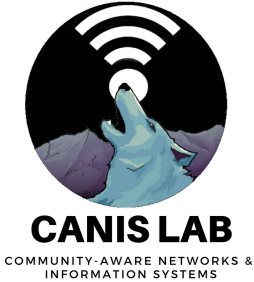# CS486C – Senior Capstone Design in Computer Science
Project Description

Project Title: ARORA Community Mentor Portal: An Interactive Portal for Connecting Hopi Youth to Trained Community Mentors and Behavioral Health Resources

Sponsor Information:

CANIS LAB
COMMUNITY-AWARE NETWORKS &
INFORMATION SYSTEMS

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Project Overview

Native Americans, the Indigenous people of the North American continent, represent a significant minority group within the modern American population, with over 573 federally recognized tribal groups comprising over 2.75 million individuals. Many Native Americans live on one of the 326 tribal reservations in the U.S.; 34 of the 50 U.S. states are home to at least one tribal reservation. Unfortunately, tribal communities are often quite remote, and suffer from a lack of economic opportunity, access to education, and many of the social problems that accompany these challenges. Youth in tribal communities are particularly vulnerable and suffer from higher rates of behavioral health issues, including higher rates of suicide, substance abuse, depression, and anxiety. At the same time, significant disparities in access to behavioral health care exist: in many tribal communities, behavioral health resources can be scarce and when these resources are available, stigmas around behavioral health and a perceived lack of relevance can prevent youth and their families from taking advantage of them.

In response to this urgent public health issue, the CANIS Lab has collaborated with psychologists, educational researchers, and youth advocates in the Hopi community to develop ARORA, a behavioral health app for Hopi youth

Figure 1. ARORA app interface for youth users.

that integrates mobile heath (mHealth), educational gaming, and curricular scaffolding to promote the behavioral health of youth. For instance, the ARORA app (Figure 1) allows young users to report their current mood and stress level, practice evidence-based mindfulness techniques, and engage with affirmative messages and gratitude challenges expressed in English and Hopi.

As we have iterated through a beta-testing and refinement process using the ARORA app with our Hopi beta test group, the CANIS Lab has had the opportunity to conduct interviews and focus groups with youth, families, school counselors, teachers, and youth advocates from the Hopi community. Through these efforts, we have identified a community desire to integrate the ARORA app with a forthcoming Community Mentorship program offered through the Hopi Behavioral Health Services and the Hopi Opportunity Youth Initiative.
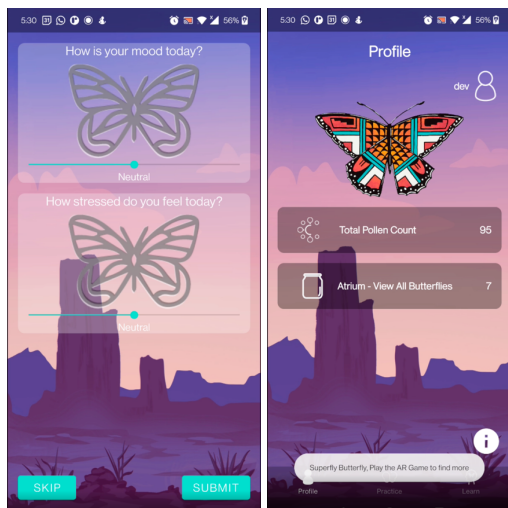
The Community Mentorship program is based on a "big brother/sister" mentorship model in which older youth (18-26 years old) in the Hopi community are trained to advise and help guide younger youth and their families to culturally-relevant behavioral health resources that are available locally and remotely. Past versions of the Community Mentorship program have proven successful in leveraging personal and community connections to allow older community members to connect, share life wisdom, and help youth make positive decisions as they move into adult life. As the Community Mentorship program re-emerges, there is a desire to enable more pervasive engagement between youth and mentors by providing Community Mentors with insights about youth's well-being through data collected from the ARORA app.

One factor that has limited the success of the Mentorship Program is simple juvenile embarrassment: like most adolescents, young mentees are often reluctant to admit certain problems or discuss certain topics directly and openly with the more mature mentors that they look up to. This is where integration of the Mentorship Program with our ARORA app could provide a powerful solution. What if the ARORA app, already being used by youth to monitor their emotional health, were partnered with a separate, but matching "ARORA-mentor" app: ARORA users could access a new area on their app where they could anonymously pose sensitive questions or bring issues to the mentor community. One or more professionally trained mentors monitoring the shared anonymous discussion space using the ARORA-mentor app could provide answers to a question, sharing their personal perspective on the matter and connecting the question asker with personalized information about available behavioral health resources and how to access them.

Envisioned Product

A prototype of the ARORA-mentor app will provide a Hopi-specific interface for trained community mentors to answer anonymous behavioral health questions (see https://www.wernative.org/ask-auntie-chat for an example of a more general version of this type of interface). It would also provide a dashboard that would allow mentors to review the ARORA app progress and mood reports of their assigned mentees and would provide a way to "flag" mentees who might benefit from an asynchronous word of encouragement or a real-time conversation to help guide them to relevant behavioral health resources either in the immediate community, region, or resources offered remotely. Some features will include:

The Basics
- A cross-platform (works on Android and iOS) mobile phone app that:
  - Provides a dashboard that allows Community Mentors to view mood reports of their mentees
  - Provides flags next to mentees who need extra encouragement or individual attention based on mood report results
  - Provides a way for Community Mentors to view a list of anonymously asked behavioral health questions that have been assigned to them and provide a custom response with connections/links to information about relevant informational and healthcare resources that are relevant to the answer
  - Provides a way for questions and responses to be "vetted" and approved or modified by licensed behavioral health professionals who are acting as Community Mentor Trainers
  - Provides a way for community mentors to reach out to their Community Mentor Trainor (a licensed behavioral health professional) if they have questions or need advice about how to handle a situation

Unique and Key Features to Make the Community Mentor App Truly "Usable"
- Mobile phone app
  - Uses basic temporal analysis techniques of mentee mood reports and ARORA usage patterns to flag mentees who are making positive progress, falling behind, or seem to be at risk
  - Mentors are able to schedule real-time (in-person or video/phone) meetings with mentees and their families based on perceived need
  - Mentors receive anonymous questions from a broader pool of users (not just their mentees) that are filtered based on selected topics of interest (e.g., "questions about anxiety" or "questions about Hopi cultural perspectives on resilience")
  - Tracks common themes in questions asked through the Community Mentor Portal and provides global insights to Community Mentor Trainers (licensed behavioral health professionals working in the community)

o Provides a way for mentees to rate answers to anonymous questions

Stretch Goals: Cool ideas for an exceptional Community Mentor App
- Mobile phone app
  - Works as a web app as well as a mobile phone app (think: support for mentors who prefer to use a laptop to look at the information)
  - Provides predicted times when phone calls or video-based calls with mentees are most-likely to be possible based on records of when a user's phone synchronizes with an Internet-based ARORA server (Internet connectivity is intermittent for users who live in Hopi)
  - Opens into a secure video and/or voice conferencing app when starting a call from the Community Mentor Portal
  - Leverages mentee ratings of question responses to provide suggestions for how to answer similar questions (e.g., "here is an example of a great answer to this question topic that you may want to use as you craft your response")

Note that we have described the ARORA-mentor app as a distinct, separate mobile app from the ARORA app, though linked to communicate. While the CANIS Lab has visual assets that can help the team match some of the "look and feel" of the ARORA youth app, we will leave interface design decisions to be guided by the capstone team.

Societal Impact:
It is anticipated that the development of the ARORA Community Mentor Portal will be extremely helpful in mediating connections between Hopi youth and culturally responsive behavioral health care resources offered at local, state, and national levels. This is a critical step towards closing the gap between Hopi community, cultural strengths, and public health challenges in Hopi, such as lack of availability and perceived relevance of health resources, low academic achievement, and rates of youth suicide.

Knowledge, skills, and expertise required for this project:
- Basic mobile app and web app development skills. While a mobile app (Android and iOS) is the key platform that should be supported, many Community Mentors might prefer to access the interface as a Web app.
- Basic understanding of RESTful APIs and client-server architectures
- Basic understanding of how chat bots work
- Basic understanding of how recommendation systems work

Equipment Requirements:
- Some of the portal should integrate with information stored on the ARORA server: https://github.com/CANIS-NAU/ARORA-Server
- There should be no software required other than a development platform and software/tools freely available online
- Android phones (Available via CANIS Lab)

Software and other Deliverables:
- A strong as-built report detailing the design and implementation of the product in a complete, clear and professional manner. This document should provide a strong basis for future development of the product.
- Complete professionally-documented codebase, delivered both as a repository in GitHub, BitBucket, or some other version control repository; and as a physical archive on a USB drive.
- At minimum, an Android and web application user interface for the ARORA Community Mentor Portal that is ready for extensive user testing.
- Demo mobile application, installed on an Android device provided by the client; all key features must be fully demonstrated.