



Development of a Chatbot Prototype for AIMhi-Y App or Stay Strong Website Research Plan

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1. Introduction

The Aboriginal and Islander Mental Health Initiative for Youth (AIMhi-Y) is a culturally appropriate and evidence-supported wellbeing intervention that aims to help Aboriginal and Torres Strait Islander young people aged 12-25 with their mental health. AIMhi-Y is a program developed by the Menzies School of Health Research that combines mobile application with manual-based guidance, that includes Indigenous-specific content and imagery to promote and target a culturally relevant and accessible strengths-based approach (Dingwall et al., 2023).

The client, the AIMhi Stay Strong team from Menzies, has identified a need to increase user engagement with the AIMhi-Y digital resources. This research project will address that need by developing a draft of a rule-based chatbot prototype. This could then potentially be developed into an LLM based approach. The chatbot is designed to be an interactive, engaging way to access the core concepts of the AIMhi-Y framework, potentially as a separate item in the AIMhi-Y app or on the Stay Strong website.

This project will use the evidence-based principles of the brief treatment manual. it has a inclusive four-step method to study and inspect wellbeing(Nagel & Dingwall, 2014). On top of that, we will make sure that the project follows the privacy,safety and governance principles of the National Safety and Quality Digital Mental Health standards to make sure the prototype will be safe, ethical and effective. And,it will be a proof-of-concept for the later co-design process with end users

2. Aim of Research

This research is focused on addressing the relevant issue between static digital content, and their limitations for interactive, conversational interactions, to support and promote the mental wellbeing of young First Nations people. This project aims to fill the gap between these static digital content and the interactive engagement, using a chatbot model to present evidence-based AIMhi Stay Strong model, into an interactive and accessible format.

The project's objectives are:

1. To Create a working, rule-based chatbot prototype that effectively mirrors a supportive conversation following the four-step AIMhi Stay Strong model: identifying supportive people, identifying strengths, identifying worries, and setting goals (Nagel & Dingwall, 2014).
2. Incorporate a non-failing, rule-based risk management protocol in the chatbot to identify distress keywords and refer users in real-time to appropriate help services, aligned with the NSQDMH standards (ACSQHC, 2020; Dingwall et al., 2023).
3. To Produce detailed technical and design documentation outlining the chatbot's architecture and decision-making process, enabling the team to seamlessly handover the project to AIMhi for future co-design and development.

3. Project Scope

This research project will investigate the design and development of a rule-based chatbot prototype.

What will be investigated (In-Scope):

- The design of a conversational flow based on the four-step AIMhi Stay Strong model.
- The implementation of rule-based (if-then) decision logic to guide conversations.
- The integration of culturally appropriate tone and language from AIMhi-Y source materials.
- The development of a standalone, demonstrable prototype.
- Creation of documentation detailing the chatbot's architecture and design rationale.
- The use of machine learning, natural language processing (NLP), or any artificial intelligence beyond simple rule-based logic maybe explored on the later iterations of the project if circumstances allows.

What will not be part of the research (Out-of-Scope):

- Live connection to AIMhi-Y app or any databases.
- Formal co-design or User Acceptance Testing with end-users.
- Making new clinical content, videos, or games.
- Collecting or storing any user data or PII.

Assumptions and Limitations:

- We assume the provided docs are enough to build a basic prototype.

- There will be no user feedback during development. So, The result will be a prototype that needs to be validated later.
- Implementation will be limited to freely available tools and platforms.

4. Approach

The aim of this research will be achieved by following a formal software-development lifecycle process that aims to translate existing clinical and cultural frameworks into a technical prototype.

1. **Requirement Analysis:** A thorough review of all provided documents (*Brief Treatment Manual, User Guide, NSQDMH Standards, Project Requirements*) will be conducted to extract core concepts, conversational elements, and safety requirements.
2. **Design:** In the design phase, the we will conceptualize the chatbot's interactive architecture and conversational logic and outline the decision pathways that will guide a user through the four-step AIMhi Stay Strong model. Then we will develop conversational prompts and responses that are culturally aligned and reflect the strengths-based, supportive tone of the AIMhi-Y program (Nagel & Dingwall, 2014). The logic for risk escalation will also be developed during the design phase.
3. **Development:** The chatbot prototype will be custom-coded from scratch. This will mean that we will have to pick appropriate programming languages and software libraries to create the base logic engine. The main development effort will be to transform the designed conversational pathways and risk escalation process into a working, interactive software application.
4. **Internal Testing:** The prototype will go through a proper developer testing to identify and address bugs, logic errors, and dead ends in the conversation. We will also test the risk escalation feature to ensure it works as expected as a malfunction could be critical.
5. **Documentation:** The entire process, from design rationale to technical implementation, will be documented to ensure the prototype can be understood, evaluated, and further developed by the AIMhi team.

5. Anticipated Deliverables of the Project

To meet the research aim, the following deliverables will be produced:

1. **A Functional Chatbot Prototype:** A standalone, demonstrable prototype, custom-coded to simulate the four-step AIMhi Stay Strong conversation and include the integrated risk escalation protocol.
2. **Comprehensive Technical and Design Documentation:** A manual for the AIMhi team detailing the chatbot's design logic, conversational architecture, and the custom technical implementation. This will include instructions for running and testing the prototype.
3. **Final Research Report:** A formal report detailing the project's introduction, aims, scope, approach, and outcomes, formatted according to university requirements.
4. **Final Presentation:** A presentation summarizing the project for stakeholders and assessors.

6. Gantt Chart

Please Visit this link to view the chart because it's too big to be inserted into the word document and inserting the image will decrease it's quality making it hard to view.

Gantt chart: <https://arpandrv.github.io/ganntchart/>

7. Resources Required

The following resources are required for this project:

- **Materials, Equipment and Software:** A personal computer, access of a remote computer with hardware powerful enough to fine-tune an open source large language model, necessary source documentation provided by the AIMhi team and other free softwares such as vscode and Trello.
- **Technical Support:** Technical support might be needed to access and setup the LLM fine-tuning in the remote computer.
- **Budget:** This project does not require any direct monetary funding but might require access to some of the computational resources of the university.

8. Special Approvals

This research project does not require human ethics clearance as it does not involve surveys, questionnaires, focus groups, or any other form of data collection involving human beings. It is focused on the development of a software prototype only.

The **intellectual property (IP)** developed in this project (the chatbot prototype and associated documentation) will be assigned to the industry partner, Menzies School of Health Research, upon completion.

Appendix A: Compliance Checklist for NSQDMH Standards

This checklist will be used during the design phase to ensure the prototype's foundational principles align with the NSQDMH Standards (ACSQHC, 2020).

NSQDMH Standard & Action	Relevance to Prototype	Compliance Action in Prototype Design
Partnering with Consumers Standard 2.06: Communicate information in a way that is easy to understand and use.	High	The chatbot's script will use plain English and the simple, culturally-tested metaphors from the AIMhi-Y materials.
Model of Care Standard 3.05: The service provider has systems to identify service users who are at risk of harm.	High	A rule-based system will scan user input for a pre-defined list of risk-related keywords (e.g., "suicide," "sad," "help").
Model of Care Standard 3.06: The service provider has systems to... effectively respond to service users who are distressed.	High	Triggering the risk protocol will immediately halt the standard conversation and present the user with direct links and phone numbers from the AIMhi-Y 'Get Help' page.
Model of Care Standard 3.01(a): Documents the purpose and intent of the model of care for each service.	High	The chatbot will provide a clear, simple introduction explaining its purpose (a supportive yarn about wellbeing) and stating that

		it is not a crisis service or a human therapist.
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References

Australian Commission on Safety and Quality in Health Care. (2020). *National safety and quality digital mental health standards*. ACSQHC. <http://bit.ly/3Hhm6N1>

Dingwall, K. M., Nagel, T., Povey, J., Sweet, M., & Friel, J. (2023). *AIMhi for youth treatment and user guide* (Version 1.0). Menzies School of Health Research. <https://bit.ly/3JfmdcA>

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