StudyPlan AI - Project Documentation

Prepared by: Caleb Bako

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# CHAPTER ONE – INTRODUCTION

## 1.1 Statement of Problem

Many college students create personal study timetables that they believe are effective. Some may even consider them perfect. However, when it comes to consistently following these timetables, they often find it difficult or even impossible. The primary reason for this failure is poor time allocation.  
Most timetables are overly ambitious, lacking proper breaks, and often do not prioritize courses based on the student's areas of difficulty. Instead of providing focused learning time, the schedules force students to jump from one subject to another with little to no breathing room. As a result, by the end of a test week or semester, students often score poorly or, in worse cases, end up with carryovers.  
The consequences of this issue extend beyond academics. Students may suffer from mental and emotional strain. Failing tests or exams despite appearing studious to peers can lead to feelings of embarrassment and low self-esteem. This external perception, combined with internal anxiety, builds up over time. Students often feel they haven't studied enough or fear they’ve focused on the wrong subjects, even if they’ve put in hours of study. This constant anxiety negatively impacts performance, further increasing the chances of failure.  
Carryovers then complicate the next semester. With an increased course load that exceeds the credit cap, students are forced to make difficult decisions—either drop a new course or defer the carryover. A wrong decision can lead to an overwhelming workload, resulting in even more carryovers and academic burnout.  
Creating an effective and personalized study timetable is a significant challenge due to various external factors such as after-class activities, domestic responsibilities, and the need for rest. Without a proper structure, students continue to fall into a cycle of poor planning, stress, and academic failure.

## 1.2 Aim and Objectives

**Aim:**The aim of this project is to design and develop StudyPlan AI — an intelligent web-based study planner to help students effectively manage their academic schedule.  
  
**Objectives:**  
• To identify and gather the functional and non-functional requirements needed to build a student study planner.  
• To design the planner based on the collected requirements using appropriate design tools and models.  
• To implement and test the study planner to ensure it meets the intended functionality and usability standards.

## 1.3 Significance of Study

This application is expected to make a meaningful impact on students, particularly newly admitted students who often struggle with academic planning and achieving good grades.  
In addition to the AI-powered study planner, the system will include:  
• A course database, which allows students to access a list of departmental courses for each semester.   
• A course management assistant, specifically designed to support students with carryovers.   
By providing structured support and easy access to essential academic information, the system aims to reduce academic stress, improve performance, and promote better time management.

## 1.4 Scope of Study

The scope of this project is limited to the development of a web-based platform that offers the following:  
• A personal and efficient AI-assisted study timetable generator tailored to students’ academic strengths, weaknesses, and availability.  
• A searchable database of departmental courses organized by semester and level.  
• A semester course management feature for students with carryovers to assist in proper course allocation and workload balancing.

# CHAPTER TWO – TECHNOLOGIES USED, SDLC, FEATURES, AND FLOWCHARTS

## 2.1 Technologies Used

• Next.js – Web application framework for React-based server-side rendering and static site generation.  
• Supabase – Backend-as-a-service providing database, authentication, and storage.  
• Gemini AI – Google’s AI model used for generating personalized study plans and recommendations.  
• Inngest – Event-driven serverless function orchestration for handling background tasks.  
• Tailwind CSS – Utility-first CSS framework for styling.

## 2.2 Software Development Life Cycle (SDLC) Model Used

The Agile SDLC Model was adopted for this project due to its flexibility, iterative approach, and focus on continuous improvement. This allowed rapid prototyping, testing, and feedback integration.

## 2.3 System Features

• AI-Assisted Timetable Generation  
• Course Database  
• Carryover Course Management  
• User Authentication & Profile Management  
• Event-Driven Task Handling

# CHAPTER THREE – TESTING METHODS, CHALLENGES, AND SOLUTIONS

## 3.1 Testing Methods

• Unit Testing  
• Integration Testing  
• Manual User Testing  
• Cross-browser Testing  
• Performance Testing

## 3.2 Challenges Encountered

• Integrating the AI  
• Creating a good prompt for the AI system role  
• Passing info between pages  
• Creating a balanced database  
• Protecting the prompt cache table with RLS while allowing Inngest access

• Fake Course Names from students for course collection in database

## 3.3 Solutions Implemented

• Integrated Gemini AI via backend API routes  
• Used prompt engineering with few-shot examples  
• Passed data between pages using Next.js router, localStorage and Supabase storage  
• Designed normalized relational database schema  
• Configured RLS policies and service role keys for secure Inngest access

• Showing courses that appeared more than once in the database by filtering data

**CHAPTER FOUR – RESEARCH POINTS & REFERENCES**

## 4.1 Impact of Poor Personal Study Timetables

Research shows poor study schedules harm students' mental, physical, and social health:  
• 80–95% of students procrastinate, lowering grades and increasing stress (Wikipedia, 2024).  
• Poor schedules lead to anxiety, depression, and low confidence (BMC Psychology, 2025).  
• Poor sleep from late study affects diet and activity (MDPI, 2023).  
• Nigerian study: 41% say poor reading causes mental sickness, 33% physical sickness, 29% social sickness (123PDF.org, 2021).

## 4.2 Related Works & Existing Solutions

• Google Calendar – Basic scheduling, no AI personalization.  
• Notion – Manual setup required.  
• StudyPlan AI – Adds AI, course management, and carryover handling.(hopefully my project will become a solution).

## 4.3 References

1. Wikipedia. (2024). Procrastination.  
2. BMC Psychology. (2025). Time Management & Mental Health.  
3. PubMed. (2020). Health Literacy in Students.  
4. MDPI. (2023). Lifestyle and Study Habits.  
5. 123PDF.org. (2021). Reading Habits and Academic Performance.