed into one. Sectioning the features out into separate apps based on which part of the program's user base, mentors or mentees, will be using those features is the most sensible and efficient way to implement the new systems. It also contributes to the greater need of making the ARORA program a fully-featured software suite that can be offered to other tribes once it is complete. The functionality of the additional app allows for programs like the Hopi mentorship program to utilize the ARORA project and can be applied to adjacent situations as well, like a mental health center that does not necessarily have a dedicated mentorship program but still wants to field anonymous questions from citizens and track mood reports for regular visitors to provide better care. Following from here, this document will introduce the specific requirements that the new mentorship app needs to meet to be a proper implementation of the solution vision.

## 4. Project Requirements

Several requirements need to be incorporated into the finished product. These requirements include specific functions the app must provide the user, a baseline efficiency of these functions, and other details that allow the project to exist in conjunction with other apps.

Functions that the app must provide include the following:

- Setup
- Login
- Chat
- Unanswered Questions
- Calendar
- Mood Reports

Requirements that aren't explicit functions but relate to the usability of those functions are considered performance requirements. An efficient and enjoyable user experience is still necessary. Therefore the latency of different actions will be recorded and reduced where possible. Furthermore, the usability of the app will become quantifiable through testing. Aspects of usability include startup times, page loading times, and the intuitivity and efficiency of interactions.

Environmental requirements are designed to guarantee that the product works in conjunction with a larger system. The client needs the project to work with a separate preexisting application that is used by the mentees each mentor is assigned. This will be accomplished by using compatible software and database systems. Making the apps appear as one cohesive product by utilizing similar themes and assets will allow for visual consistency. Due to inconsistent internet connections within the Hopi reservation, the app needs to be able to reconcile any inconsistencies between the user's app and the ARORA server. Lastly, the product needs to be available to users with iOS and Android devices.



## 4.1 Functional Requirements

The functional requirements of the product are derived from features our client has specified they want. The culmination of all of these functions will produce a satisfactory and usable product.

### 4.1.1 Setup - Setting up their account

- **Identification Code**  
ID Code provided to mentor from supervisor.
- **Password**  
Unique password for secure entry.
- **Recovery Email**  
Email to associate with the account for recovery.

### 4.1.2 Login

- **Identification Code**  
Used as a username for logging in to account.
- **Password**  
Used to securely log in to an account.
- **Two-Factor Authentication**  
Requires two different forms of identification to verify identity.
- **Password Recovery**  
Reset password via a link sent to recovery email.

### 4.1.3 Chat System

- **Identifying Information**  
Examples: Profile Picture or Name.
- **Preview of Last Message**  
Example: Seeing the first few words of the last message sent.

- **Sorted by Most Recent**

Conversations are shown from most recent to oldest in terms of the last message sent.
- **Search Conversations**

Search for a conversation by name of the recipient.
- **Create Conversations**

Ability to make a new conversation with a mentee.
- **Delete Conversations**

Ability to delete a conversation.
- **Send Messages**

Ability to send messages in a conversation.
- **Delete Messages**

Ability to delete sent messages.
- **Edit Messages**

Ability to edit sent messages.
- **Typographical Emphasis**

Ability to bold, italicize, and underline text before sending.

#### 4.1.4 Anonymous Questions

- **View Unanswered Questions**

Ability to view questions that have yet to be answered.
- **Search for Question**

Ability to search through questions by title and subject.
- **Answer Questions**

Ability to send answers to questions.

#### 4.1.5 Calendar System

- **Google Calendar Functionality**

Integration with Google Calendar. Example: exporting meetings with mentees to a personal calendar.

### 4.1.6 Mood Reports

- **Ability to View Mood Reports**

Examples: List, Grid, or Collage.

## 4.2 Performance Requirements

Beyond meeting the functional requirements, there are certain non-functional requirements that will increase the performance and ease of use of the ARORA mentorship app. Dr. Vigil-Hayes has not made any formal requests for these requirements, so they have largely been determined by researching common app development practices.

### 4.2.1 Latency

- **< 1 Second with minimal data**

When actions are being performed that include small amounts of data, the latency will be less than one second.

- **< 1 Minute with data**

When actions are being performed that include more than small amounts of data, the latency will be less than one minute.

### 4.2.2 Usability

- **< 10 Second Startup Times**

The app will open to the login page in under ten seconds.

- **< 1 Second Page Load Times**

Each page within the app will be loaded in under one second.

- **Intuitivity**

Layout of features will be continuously modified until all testers correctly identify them at a rate greater than 50%.

## 4.3 Environmental Requirements

The app is intended to work in conjunction with a preexisting application, the ARORA Mentee App, to strengthen an upcoming mentorship program. To guarantee that these programs appear as one cohesive program, they will be visually similar and work together. The professionally designed assets have been permitted to be used in this app to maintain visual consistency. The app will be able to resolve any inconsistencies related to offline updating due to unpredictable internet service in the Hopi community. Furthermore, the app will be usable on both iOS and Android devices.

### 4.3.1 Visual Consistency

- **Color Scheme**

The color scheme will be similar to ARORA Mentee App.

- **Theme**

The theme will be consistent with ARORA Mentee App.

- **Assets**

Assets from the ARORA Mentee App will be used to maintain a cohesive appearance.

### 4.3.2 Offline Inconsistencies

- **Reconciliation**

When reconnected to the internet, data will sync.

### 4.3.3 Operating Systems

- **iOS**

Ability to use the app on an iOS powered device.

- **Android**

Ability to use the app on an Android run device.

- **Web App**

Stretch goal: Ability to use the app through a website.

## 5. Potential Risks

There are certain risks that must be addressed when considering the development of the ARORA mentorship app. These risks primarily stem from situations where the above requirements are not met. If not addressed, these may bring consequences of varying severity to the client, the users of the app, and the Hopi community mentorship program as a whole. The following Table 5.1 provides an overview of the risks present in this project.

Table 5.1 Risk Likelihood and Severity

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>
Inaccurate Data	Low	Medium
Incomplete Data	Medium	Medium
Data Leak to Mentor	Low	Low
Data Leak to Mentee	Low	Medium
Data Leak to Outsider	Low	High

### 5.1 Inaccurate Data

The first of these risks relate to a failure to send mood reports from a mentee to a mentor within the program. As these reports provide information about the emotional wellbeing of the mentee, inaccurate or missing information may result in the mentees most in need of mentorship being overlooked. However, the ability of mentees to send messages to their mentors reduces the severity of this risk, as a mentee that feels their mentorship needs are not being met can ask for guidance directly.

Likewise, the failed delivery of these messages also presents a risk. While the mood reports will contain general information about a mentee's wellbeing, messages to mentors may need more specific and directed responses. Failure to send these messages to mentors, or for a response to be sent in return, could leave the mentee

without the guidance which they require. This increases the importance of maximizing the accuracy and consistency of messages sent, both to and from community mentors. However, this risk can only be mitigated to a point due to the limited internet access in these communities.

## 5.2 Data Leaks

The sensitive nature of the topics likely to be discussed within the mentorship app creates what may be the greatest risks, should user anonymity not be properly preserved. This failure could happen in multiple ways, each with varying degrees of severity. If the identity of the mentee sending a message is revealed to the associated mentor or mentors, the trust of the mentee would be violated. However, any information in this situation would only be leaked to the mentor in question, who could be instructed not to spread the information further.

If a leak of information occurs from one mentee to another, such as a mood report or mentor conversation becoming visible to a different mentee, there may be much steeper consequences. This other mentee may be a peer of the one involved, and therefore may be able to identify them based on the content of the messages, even if no name is provided. This information could then be spread to more of the mentee's peers, which could have severe consequences, amplified by the personal subject matters which are likely to be discussed in an app centered around mental health and mentorship.

A leak could also occur should an unauthorized user gain access to a mentor account. This could happen with a user who is a part of the mentorship program, such as a mentee, or with someone with no association with the program at all. This may be the most dangerous category of a potential leak, as unlike those previously mentioned, this would likely require the perpetrator to have intentionally gained access to the system, and implies malicious intent. However, this risk could be severely mitigated through the use of security measures, such as the use of authentication when a mentor account is created or logged into.

## 6. Project Plan

The project plan and its form of execution are described using Figure 6.1 titled “ARORA Mentor App Project Plan” located at the end of this section. The figure outlines phases over a two-week basis, in which phases have been ordered by the need for the phase to be completed and used by subsequent phases. The phases shown represent sub requirements for our overarching main requirements, in which the phases include:

- **Technical Demoing**

Demoing a chosen framework, framework platform, database, and server use in order to confirm they are compatible before app implementation. This is what the team is currently working on.

- **Database Design & Setup**

Structuring the Database to store mentor login information, general mentee information, and anonymous questions information. How the database will be accessed when information needs to be pulled will also be decided.

- **Login Screen**

Setting up the login page shown when the app is first opened, and implementation to check the inputted login credentials against the database.

- **Accessible Mentee Information**

- **Home Screen Design Setup**

Setting up the landing page that displays the mentor’s list of mentees once the mentor logs in.

- **Mood Report Access**

Obtaining and structuring mood report data from the existing ARORA server for storage and access.

- **Generated Mentee Page Implementation**

Generating a mentee page that displays, for example, their name, contact information, and mood report data, accessible from the home page.

- **Anonymous Question List System**
  - **Anonymous Question List System Page**

Designing a page with, for example, an infinite scrolling list, a search bar, search filter abilities, and commenting ability.
  - **Anonymous Question List Data Access**

Obtaining and structuring the anonymous questions data from the existing ARORA server for storage and access.
- **Chat System**
  - **Chat Screen Design**

Designing a page with the ability for mentees and mentors to send chat messages back and forth. It, for example, can have the ability to edit messages or delete messages.
  - **Chat Screen Data Access**

Obtaining and structuring incoming and outgoing messages from the chat system for storage and to display on the screen.
- **Google Calendar Integration & Calendar Design**

Designing the calendar page and integrating Google Calendar.
- **Aesthetic Asset Placement & Design**

Utilizing existing ARORA assets and potentially new assets to create an aesthetic environment around the app's functionality.
- **Refinement**

Dedicated time to retreat back and stress test or debug the app's implementation, in order to discover and fix any potential issues previously unseen.
- **Potential Stretch Goal Implementation**

The team will determine whether stretch goals can be implemented in the leftover amount of time allocated for the project's implementation, and potentially implement what is decided.



		November Week 1-2	November Week 3-4	December Week 1-2	December Week 3-4	January Week 1-2	January Week 3-4	February Week 1-2	February Week 3-4	March Week 1-2	March Week 3-4	April Week 3-4	May Week 1-2
Expected	Technical Demoing	[Bar]											
Tentative	Database Design & Setup			[Bar]									
	Login Screen			[Bar]									
	Home Screen Design & Setup			[Bar]									
	Mood Report Access					[Bar]							
	Generated Mentee Page Implementation					[Bar]							
	Anonymous Question List System Page Design					[Bar]							
	Anonymous Question List Data Access					[Bar]							
	Chat Screen Design					[Bar]							
	Chat Screen Data Access					[Bar]							
	Google Calendar Integration & Calendar Design							[Bar]					
	Aesthetic Asset Placement & Design								[Bar]				
	Refinement								[Bar]				
	Potential Stretch Goal Implementation			Now							[Bar]		

Figure 6.1 ARORA Mentor App Project Plan

## 7. Conclusion

The ARORA mentor app is going to close the final technological gap between a beneficial community mentor program and the youth of the Hopi Tribe. The client, Dr. Vigil-Hayes of CANIS lab, is aiming to achieve this through the relationship between a new mentor-focused app and CANIS lab's existing youth-focused app, which the mentees will use. Currently, Hopi youth struggle with higher rates of suicide, depression, anxiety, and substance abuse due to the lack of mental health resources within their community. The Hopi community mentor program, made up of older Hopi individuals trained in providing mental health resources and guidance, needs a utility to further reach and connect to the Hopi youth in need. The mentor app project, as an expansion of the ARORA project, will represent such a utility, with mentors able to view youth mentees' mood reports, answer questions they may have, and allow themselves to easily contact youth or be contacted.

These features will be implemented in line with the project plan in the previous section. The five processes in development will be a home screen implementation, a database implementation, an anonymous question list system, a chat and calendar system, and potentially additional stretch goal features if time allows. The home screen

implementation will give the mentor a board of all current mentees' status, with the ability to flag or contact mentees that need help using their mood report data. The anonymous question list system allows the mentors to answer questions with appropriate guidance, and be able to automatically obtain incoming reports and take action immediately through automatic refreshing. The chat and calendar system will act as a direct line between the mentor and the mentee, with chat messages being able to be sent back and forth, and the ability to create appointments to potentially chat with the mentee through a phone call. The mentorship app's connection to the existing ARORA app allows Hopi mentors to have effective relationships with mentees.

Currently, the expansion of the ARORA project is proceeding smoothly. So far, desired features were discussed with the client, an appropriate tech stack was chosen, and requirements were discussed and refined based on the feature list and with the client's input. At the moment, requirements are being finalized and a mockup-style demo is in development. In the near future, building on the strong planning foundation created thus far, development on the mentorship app itself will begin. The expansion of the ARORA project to include a new mentorship app that provides technological support for the Hopi peer mentorship program has a positive impact on a community in need, and will be a useful component in the ongoing work to improve access to mental healthcare for Hopi youth.

## 8. Glossary

<b>Term</b>	<b>Definition</b>
<b>Assets</b>	Design elements, such as images, sounds, or music
<b>Authentication</b>	Methods used to verify a user's identity
<b>Backend</b>	An application not visible to the end-user; often used to store and retrieve data
<b>CANIS</b>	The Community Aware Networks and Information Systems research lab
<b>Companion</b>	An application designed to work alongside another application or real-world program
<b>Latency</b>	A measure of the amount of time it takes for a response to occur after an action has been taken
<b>Home Screen</b>	The main screen of an application; often the first screen that appears after a user has logged in.
<b>Interface</b>	The visual component of an application with which users interact
<b>Operating System</b>	The software through which additional software is run and managed; often tied to hardware type
<b>Software Suite</b>	A collection of programs with related or connected uses
<b>Stretch Goal</b>	Optional goals towards which remaining effort will be put after primary goals are completed
<b>Two-Factor Authentication</b>	An authentication method in which the user must verify their identity by providing at least two pieces of evidence such as a PIN or possession of another registered device

## 9. References

[1] US GAO. (n.d). Tribal and Native American Issues. Retrieved October 30, 2021, from <https://www.gao.gov/tribal-and-native-american-issues>

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