

PLANORA - Master Your Time, Maximize Your Learning

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Abstract - Effective study planning is essential for students to manage academic responsibilities, yet many existing tools rely on static task lists and fixed timers that do not adapt to individual study habits. As a result, students often face difficulties in maintaining consistency, prioritizing subjects, and tracking their overall progress. To address these challenges, this paper presents **Planora**, an AI-powered personalized study management system developed using Python Flask, MongoDB Atlas, HTML, CSS, and JavaScript. The platform integrates task management, Pomodoro-based study sessions, notes management, session tracking, and learning analytics within a single environment. A personalized onboarding process collects user preferences and study-related information, enabling the system to provide recommendations such as best study time and priority focus subjects. Planora also incorporates the Google Gemini API to offer an AI Study Assistant along with automatic flashcard and quiz generation from uploaded study materials. Additionally, visual analytics help students monitor study patterns, productivity trends, and subject-wise learning progress. By combining personalization, productivity tools, learning analytics, and AI-assisted learning support, Planora provides a practical solution for improving study consistency and overall learning effectiveness.

1. INTRODUCTION

Managing academic responsibilities has become increasingly challenging for students due to multiple

subjects, assignments, projects, and examinations. While traditional methods such as notebooks, planners, and to-do lists help organize tasks, they provide limited support for tracking study progress and maintaining consistency. Similarly, many digital productivity tools offer individual features such as task management or focus timers but lack personalization and integrated learning support.

To address these challenges, this paper presents **Planora**, an AI-powered personalized study management system developed using Python Flask, MongoDB Atlas, HTML, CSS, and JavaScript. The platform combines task management, Pomodoro-based study sessions, notes management, session tracking, learning analytics, and AI-assisted learning support within a single environment. It also provides personalized recommendations such as best study time and priority focus subjects based on user preferences and study activity. By bringing these features together, Planora helps students improve study organization, productivity, and learning consistency.

2. Literature Review

Zhou [1] proposed a personalized learning system using Generative AI to deliver customized educational content based on student requirements. However, the

system mainly focuses on content personalization and does not support study planning or session tracking.

Hasan et al. [2] discussed the use of machine learning in personalized education, tutoring systems, and learning analytics. Although the study demonstrates the benefits of data-based learning support, it does not address comprehensive study management requirements.

Almeida et al. [3] developed a recommendation model for personalized teaching materials in e-learning environments. Although the system recommends suitable learning resources, it lacks productivity tracking and AI-assisted study support.

Chavan et al. [4] presented an AI-based study planner that helps students organize academic tasks and schedules. However, the system focuses mainly on task planning and does not include learning analytics, flashcard generation, or quiz generation features.

Ghazi et al. [5] developed a Pomodoro-based productivity application to improve focus and time management. While the system supports study sessions, it does not provide personalized recommendations or AI-powered learning assistance.

Yau and Joy [6] proposed a context-aware learning framework that adapts study schedules based on learner activities and routines. However, the framework does not include study analytics, AI-assisted learning support, or content generation capabilities.

3. PROBLEM STATEMENT

Existing study planning and productivity tools often provide isolated functionalities such as task management, note-taking, or focus tracking. As a result, students are required to use multiple applications to manage different aspects of their academic activities. This fragmented approach makes it difficult to track study progress,

This fragmented approach makes it difficult to track study progress, maintain consistency, identify priority subjects, and monitor overall productivity.

4. OBJECTIVE

- To create a study management platform that helps students organize and manage their academic activities more effectively.
- To provide a secure login system with support for both traditional authentication and OAuth-based login.
- To provide Pomodoro-based study sessions for improving focus and study consistency.
- To enable students to create, manage, and review study notes and session history.
- To provide personalized recommendations such as best study time and priority focus subjects based on user preferences and study activity.
- To integrate an AI Study Assistant for academic guidance and doubt resolution.
- To generate flashcards and quizzes from uploaded study materials using Generative AI.

5. Functional And Non Functional Requirements Of Planora

2.1 Functional Features

- **User Registration & Authentication:** Users can register using email and password or log in through Google and GitHub OAuth. Passwords are securely stored using encryption techniques.
- **Personalized Onboarding:** New users complete a questionnaires that collects information such as subjects, study preferences, sleep schedule, motivation, learning challenges, and preferred study time.

- **Personalized Dashboard:** Displays best study time, priority focus subject, daily streak, recent study activity, and quick access to important features.
- **Task Management:** Users can create, update, delete, and manage study tasks with deadlines, priorities, and estimated duration. 4. 5.
- **Pomodoro Study Sessions:** Provides customizable focus sessions with break intervals, pause/resume functionality, and session tracking.
- **Session History:** Stores and displays previous study sessions with details such as subject, study duration, date, cycles completed, and completion status.
- **Notes Management:** Allows users to create, organize, filter, and review study notes. Notes can also be linked to study sessions.
- **AI Study Assistant:** Provides academic assistance, concept explanations, study guidance, and answers to study-related queries.
- **Flashcard & Quiz Generation:** Generates flashcards and quizzes from uploaded study materials to support revision and self-assessment.

2.2 Non-Functional Features

- **Performance:** Dashboard, tasks, notes, and session data should load quickly to provide a smooth user experience.
- **Security:** User credentials and study data must be stored securely, with proper authentication and access control mechanisms.
- **Data Privacy:** Users should only be able to access and manage their own information and study records.
- **Usability:** The system should provide a simple, user-friendly, and responsive interface that is easy to navigate.
- **Data Integrity:** Tasks, notes, sessions, and analytics data should be stored accurately without loss of information.
- **Reliability:** Core features such as task management, study sessions, analytics, and AI assistance should function correctly under normal usage.
- **Maintainability:** The code structure should be organized and modular to support future updates and improvements.

- **Scalability:** The system should be capable of handling an increasing number of users and study records efficiently.

6. METHODOLOGY

The development of Planora followed an iterative approach, allowing different modules to be designed, implemented, tested, and improved gradually throughout the project lifecycle. The primary goal was to create a unified platform that helps students manage their studies, track productivity, and access AI-powered learning support from a single environment.

The project began with requirement analysis, where the challenges faced by students in managing study schedules, tasks, and learning resources were identified. Based on these requirements, key modules such as user authentication, personalized onboarding, task management, Pomodoro-based study sessions, notes management, session tracking, learning analytics, and AI-assisted learning support were defined. Non-functional requirements such as security, usability, reliability, and performance were also considered during the planning phase.

The implementation phase focused on developing individual modules and integrating them into a single platform. Users can create and manage study tasks, conduct Pomodoro-based study sessions, maintain notes, and review session history. Study activity data is analyzed to generate insights and visual reports that help students understand their productivity and learning patterns. To enhance learning support, the Google Gemini API is integrated to provide an AI Study Assistant as well as flashcard and quiz generation from uploaded study materials.

The system was tested using functional and non-functional testing techniques to verify the correct

operation of all modules. Individual features such as task management, study sessions, notes, analytics, and AI-based functionalities were tested to ensure reliability, accuracy, and a smooth user experience.

7. SYSTEM ARCHITECTURE

- Authentication: Users can securely log in using email credentials or Google and GitHub OAuth.
- Onboarding: The system collects study preferences, subjects, learning goals, and study habits for personalization.
- Dashboard: Provides access to tasks, study sessions,

notes, flashcards, quizzes, analytics, and the AI Study Assistant.

Core Services & Storage: Gemini API supports AI-powered features, while MongoDB stores user data, tasks, notes, sessions, and analytics records.

8. IMPLEMENTATION PLAN

Planora is developed using HTML, CSS, and JavaScript for the frontend, Python Flask for backend development, and MongoDB Atlas for data storage. The system integrates study planning, productivity tracking, learning analytics, and AI-assisted learning support within a single platform.

A. Authentication Module

The authentication module allows users to securely access the platform through email login as well as Google and GitHub authentication. After successful login, users can access their personalized study environment.

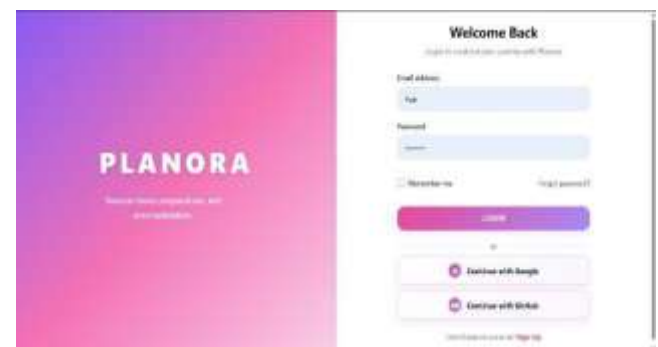


Figure 1: Login Page of Planora

B. Dashboard Module

The dashboard acts as the main workspace of the system. It displays study insights such as best study time, priority focus subject, daily streak, flashcards, tasks, and AI study assistance.

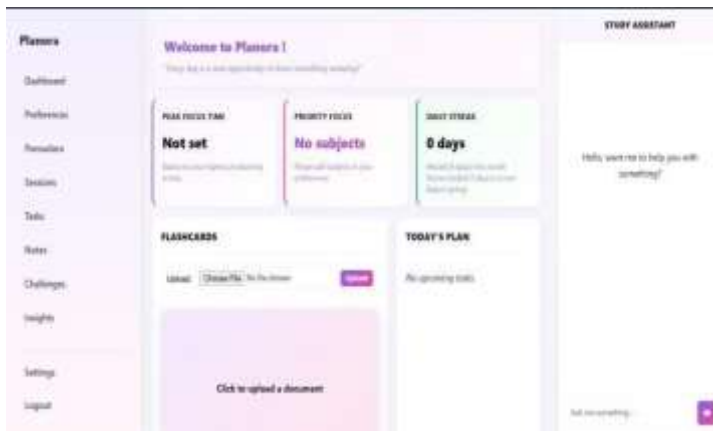


Figure 2: Dashboard of Planora

C. Task and Study Session Module

The platform allows users to manage study tasks and conduct Pomodoro-based study sessions. Session details are recorded to help users monitor their study activities.

D. Notes and Session History Module

Students can create study notes and review previous study sessions. This helps in tracking progress and maintaining study records.

E. AI Study Assistant Module

The Google Gemini API is integrated to provide academic support, answer study-related questions, and assist students during learning.

F. Flashcard and Quiz Generation Module

The system generates flashcards and quizzes from uploaded study materials, helping students revise concepts and assess their understanding.

G. Learning Analytics Module

Study data is analyzed and presented through visual charts, allowing students to track productivity, study hours, and learning progress.

9. SECURITY ANALYSIS

Security plays an important role in Planora as the system stores user accounts, study records, notes, and session information. To ensure secure access, users can log in using their email credentials or through Google and GitHub authentication. To enhance account security, passwords are converted into hashed values using the bcrypt algorithm before being stored in the database.

The system is designed so that users can access and manage only their own data, including tasks, notes, and study sessions. In addition, all information is stored securely in MongoDB Atlas, helping maintain data privacy and prevent data loss. These security measures contribute to creating a safe and reliable environment for students to manage their academic activities.

10. LIMITATIONS

- The AI Study Assistant uses the Gemini API, so there may be times when responses are delayed or unavailable due to issues with the external service.
- The quality of flashcards and quizzes depends on the content available in the uploaded study material. Documents with limited or unclear information may produce less useful results.
- The current version of Planora is mainly intended for individual students and does not provide features for group study or collaborative learning.
- Recommendations such as best study time and priority focus subject are based on user activity. New users with very little study data may receive less accurate recommendations initially.

11. FUTURE SCOPE

- A mobile application can be developed to provide students with easier access to study planning and productivity features.
- The recommendation system can be enhanced to provide more personalized study suggestions based on long-term study patterns and user activity.
- The AI Study Assistant can be improved to provide more detailed academic guidance and better support for uploaded study materials.
- Advanced learning analytics can be introduced to provide deeper insights into study habits, productivity trends, and subject-wise performance.
- Support for additional document formats can be added to improve flashcard and quiz generation from various study resources.
- Collaborative learning features such as study groups and resource sharing can be incorporated to encourage peer learning and interaction.
- Integration with academic calendars and examination schedules can help students plan their studies more effectively and manage important deadlines.

12. CONCLUSION

Students often face difficulties in managing their academic activities due to multiple subjects, assignments, projects, and examinations. To address these challenges, Planora was developed as an AI-powered personalized study management system that helps students organize their studies and monitor their learning progress more effectively.

The platform combines study planning, productivity tracking, learning analytics, and AI-assisted learning support within a single environment. Features such as task management, Pomodoro-based study sessions, notes management, session tracking, flashcard generation, quiz generation, and the AI Study Assistant help students maintain consistency and improve their overall study experience.

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