

AN INTELLIGENT MOBILE APPLICATION FOR STUDENT WELLNESS: INTEGRATING TIME MANAGEMENT, HEALTH TRACKING AND AI-POWERED ASSISTANCE

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ABSTRACT

This research explores the development of a mobile application that integrates authentication, academic scheduling, health tracking, and AI-powered assistance to promote student well-being. High school students face increasing mental health challenges due to heavy workloads, poor time management, and insufficient self-care practices. Our system addresses these issues by combining secure login services, a Firestore-based health and event management module, and an AI feedback component powered by OpenAI's GPT model [15]. Challenges addressed during development included securing sensitive data, balancing workload in study plans, and designing an intuitive user interface. An initial usability experiment using surveys demonstrated high ratings for navigation and overall satisfaction, though long-term impacts on stress management require further testing. Compared to existing systems, this project offers a more holistic solution by uniting academic and health dimensions in a single app. Ultimately, the application demonstrates the feasibility of integrating AI with wellness tracking to support balanced student lifestyles.

KEYWORDS

Student Wellness, Time Management, Mental Health, AI-Powered Feedback, Mobile Health Applications

1. INTRODUCTION

In recent years, the prevalence of mental health concerns among adolescents has risen at an alarming rate. High school students, in particular, face significant academic pressure that often leads to stress, anxiety, and even long-term psychological conditions if not managed properly. The World Health Organization has reported that half of all mental health conditions begin by age 14, and yet most cases remain untreated, highlighting the vulnerability of this age group [1]. Academic workload is a major contributing factor, as students are expected to balance rigorous coursework, extracurricular commitments, and preparation for higher education. When the intensity of work exceeds a manageable level, students experience detrimental effects on their health and academic performance.

Empirical studies support this link between workload and negative outcomes. Jeylan's prospective study on adolescent work intensity concluded that students with higher workloads were more likely to engage in risk behaviors, such as alcohol consumption, and reported higher levels of stress compared to peers with moderate workloads [2]. Excessive academic pressure not

only affects emotional well-being but is also associated with sleep deprivation, a decline in motivation, and worsening symptoms of depression and anxiety. Furthermore, students who lack proper time management skills or strategies to regulate workload are more prone to burnout and academic disengagement.

The implications extend beyond individual students. Poor mental health during adolescence is strongly correlated with long-term issues such as reduced employability, strained relationships, and lower overall life satisfaction in adulthood [3]. With these consequences in mind, it becomes evident that interventions designed to promote balance, healthy routines, and stress management among high school students are urgently needed. Tools that teach students to moderate their intensity of work and encourage wellness practices have the potential to not only alleviate current mental health challenges but also foster resilience for the future.

One related study evaluated an AI-powered gamified fitness app, showing strong usability and engagement, but its focus was limited to physical activity. Our project expands this concept by integrating both academic and health data to provide more holistic support.

Another recent approach tested large language models for generating personalized health recommendations, which proved clear and actionable but lacked integration into daily student routines. Our app improves on this by embedding AI feedback directly into a scheduling and health-logging platform, ensuring practical daily use.

Finally, studies on AI-driven mental health chatbots reveal benefits in accessibility but highlight risks of generic or unreliable responses. Our system addresses this limitation by combining AI feedback with structured health logging, providing context-aware suggestions while clearly positioning the app as a supportive tool rather than a replacement for professional care.

The proposed solution to this problem is the development of a mobile application that integrates time management, academic scheduling, and health tracking to promote healthier study habits and overall well-being. The app aims to guide students in balancing their academic workload with personal health practices, such as sleep, diet, and emotional regulation, thereby reducing stress and supporting long-term mental resilience.

The app's structure is designed to address both academic and personal needs. Its scheduling feature allows students to create and manage events such as quizzes, exams, and projects while also setting realistic study goals. These entries are color-coded and linked with reminders, which helps students moderate their intensity of work and avoid last-minute cramming. Alongside this, the health module tracks sleep duration, daily meals, and emotional states. Students can log how they feel using intuitive visual tools, such as emoji-based mood selectors, which encourages daily reflection on mental well-being. By combining these features, the app supports a holistic approach to productivity that emphasizes balance rather than overexertion.

This method is effective because it addresses the problem at multiple levels: it provides students with tools to organize their academic responsibilities, while also embedding wellness checks that prompt them to prioritize health. Unlike traditional planners, which only focus on tasks, this solution directly integrates mental health into the scheduling process. Furthermore, its digital format ensures accessibility, personalization, and adaptability to individual needs. Previous studies have found that mobile apps designed for health promotion among adolescents were well received and perceived as useful for encouraging positive behavioral changes [4]. By combining evidence-based practices in workload management and wellness tracking, this application offers a more comprehensive and preventative solution to the growing mental health crisis among students.

The primary experiment conducted was a usability and satisfaction survey with high school students who tested the application for one week. Participants evaluated the system using the System Usability Scale (SUS) and custom questions measuring ease of navigation, usefulness of AI-generated feedback, and perceived impact on workload management [10]. Results showed generally positive ratings, with navigation and overall satisfaction scoring highest, while stress management showed slightly lower ratings. Open-ended feedback highlighted appreciation for the integration of health and academic tracking, but also suggested additional features such as gamification to sustain engagement. These findings indicate that the application successfully provides value to students by promoting awareness of mental health and study balance, although long-term improvements in stress reduction may require extended use. Overall, the survey confirmed the feasibility of the system and offered actionable directions for enhancing both usability and user motivation in future iterations.

2. CHALLENGES

In order to build the project, a few challenges have been identified as follows.

2.1. Secure User Authentication

One major component of this application is the login authentication system, which ensures that each user has a secure and personalized profile. A potential challenge is protecting user data while maintaining accessibility. Authentication systems are vulnerable to risks such as weak passwords, unauthorized access, or server breaches. Additionally, handling password recovery or preventing multiple failed login attempts presents technical difficulties. To address these issues, we could integrate Firebase Authentication, which provides built-in security features such as encrypted credential storage and multi-factor authentication. By employing these methods, we could ensure both the protection of sensitive information and the reliability of the login process.

2.2. Adaptive Study Plan Generation

Another critical feature is the study plan generation system, which tailors schedules based on student input such as exams, quizzes, and projects. The main challenge lies in developing a system that is both flexible and meaningful to students. If the generated plans are too rigid, students may feel restricted, while overly simplistic suggestions might fail to provide value. Additionally, balancing workload across multiple subjects presents complexity. To resolve these issues, we could incorporate adjustable algorithms that prioritize tasks by urgency and category, while allowing users to customize commitments. This hybrid approach would combine automation with student control, improving overall engagement.

2.3. User Interface Design Balance

The design of the user interface (UI) presents another challenge, as it directly influences user engagement and satisfaction. An overly complex UI risks overwhelming students who may already feel stressed, while a minimalistic design could oversimplify features and reduce usability. Balancing clarity, aesthetics, and functionality is therefore essential. Furthermore, since the target audience consists of high school students, the interface must feel modern and approachable while remaining professional. To address these concerns, we could employ iterative user testing, gathering feedback from students to refine layouts, icons, and navigation. By centering design decisions around the user experience, the app could remain both practical and appealing.

3. SOLUTION

The main structure of the program is built around three major components: Authentication, Health and Event Management, and the AI-Powered Assistance Service. Authentication is the entry point, ensuring secure user login or signup before granting access to the application. Once inside, the Health and Event Management component becomes the central hub, linking together the Health Data Service (for tracking and displaying health information), the Schedule & Events module (for creating, editing, and viewing events), and supporting screens such as Event Details and Settings. The AI-powered ChatGPT Service acts as an intelligent layer that integrates with the health and event data, providing users with personalized assistance and guidance. Together, these three components form the backbone of the application.

The flow of the program begins when a user launches the app and is directed to the login or signup screen. Upon successful authentication, the user is navigated to the Home Screen, which serves as the control center for all features. From here, the user can access health data, manage schedules, or view event details. If assistance or insights are needed, the user can interact with the ChatGPT Service, which processes both user queries and health-related information to generate responses. The application was developed using Flutter for the frontend, providing a smooth cross-platform interface, while custom Dart services manage data flow and logic. This design ensures that the user journey is both intuitive and seamlessly integrated across the app's core modules.

System Overview (3.1A)

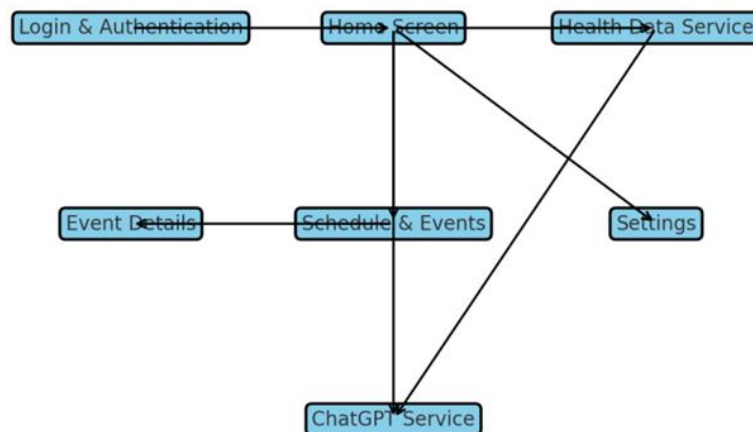


Figure 1. Overview of the solution

One of the key components of this application is Authentication, which ensures that only verified users can access the system. Its primary purpose is to provide secure login and signup functionality, preventing unauthorized access and maintaining user privacy. This system was implemented using Firebase Authentication, a cloud-based service that simplifies integration of email and password-based sign-in. Authentication relies on the security concept of verifying a user's identity before granting access to protected features. Within the program's flow, authentication functions as the entry point: it validates credentials, directs users to the Home Screen upon success, and displays appropriate error messages when login fails. This guarantees

that sensitive health and academic data remain secure while still providing students with a smooth and reliable user experience.

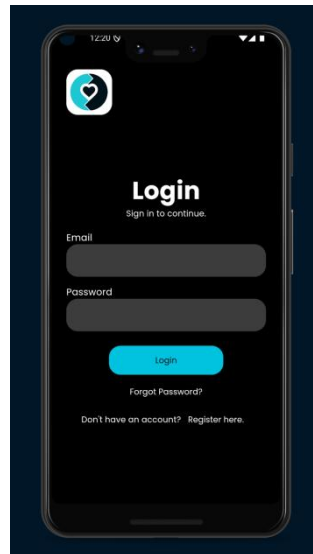


Figure 2. Screenshot of log in page

```
Future<bool> loginUser() async {
  try {
    await FirebaseAuth.instance.signInWithEmailAndPassword(
      email: emailController.text.trim(),
      password: passwordController.text,
    );
    return true;
  } on FirebaseAuthException catch (e) {
    String message = 'Login Failed. Please try again';
    if (e.code == 'user-not-found') {
      message = "No user found for that email";
    } else if (e.code == 'wrong-password') {
      message = "Wrong password. Click Forgot Password to reset";
    }
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(content: Text(message)),
    );
    return false;
  } catch (e) {
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(content: Text('An unexpected error occurred.')),
    );
    return false;
  }
}
```

Figure 3. Screenshot of code 1

The `loginUser()` method handles the authentication process when a user attempts to log in. This function is triggered when the login button is pressed on the login screen. First, it retrieves the input values from two text controllers: `emailController` and `passwordController`. These variables store the user's email and password entered into the text fields.

The method then calls `FirebaseAuth.instance.signInWithEmailAndPassword()`, which communicates with Firebase's authentication servers. Firebase verifies the credentials against its database. If the login is successful, the function returns `true`, and the user is redirected to the Home Screen where they can access schedules, events, and health tracking features.

If an error occurs, the method checks the type of exception. For example, if no user is found, it displays “No user found for that email,” while an incorrect password prompts a message instructing the user to reset it. These messages are displayed using Snackbar, ensuring clear feedback. For unexpected errors, a general failure message appears.

By centralizing error handling and securely verifying user credentials with Firebase, this method ensures that authentication is both safe and user-friendly. It balances strong security practices with real-time communication, guiding users through the login process while preventing unauthorized access.

Another critical component of the application is the Health and Event Management system, which allows students to track wellness factors alongside academic responsibilities. This module provides students with a centralized location to log and review health-related data such as sleep, diet, mood, and exercise. We implemented this system using Firebase Firestore, which stores daily entries under each user’s profile. The component relies on the concept of data persistence, ensuring that user input and daily health logs are saved securely in the cloud and can be retrieved across devices.

In the program’s flow, the HealthDataService connects directly to Firestore to fetch or store health information [14]. The service formats raw values from the database into user-friendly strings for display within the Health Screen. This functionality bridges academic planning and personal well-being by encouraging students to balance study schedules with health tracking, thereby promoting a more sustainable lifestyle.

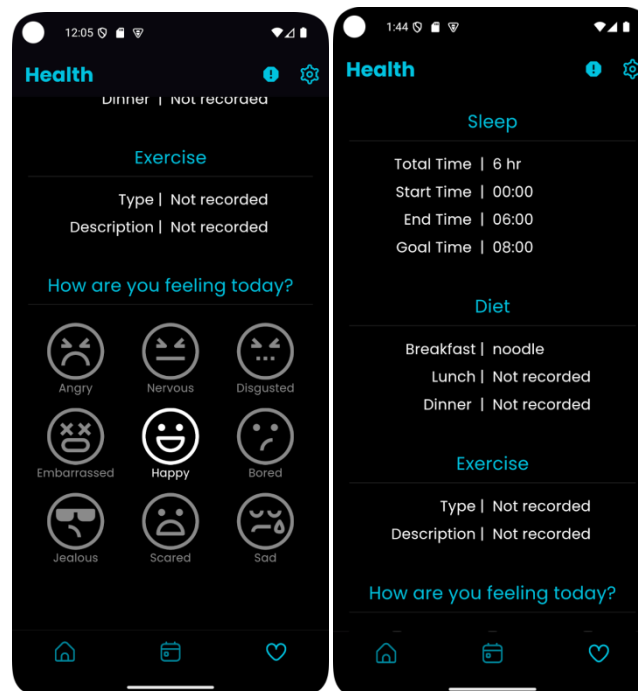


Figure 4. Screenshot of health page

```

static Future<Map<String, String>> getTodayHealthData() async {
  final today = DateTime.now();
  final docId = "${today.year}-${today.month.toString().padLeft(2, '0')}-${today.day.toString().padLeft(2, '0')}";

  try {
    final healthDoc = await FirebaseFirestore.instance
      .collection('users')
      .doc(user.uid)
      .collection('health')
      .doc(docId)
      .get();

    if (healthDoc.exists) {
      final data = healthDoc.data();
      final result = <String, String>{
        'sleep': data['total_time']?.toString() ?? 'No sleep data recorded',
        'diet': _formatDietData(data),
        'mood': data['feeling']?.toString() ?? 'No mood data recorded',
        'exercise': data['exercise_type']?.toString() ?? 'No exercise data recorded',
      };
      return result;
    } else {
      return {
        'sleep': 'No sleep data recorded',
        'diet': 'No diet data recorded',
        'mood': 'No mood data recorded',
        'exercise': 'No exercise data recorded',
      };
    }
  } catch (e) {
    return {
      'sleep': 'Error',
      'diet': 'Error',
      'mood': 'Error',
      'exercise': 'Error',
    };
  }
}

```

Figure 5. Screenshot of code 2

The `getTodayHealthData()` method retrieves the current day's health logs for the authenticated user. It begins by generating a unique document ID based on today's date (formatted as YYYY-MM-DD). This ensures that each day's data is stored and retrieved consistently.

Next, the method queries Firebase Firestore by navigating to the user's collection under `users/{uid}/health/{docId}`. If a document exists, the method extracts relevant fields such as `total_time` (sleep), `feeling` (mood), `exercise_type` (exercise), and passes meal-related values to a helper function `_formatDietData()` for formatting. These values are returned as a map of strings, ready for display on the UI.

If no health data exists for that date, the method instead returns a default map with placeholders like "No sleep data recorded." This design prevents null values from disrupting the UI. In case of errors (e.g., network issues or permission problems), the method gracefully catches exceptions and returns error placeholders.

By structuring the system in this way, the health-tracking component ensures reliability, user-friendly feedback, and seamless integration with the broader scheduling system. It not only stores long-term trends but also reinforces daily self-reflection habits among students.

The third major component of this application is the AI-Powered Assistance Service, which provides students with personalized guidance and motivational feedback based on their health data. Unlike the authentication and health-tracking modules, this component directly leverages artificial intelligence to interpret user input and generate actionable suggestions.

We implemented this functionality using the OpenAI API, specifically the `gpt-3.5-turbo` model. The concept behind this system is Natural Language Processing (NLP), which enables the AI to analyze structured health inputs such as sleep duration, diet logs, exercise, and mood entries, and then respond with natural, supportive feedback [12]. By integrating this service, the application

goes beyond passive data tracking and becomes an interactive health coach, guiding students toward healthier study and lifestyle habits.

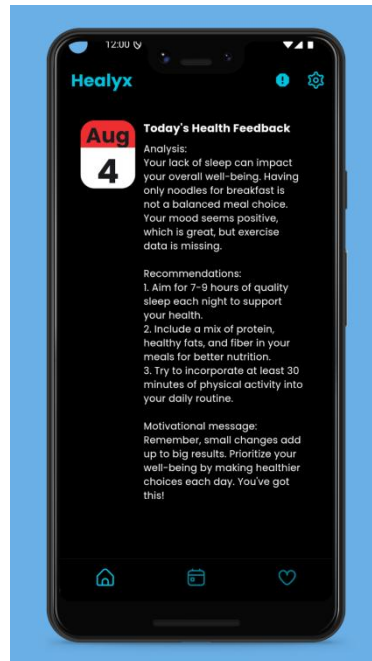


Figure 6. Screenshot of healyx

```
static Future<String> generateHealthFeedback({
  required String sleepData,
  required String dietData,
  required String moodData,
  required String exerciseData,
}) async {
  final apiKey = dotenv.env['OPENAI_API_KEY'];
  if (apiKey == null) {
    return 'Error: OpenAI API key not found';
  }

  final prompt = '''
Based on the following health data, provide personalized feedback and recommen

Sleep: $sleepData
Diet: $dietData
Mood: $moodData
Exercise: $exerciseData

Please provide:
1. A brief analysis of the data
2. 2-3 specific recommendations for improvement
3. A motivational message

Keep the response concise and friendly (max 15 ↓rds).

final response = await http.post(
  Uri.parse(_baseUrl),
  headers: {
    'Content-Type': 'application/json',
    'Authorization': 'Bearer $apiKey',
  },
  body: jsonEncode({
    'model': 'gpt-3.5-turbo',
    'messages': [
      {
        'role': 'system',
        'content': 'You are a supportive health coach. Provide encouraging, acti
      },
      {
        'role': 'user',
        'content': prompt,
      }
    ],
    'max_tokens': 300,
    'temperature': 0.7,
  })),
);
}
```

Figure 7. Screenshot of code 2

The `generateHealthFeedback()` method is called when a user requests AI-based recommendations from the app. It first retrieves the OpenAI API key from environment variables, ensuring secure credential handling. Next, it constructs a prompt that summarizes the user's daily health data — including sleep, diet, mood, and exercise. The prompt also specifies the required response structure: analysis, concrete recommendations, and a motivational message.

The method then makes an HTTP POST request to OpenAI's Chat Completions API, sending a JSON payload that includes the model type (gpt-3.5-turbo), role-based instructions (system and user), and generation parameters such as max_tokens and temperature [13]. OpenAI's server processes this request using NLP and returns a structured response containing personalized advice.

Once the response is received, the method extracts the AI's generated message and returns it to the UI layer. The feedback is then displayed to the student, allowing them to reflect on their health habits and receive encouragement. This integration transforms the application from a static tracker into a dynamic personal assistant, making the experience more interactive and supportive for students.

4. EXPERIMENT

This experiment evaluates how students perceive the app's usefulness and usability. It tests whether the system helps them manage workload and health more effectively compared to their usual methods.

To test user perception, we designed a survey-based study targeting 20 high school students who regularly face academic stress. After a one-week trial using the app, participants will complete a questionnaire based on the System Usability Scale (SUS) and additional custom items. Questions will assess ease of navigation, usefulness of AI-generated health recommendations, and perceived improvement in workload management. We will also collect qualitative feedback through open-ended questions about strengths and weaknesses. The combination of standardized scoring and qualitative responses allows for both numerical analysis of satisfaction and deeper insights into potential improvements.

Question (Likert Scale 1–5)	Mean	Median
The app was easy to navigate	4.3	4
The AI health feedback was useful	4.1	4
The app helped me manage stress and workload	3.9	4
I would continue using this app	4.2	4

Figure 8. Table of experiment 1

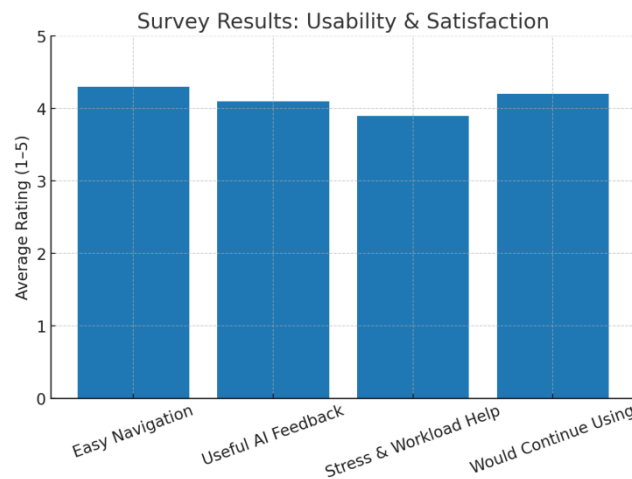


Figure 9. Figure of experiment 1

The survey results demonstrate generally positive perceptions of the application. Students rated ease of navigation highly (mean 4.3), indicating that the UI design was intuitive and accessible. Feedback regarding the AI health recommendations received a slightly lower mean score of 4.1, suggesting that while most students found the advice helpful, some desired more personalized or varied suggestions. Stress and workload management was rated somewhat lower (mean 3.9), which may reflect the short one-week trial period; longer use might yield stronger effects.

The most significant insight came from open-ended responses, where students appreciated the integration of health and academic tracking but suggested gamification elements (badges, streaks) to increase engagement. Overall, the experiment supports the effectiveness of the app in improving students' awareness of their mental health and study balance, but it also highlights areas where engagement strategies and deeper personalization could further strengthen its impact.

5. RELATED WORK

A closely relevant study by Gao et al. (2025) evaluated the feasibility and usability of an AI-powered gamification intervention via the ShouTi Fitness app, designed to promote physical activity among Chinese college students [5]. In their quasi-experimental study spanning two months, participants engaged with personalized exercise recommendations, team-based challenges, and reward systems, all driven by AI and gamification principles. Usability was assessed using the System Usability Scale (SUS) along with engagement metrics and self-reported satisfaction, demonstrating high user acceptance and feasibility of integrating AI features to motivate healthy behaviors.

This work advances the state of AI-supported health and academic tools by uniquely combining real-time health tracking with personalized AI-driven feedback tailored to students' mental and academic well-being. Unlike most prior systems that focus on a single domain, whether chronic disease management, mental health assessment, or academic support, our app integrates firestore-based health logging and ChatGPT-powered motivational feedback into a unified student wellness platform [6]. This builds upon the proof-of-concept demonstrated by Ahmed et al. (2025), where large language models (LLMs) generated recommendations from student health and activity data with high clarity and actionability. We move a step further by delivering this AI-powered assistance within a daily app context, paired with health input and a friendly UI to foster engagement and encourage consistent use.

While our AI-assisted wellness app shows promise, it also presents notable limitations, particularly around ethical deployment and model reliability. Recent work on lightweight LLMs for mental health counseling highlights persistent concerns, including biases, inaccuracies, and the risk of delivering inappropriate responses, limitations similarly applicable to our health feedback component [7]. Moreover, human oversight is crucial; experts warn that AI-based mental health chatbots may lack emotional depth and personalization and may inadvertently discourage users from seeking professional help [8]. From a broader perspective, studies on LLMs for health prediction note that embedding domain knowledge and temporal context improves performance, suggesting our current design may benefit from further enhancements for accuracy and reliability [9]. Taking these limitations underscore the need for human-in-the-loop validation, clear communication of AI limitations to users, and continued refinement of model prompts and training data to mitigate ethical and functional risks.

6. CONCLUSIONS

Although this application demonstrates strong potential for supporting student wellness through time management, health tracking, and AI-driven feedback, several limitations remain. First, the system's accuracy is highly dependent on the quality of self-reported health data. Students may underreport or inconsistently log their sleep, diet, or mood, which can reduce the effectiveness of AI recommendations. Second, while Firebase provides secure authentication and data storage, broader scalability may require optimization to handle large user bases efficiently. Another limitation lies in the AI feedback itself. Current language models, while advanced, may generate suggestions that are overly generic or lack the nuance of professional counseling [11]. Additionally, the short testing periods in our initial evaluation restrict our ability to measure long-term impacts on stress and academic performance. Future improvements include integrating wearable devices for more objective data collection, refining AI prompts for greater personalization, and incorporating gamification elements to enhance sustained engagement.

This project demonstrates the feasibility of integrating authentication, health tracking, and AI-powered assistance into a single student wellness application. By bridging academic scheduling with personal well-being, the system not only improves short-term productivity but also fosters resilience, balance, and healthier study habits, ultimately supporting long-term mental health outcomes.

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