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**Āwhina Mobile App**

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**Abstract**

The Āwhina group at Victoria University want a mobile application that helps their members connect and communicate with one another. This preliminary report discusses the project to design, develop, and evaluate the desired mobile application. Research has been conducted on similar applications which are influential for the design of this app. The project has been split into several phases to be iterated through, which are: Designing the app and conducting focus groups with potential users, creating a mock-up of the app, implementation, and app evaluation with user testing. To achieve the goal of connecting Āwhina members the app will allow students to chat with their mentors, create mentoring sessions, and allow mentors to create workshops. Additionally there will be features for users to record their attendance at events and for staff to promote events.

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# Introduction

The Āwhina group are looking to build a mobile application that will allow students and staff to communicate and connect with one another. This need was originally filled by the application Slack and other applications but Āwhina are now looking for an application customised for them. Āwhina rely on many platforms such as Instagram and Facebook so the purpose of this app is to reduce the burden of needing so many platforms. They do not have a fixed goal in mind about how the app should achieve this, and different members in Āwhina will have different feelings on what they would like to see from this app. During the initial design stage of the project focus groups will be conducted with members of Āwhina to learn more about the Āwhina culture and what apps they currently use or would like to see to fit their individual needs. Despite the focus groups not being conducted yet, there are already some ideas on what functionality the app should have. The app should: allow users to message one another privately and in groups, create Āwhina events for a calendar that users can see and join, and notices that all Āwhina members may need to see as part of the group. The final product that will come from this project is a proof of concept. It is expected to be able to use dummy data but will not be deployment ready. This will allow future extension to be made to the app that add or change ways users can connect with each other.

The proverb for this project is: ‘E iti noa ana, na te aroha’, meaning ‘Although it (the gift) be small, it is a gift of love.’ This proverb has been chosen from [1] and represents the project. While this is a small one person and one year project, it will provide benefit for Āwhina and will be completed to best provide value for them.

## Project Phases

To achieve the project goal, the project has been split into several phases that will be iterated through. The initial phase is research and design. This has involved conducting research about similar apps to the one Āwhina wants. These similar apps have been evaluated by how relevant they are and how they will influence the design and implementation of this app. Additionally research will be conducted on implementation and design patterns of mobile apps. This is to ensure that the Āwhina app will be implemented in a way that makes maintenance and extension of features easy, as this is a proof of concept and needs to be extended after the project is completed. The design part of the initial phase involves focus groups and implementation of some basic app features. These basic app features are registration and login for the app, and setup of a database, server, and the app itself.

The second phase of the project is creating and evaluating wire frames of the app. This will be completed using Balsamiq as it allows users to navigate through the wire frame pages when page buttons are clicked. The wire frames will be created based on the data obtained through the focus groups. As the wireframes are completed, user testing will be conducted to evaluate if the app meets the user requirements. By using a wire frame instead of implementing the app, it will be less costly to make changes to the app as wire framing is faster than implementation of the final app. Additionally the wireframes will not require access to a database or server.

The third and final stage of the project is app implementation and evaluation. The app is required to be multiplatform and will be created using the MERN tech stack (Mongodb, Express, React, Node). This involves creating an Express server running in Node to handle client requests, A Mongo database to store user data such as messages and events created by users, and a React frontend that users will interact with directly. The frontend will be a hybrid mobile app that uses the Ionic framework, which will allow the app to be multiplatform. This frontend will use a RESTful api to send HTTP requests to the server. These requests will contain user information to store within the database, and other actions such as authentication. By using Ionic instead of React Native, a physical phone or emulator will not be needed during the implementation phase. This will speed up implementation as emulators are slower than running an Ionic hybrid mobile app in a browser. To evaluate the app, two sessions of user testing will be run. These sessions will involve testers completing some tasks within the app and being recorded doing so. After this they will complete a questionnaire about their experience. This feedback will be used to change the User Experience of the app and determine what features could be added or changed. Not all new features may be implemented in this projects proof of concept, but they are possible extensions for the app.

Two evaluations will be held with the first using the Balsamiq wireframe and the second using the Ionic implementation. Due to time constraints the evaluation of the Balsamiq wireframe may not occur, but the evaluation will be key to making sure the app meets Āwhina’s business and user requirements.

# Related Research

Source [2] is a paper on the usefulness of a mobile phone operating system where the language is in Te Reo. People who were familiar with Te Reo were asked to complete several tasks using the phone and answer some questions about it. The study found that it took users a while to gain confidence in the system and had an increased error rate. With tasks that needed to be completed quickly users would revert to the English version of the phone. Despite this the testers unanimously thought that a phone in Te Reo was a good thing that should continue to be worked on. This has relevance to this project because the app to be produced will be used by Āwhina, which is a Māori group within Victoria University. Therefore, it is important to provide users the option to use the app in Te Reo. The study shows that it may be initially harder for users to complete their goals and may impact negatively on their user experience, it is still functionality that the users would like to see.

Source [3] is a journal article about how mobile learning can complement Indigenous languages, and cultural sustainability. It is relevant to this project because it shows how native languages will die overtime due to lack of use. Most applications are created not in indigenous languages and new generations are increasingly learning just more widely used languages such as English. This impacts on the sustainability of a culture. This project is to create an app that connects Āwhina members, and it is important that this app has a Te Reo option to help preserve Māori culture. As shown in the article, not providing language options or indigenous groups is part of what leads to cultures becoming unsustainable. This is the opposite from what Āwhina want from this app, so a requirement is that users need a Te Reo option.

Source [4] is an application that allows users to view upcoming workshops and events for tertiary students, and for users to register and attend these events. Summer of Tech is relevant to this application because it shows a successful way of laying out an application for users to see and register for events. While it doesn’t contain other functionality that Āwhina wants, it is useful in designing a good User Experience for parts of this app.

Source [5] is a web application where users can search a map that identifies Indigenous Nations, territories, and Indigenous communities across the globe. It focuses on Australia, New Zealand, The United States of America, and Canada. It is relevant to this application because it is a hybrid web app that can be used in browser and on mobile phones. It is an example of how to structure an application to fit the different User Experience on mobile and desktop platforms. Additionally, Whose Land is relevant because it is an example of an app focusing on Indigenous culture, which will help when designing the Āwhina mobile app that focuses on Māori community.

Source [6] and [7] are about using mobile devices for Māori Language Learning. They discuss limitations and considerations for using Mobile devices and conducting Māori-centred Research. This is relevant to this research project where almost all evaluation will be done with the members of Āwhina, and for designing the apps UX.

[8] is a research article on Māori utilization of social networking sites to create relationships and community. This is extremely relevant to this app as Āwhina’s primary goal for this research project is to have an app that connects their members and strengthens the community. The article discusses what features make social networking sites better at developing and maintaining relationships and evaluates how these sites meet Māori principles.

[9] discusses how networking has arisen and the effect of online socialization. It discusses if community is viable online and what makes it a good and bad substitute for physical networking. This is relevant to this research project, where the goal is to produce an app to create virtual communities and networking.

[10] is a case study on Dodgeball, a social networking application created by Google. The article discusses the different types of networking spaces and the implications that mobile social networks have on their users.

[11] need to finish reading

# Design

Meetings were held with Āwhina staff members and supervisors Ani Eparaima and Kevin Shedlock to understand what Āwhina is and how this app will help them. By understanding how Āwhina operates the business and functional requirements of the app can be identified. Āwhina wants to have an app that simplifies and consolidates the work they do to a single platform, so the applications design will be based on what Āwhina does and what the staff and students do. These user archetypes are described below.

As the requirements for the app became known I created a wireframe to represent what the app would look like once it is implemented and how users would interact with the app. I have created the wireframe using Balsamiq as it has many tools for creating the wireframes and the result can be imported into a pdf that is interactive. This allows the wireframe to be evaluated with tests involving potential users to evaluate the UX of the design. By creating and evaluating a wireframe before the app implementation, changes to the design can be made more cheaply and earlier than during implementation. The wireframe pages can be seen in Appendix A.

## Personas and User Archetypes

The main types of user have been made into archetypes to better understand how this app will provide value for them, and how they will use the app. Each of these archetypes and their goals / requirements will be described. These archetypes are based on how the Āwhina group operates with events, tutoring, and other activities. Currently these people use several mediums for Āwhina’s general operations, such as recording attendance to tutoring sessions on paper or with Libcal. By analysing how the different people in Āwhina act and how they get involved, the requirements for this application can be discovered.

## Student

The student is the most common archetype of all the groups within Āwhina. They join Āwhina typically in their first year as they make their transition into university life. When students join, they are given a mentor who will assist them with their transition and provide pastoral care. The student interacts with Āwhina by connecting with their mentor, organising study sessions for themselves and a tutor, and attending the events held by Āwhina. Students are the focus of Āwhina, which aims to provide connection and mentoring to them. Āwhina targets first years especially, particularly those in larger courses. For student interaction, Āwhina focuses more on mentoring than other events like study sessions. The main form of communication that students have with Āwhina is through Instagram, which is used for messaging, promotions of Āwhina, and promotions of students who have excelled.

## Mentor

The mentor is a staff member within Āwhina. They run workshops that students can attend and mentor the students. These workshops can be technical, pastoral, or mentoring sessions. Some of these workshops are student driven and some are driven by mentors. Mentoring sessions are driven by the student, who will provide the materiel to be covered, and the mentor will provide the assistance. Mentoring can be one to one or involve a few more students and mentors and can also be informal. These events can occur in person or online, and attendance is recorded. Study Sessions are conducted by mentors and are used for things like exam crams. These are larger events that mentoring, and student attendance is recorded. Tutoring sessions are also conducted by mentors and are school specific. Attendance for these tutoring workshop sessions is recorded. Workshops that are for larger courses are prioritised over smaller courses.

Of the events where attendance is recorded, Āwhina mentors have done so in the past using apps like Libcal, or QR codes, or on paper. Information needed for attendance is student Id and sometimes phone number.

## Volunteer

Volunteers are staff of Āwhina that are not as full time as mentors. Additionally, they overlap the student and mentor archetypes as they can attend events as students. Because of this overlap, the app will need to be able to provide the same functionality students have for mentors and volunteers. As with mentors, volunteers are typically assigned to students during university o-week. However, students can change their mentor over the course of their study.

# App Features

This project aims to provide an app that has functionality for several different features. Some of these have already been implemented, which is shown in section 4.1. Below is a list of each known feature requirement, in order of how important they are for Āwhina.

**Mentoring**

Āwhina’s main focus and activity is mentoring for students. This involves students being assigned a mentor when they join Āwhina, and organisation of mentoring sessions. These sessions can be face to face or online, formal and informal, and can involve a few students and mentors. These sessions are mostly student driven, where the student provides information and a topic for the session. These sessions have attendance recorded like with QR codes. The app should provide students the ability to create mentoring sessions that are private to others except their mentor, with information about where and what the mentoring will be about. A way to record attendance such as QR codes should be provided.

Status: Pages designed in wireframe. To be implemented in app.

**Workshops**

Workshops are mentor driven events that are either pastoral, technical, or study sessions. Attendance is recorded. Workshops are split by faculty and school within university, so students can choose to attend workshops relevant for their courses. The app should allow students to see all the upcoming workshops and record their desire to go and attendance.

Status: Pages designed in wireframe and discussed with Ani about what workshops are, and how students and mentors would be able to interact with them. To be implemented in app.

**Communication**

Āwhina students and their mentors need to be able to communicate with one another using the app. This allows them to connect with one another and organise times for their meetings.

Status: Pages designed in wireframe, partially implemented in app as different users are given a unique token to be used with a socket connection to post messages to the server.

The chat functionality is yet to be implemented but is planned to use sockets. This is because sockets have lower overhead than HTTP requests, and the chat functionality will involve users frequently sending many messages to the server. For simplicity, private messages between two users will be treated the same as group chats. The difference between private and group chats will be in the presentation layer, such as preventing users from inviting others to their private chats. This will speed up implementation of the chat and mean that private chats and group chats can be stored the same way within the database.

**Promotion**

Āwhina promotes their activities and stories such as students who have excelled. This is to gain awareness among people not within Āwhina and promote their services to new students. To achieve this the projects app should be able to post to other social media such as Instagram which is currently used for promotion purposes.

Status: Pages partially designed in wireframe and discussed with Ani about what social media promotions would b posted to, and what kind of content would be posted.

# Implementation

The parts of this project that have been completed are the setup of a server, a database, and a hybrid mobile app. The server is an Express app used to create socket connections with the webapp and handle HTTP requests from the client mobile apps and database.

The mobile app is a hybrid mobile app, making it combine some of the features of web apps and native apps. A hybrid mobile app was chosen because it means multiple native versions of the app do not need to be created, which saves implementation time. Āwhina wants the app to be multiplatform so this is an important requirement. The hybrid app is created using Ionic React, which runs within a device’s native browser. It will need to be installed like a native app but will not completely require an internet connection like a web app does. The app will connect with the server via socket and HTTP requests using the server’s RESTful API.

The database is a MongoDB database which stores the JSON objects used by the server and mobile app. It is accessible only by the server to create boundaries between the layers of the application. These three components of the project are the presentation, business, and data layers of the mobile app architecture. Splitting the app into these three layers makes the app more maintainable and easier to develop.

## Current Features

Some parts of the app have already been implemented. This includes an express server that the client applications communicate with, and the first stages of the ionic app itself.

The current features of the app implemented are the login and registration system. Users can login and register based on user accounts within the Mongo database and will be directed to the apps home page or told why their attempt failed. Passwords are stored as a hash within the database as a security measure. One proposed change to this system is to use Google’s Firebase instead of MongoDB. This is because Google has a far better security system, and this project will come under their free tier. Despite this project being a proof of concept, it is important to maintain high security in case this project is continued and deployed. The current login and register system using HTTP requests, not socket io messages. When a user registers, an HTTP request is sent to the server with the relevant registration data. A JSON object is then created for the user and stored within the database for later use.

In addition to the login and registration, some base pages have been set up for events and mentoring.

# Evaluation

Focus groups and User testing recruitment sheets have been created for distribution among Āwhina members. These focus groups and user testing sessions will use the created Questionnaires and the app / wireframe to evaluate the User Experience, and to evaluate the needs of Āwhina members against the designed app. By having the focus groups before most of the implementation, changes can be made to the design earlier when it is less costly.

Two focus group sessions will be held on the 9th and 11th of June, with 6-8 Āwhina members in each. Discussions from these sessions will be used to evaluate the wireframe in addition to finding user requirements.

Two user testing sessions are planned to be held, one which will test the wireframe and one to test the ionic app. These sessions will involve the users completing some tasks within the app and getting their feedback. If there is not enough time for both testing sessions then the wireframe test will be dropped as it is more important that the app to be given to Āwhina is evaluated than the wireframe.

# Future Work

Currently the project is in its 12th week, with 20 more weeks until final submission.

A Gantt chart of the project can be seen in Appendix B.

During weeks 13 and 14 pages from the mockup will be implemented in the app. Functionality of the pages will not be added at this time but the ionic components and page layouts will be implemented.

Focus groups are to be held on the 9th and 11th of June, week 15 of the project. During week 15 analysis of the focus groups will occur, and further implementation of app pages.

During week 16 application features will be implemented into the pages according to priority rating of the feature. The descending order of priority is: Mentoring, Workshops, Communication, and Promotion.

Wireframe testing and test analysis will occur in week17 in addition to feature implementation.

From week 18 onwards work will continue on app features as seen in the Gantt chart, with week 28 used for application user testing. The final report will be completed between weeks 28 and 32, with the project snapshot on week 31.

The remaining tasks required to complete this project are described in the following table. This includes the duration of the task and the weeks it is planned to be completed in.

As the focus groups have not occurred yet, the scope of the project is not fixed yet. Currently the scope includes creating an ionic app and server to contain the app features discussed in section 4 but decisions on increasing the scope will be made after the focus groups. Everything currently represented within the wireframe is considered in scope for the app implementation. As this project is to produce a proof of concept for Āwhina the final app is not expected to be deployed. The app is expected to be able to be deployed in the future after the project and contain the features mentioned in section 4.

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