



Project Documentation

Project Name: **HalaTuju**

Team Name: **Bubble Berry**

SDG: **4 – Quality Education**

1. Technical Implementation Overview

1.1 Core Mission

HalaTuju is an intelligent decision-support platform designed to resolve the stream selection crisis in Malaysian secondary education. It bridges the gap between traditional counseling and the digital economy by providing an AI-driven "Oracle" that analyzes student psychometrics.

1.2 Technologies Used

- **Google AI Studio (Gemini 1.5):** Acts as the core reasoning engine. It processes raw psychometric scores (RIASEC model) to generate future-proof career roadmaps and "Career Personas" such as "*The Makers*" or "*The Storytellers*".
 - **Firebase Studio:** Utilized as a unified agentic workspace to architect both the user interface and backend infrastructure.
 - **Firebase Realtime Database:** Provides a low-latency NoSQL database to store the 90-question diagnostic bank, student responses, and generated career reports.
 - **Firebase Authentication:** Used to provide secure Google Login for each student.
 - **Next.js 14:** The primary frontend framework using the App Router and Server Actions for secure AI logic handling.
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2. Implementation, Innovation, and Challenges

2.1 Implementation Details

The system follows a strategic steps flow:

Multi-Dimensional Input: The student provides two critical datasets:

- **Psychometric Assessment:** A 90-question diagnostic mapping Interests (Heart), Competency (Hands), and Personality (Head).
- **Academic Profile:** Users key in their most recent grades for core subjects (Mathematics, Science, English, etc.).

Hybrid Scoring Engine: The system calculates a "Preference Score" based on the RIASEC model.

- **Academic Validation:** This is the "Reality Check" layer. The engine compares the student's preferred career path against their academic strengths. For example, if a student expresses interest in "STEM/Engineering" but their keyed-in Mathematics grade is a "D," the AI is instructed to suggest a bridge program or emphasize the specific subjects they need to improve to reach that goal.

AI Reasoning (Gemini 1.5): The backend triggers a request to Gemini 1.5, passing the combined data (*Psychometric Scores + Academic Grades*). Through strict system instructions, the AI acts as a counselor, reconciling the student's passion with their actual academic performance.

Reporting: A personalized "Future Roadmap" is generated, recommending specific Form 4 streams (Sains Tulen, Aliran Teknikal, or Kemanusiaan) that are both aspirational and academically realistic.



2.2 Innovation

- **Static to Dynamic:** Unlike traditional paper-based tests (PPSi) that give generic categories, HalaTuju provides a qualitative explanation of why a student fits a specific path.
- **Predictive Market Alignment:** The AI's knowledge base is integrated with the current Critical Occupations List, steering students toward high-growth fields like AI and Cybersecurity rather than just traditional roles.
- **Career Personas:** Instead of abstract academic choices, it defines tangible professional identities to help students visualize their future selves.

2.3 Challenges Faced & Solutions

- **Challenge 1: Steep Learning Curve with Firebase Studio**

As first-time users of Firebase Studio, we faced a significant challenge in managing a unified agentic workspace. Navigating the integration between the AI-driven code generation and our manual backend configurations was difficult for a "newbie" team.

- **Solution:** We adopted an iterative learning approach, spending extra hours in the documentation and utilizing Firebase's real-time debugging tools to ensure our database rules and authentication flows were synchronized correctly. This forced us to master full-stack concepts in a very short timeframe.

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- **Challenge 2: Google Cloud Billing & Resource Constraints**

A major hurdle was the requirement for paid Google Cloud Service tiers for certain advanced features (like automated deployment or specific cloud functions). As a student team with zero budget, we could not access the paid features necessary for a "one-click" live deployment.

- **Solution:** We pivoted our strategy to focus on a Local-First Technical Review. By optimizing our code to run perfectly in a local development environment and providing clear GitHub documentation, we ensured the judges could still evaluate our 100% functional prototype without needing a hosted URL.



HalaTuju

- **Challenge 3: Reconciling Passion with Academic Reality**

Integrating user grades introduced a logic conflict: what happens when a student's dream doesn't match their current results?

- **Solution:** We engineered the Gemini 1.5 prompt to act as a "Growth Mindset" counselor. Instead of telling a student "No," the AI suggests the necessary academic improvements and specific KSSM subjects needed to bridge the gap between their current grades and their desired career.

The image displays three screenshots of the HalaTuju mobile application interface, illustrating its features for students:

- Form 4 Academic Streams:** This screen provides information about the four main academic streams available in Malaysian secondary schools. It includes a large image of a DNA double helix, the title "Science Stream", a description for the stream, and a list of core subjects: Biology, Chemistry, and Physics.
- Arts & Humanities:** This screen highlights the "Arts & Humanities" stream, described as "The Storytellers exploring society and creativity". It lists core subjects: Literature, History, Fine Arts, and Languages.
- Target Stream:** This screen shows the "Target Stream" section under "ACTIVE GOALS". It prompts the user to "Take the assessment to start!" and displays the "Profile Setup" progress at 0%.
- TVET / Vocational:** This screen shows the "TVET / Vocational" stream, featuring an image of three individuals working on a mechanical engine, and the title "TVET / Vocational".
- Academic Profile:** This screen displays a placeholder message: "Please log in to view your academic grades and profile." It includes a "Log In" button.



Academic Grades
Please enter your Form 3 trial or predicted results.

Bahasa Melayu
A

English
A

Mathematics
B

Science
B

History
A

Geography

When I encounter a new gadget, my first instinct is to:

- Read the specifications and technical data
- Think about how it improves people's lives
- Open it up to see the interior components
- Estimate its price and market value

← Previous Your progress is automatically saved.

ORACLE RECOMMENDATION

Arts
"The Social Storyteller"

Your exceptional grades in subjects like BM, BI, History, and Geography clearly demonstrate a strong aptitude for humanities and communication. This aligns perfectly with your significant interest in subjects related to people and societal interactions, making the Arts stream a natural fit for your talents.

TOP CAREER MATCHES

N Public Relations

Compatibility Breakdown

Stream	Percentage
Arts	69%
TVET	61%
Science	34%
Business	32%

N Continue to Dashboard

Disclaimer: This app is on testing phase and not all streams in Malaysia has been fully integrated into the system.