

# PREPPAL: Your Go to Website for Study Mates and Exam Preparation

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**Abstract:** PrepPal is an innovative social education platform designed to foster collaborative learning among students, exam aspirants, and lifelong learners. Leveraging advanced matchmaking algorithms, the platform connects users with study companions who share similar academic interests, promoting a community-driven approach to education. PrepPal offers a range of features, including integrated task management tools, customizable profile setups, group study rooms for real-time collaboration, and a Pomodoro timer to encourage productive self-study sessions. Streak tracking and goal-setting functionalities further enhance user motivation by reinforcing consistency and accountability.

The platform prioritizes user safety and authenticity through LinkedIn and GitHub profile verification, ensuring a trusted learning environment. As a scalable solution, PrepPal plans to start with essential resources such as formula sheets and expand by partnering with established EdTech platforms to provide specialized content and study material. By reducing the isolation often associated with self-study, PrepPal aims to enhance learning outcomes, foster peer-based support networks, and cater to the evolving needs of modern learners. The platform embodies a sustainable, interactive educational model that bridges the gap between individual preparation and collaborative engagement, contributing to the broader goals of accessible and effective lifelong learning.

**Keywords:** Collaborative Learning, Matchmaking Algorithms, Social Education Platform, Self-Study Motivation, EdTech Integration, Peer-Based Support Networks

## I. INTRODUCTION

In the digital age, education is undergoing a paradigm shift, with technology playing a pivotal role in shaping learning environments. Traditional learning models, often characterized by isolation and limited peer interaction, are no longer sufficient to meet the evolving needs of students and lifelong learners. Collaborative learning has emerged as an effective educational approach, enabling individuals to engage with peers, share knowledge, and enhance their understanding through mutual support. However, finding like-minded study companions remains a challenge for many learners. PrepPal addresses this gap by creating an innovative social education platform that facilitates collaborative learning through smart matchmaking and community-driven interactions.

PrepPal leverages advanced matchmaking algorithms to connect users based on shared academic interests, such as standardized test preparation or specific fields of study. The platform's key features, including group study rooms, task management tools, and a Pomodoro timer, are designed to foster productivity and consistency. To further encourage motivation, PrepPal offers streak tracking and goal-setting functionalities, enabling users to monitor their progress over time. Recognizing the importance of a secure learning environment, the platform integrates profile verification through LinkedIn and GitHub, ensuring trust and authenticity among users. Initially, PrepPal will offer basic resources, such as formula sheets, to aid learners in their studies. Over time, the platform aims to scale its offerings by collaborating with EdTech providers to deliver a broader range of learning materials. The core objective of PrepPal is not only to improve individual learning outcomes but also to reduce the isolation that often accompanies self-study. By fostering a sense of community, PrepPal aims to build meaningful connections among users and promote continuous learning throughout life.

This paper explores the concept, design, and potential impact of PrepPal as a social education platform. It examines how the integration of technology and collaborative learning practices can bridge the gap between independent study and collective engagement, ultimately contributing to a more inclusive and supportive educational ecosystem.

## II. LITERATURE REVIEW

[1] "Massive Open Online Course Study Group: Interaction Patterns in Face-to-Face and Online (Facebook) Discussions" by Pin-Ju Chen and Yang-Hsueh Chen. They explored interaction patterns in a blended MOOC study group, combining face-to-face and online discussions to boost engagement. They addressed the issue of limited interaction in MOOCs, emphasizing that blended learning can be more effective but difficult to implement. Their study highlights the potential of local study groups to improve participation but acknowledges limitations, such as a small sample size (four participants) and pandemic-related constraints on face-to-face interaction. The authors suggest future research with larger, diverse groups to

validate their findings.[2] “An evaluation of students experiences of using virtual study spaces” by UCL library services with information services division, faculties and departments. It examined student experiences with virtual study spaces (VLS) during the pandemic when physical libraries were inaccessible. Students were motivated to use VLS by social pressure, peer influence, and the sense of belonging it fostered. VLS also helped them resist procrastination and collaborate effectively through features like online scheduling and file sharing. However, some faced technical issues, home distractions, and missed access to physical resources. The study addresses the need to understand student preferences for VLS, especially during disruptions like COVID-19, but has limitations. It focuses on a single university and a limited set of platforms, relies heavily on qualitative data, and captures experiences only during lockdowns, limiting the generalizability of its findings. [3] “Web-based Collaborative Learning” by Fan Qing, Lin Li. It provides an overview of web-based collaborative learning, highlighting its benefits in enhancing student engagement, critical thinking, communication skills, and positive attitudes toward learning. They discuss strategies like using online platforms for group projects, discussions, and resource sharing, along with examples of its application in various educational settings. However, the document lacks a clear research focus, provides limited depth, and relies on general observations without empirical evidence. While useful as an introduction, more focused research is needed for deeper insights into specific aspects and challenges of web-based collaborative learning. [4] “Exploring the role of social media in collaborative learning the new domain of learning” by Jamal Abdul Nasir Ansari and Nawab Ali Kha. They explored the role of social media in collaborative learning, focusing on student perceptions and factors influencing its effectiveness. Students view social media positively for enhancing communication, engagement, and knowledge sharing. Key factors for success include instructor facilitation, active student participation, and reliable technological infrastructure. The study addresses the need to understand how social media can be effectively integrated into learning environments but has limitations. It is context-specific, relies on self-reported data, and focuses mainly on perceptions rather than learning outcomes or long-term impact. Despite these limitations, it offers valuable insights into the potential of social media for collaborative learning. In conclusion, while prior studies focus on specific aspects of collaborative learning, PrepPal offers a more comprehensive solution. It integrates features like group formation, task management, and profile verification, addressing engagement, resource access, and safety in one platform. With its advanced matchmaking and multi-functional approach, PrepPal provides a more scalable and effective learning experience.

### III. OBJECTIVE

The primary objective of PrepPal is to enhance learning outcomes by fostering collaborative learning and reducing isolation in self-study. It connects students, exam aspirants, and lifelong learners through advanced matchmaking algorithms based on shared interests. The platform promotes productivity and consistency with tools like task management, a Pomodoro timer, and streak tracking. To ensure secure interactions, user profiles are verified via LinkedIn and GitHub. PrepPal facilitates real-time collaboration through group study rooms and plans to expand its initial resources, such as formula sheets, by partnering with EdTech platforms. Ultimately, it aims to create a supportive learning community that encourages meaningful connections and lifelong learning.

### IV. BACKGROUND

Advancements in technology have transformed education, shifting from traditional classrooms to digital learning. Despite this, many learners face isolation during self-study, affecting their motivation and productivity. Collaborative learning, which emphasizes peer interaction, can address these issues; however, there is a lack of platforms designed to foster meaningful collaboration. While social connectivity has thrived in digital spaces, educational platforms often fail to leverage this effectively. PrepPal aims to fill this gap by combining social interaction with structured learning tools. By connecting like-minded learners, offering collaboration features, and providing study aids, PrepPal seeks to make learning more engaging and connected.

The platform builds on the growing demand for personalized learning experiences, recognizing that every learner's journey is unique. PrepPal's features, such as matchmaking algorithms, task management, and customizable study settings, are tailored to cater to diverse learning styles and goals. By creating a supportive community and offering tools for productivity and motivation, PrepPal aims to enhance the effectiveness of self-directed study and make collaborative learning accessible to all.

### V. PROBLEM DEFINATION

Many students and lifelong learners encounter significant challenges related to isolation and lack of support during self-study, as traditional education systems often fail to foster peer interaction and collaboration. This results in feelings of loneliness and decreased motivation, compounded by the difficulty of finding like-minded study companions. Additionally, the overwhelming abundance of digital resources makes it hard for individuals to access relevant study materials tailored to their needs. PrepPal addresses these issues by creating a social education platform that connects users based on shared academic interests and fosters a collaborative learning environment, ultimately aiming to enhance productivity and improve learning outcomes.

## VI. METHODOLOGY AND DESIGN

### 6.1 User Onboarding Process

The user onboarding process in PrepPal is designed to be intuitive and engaging, ensuring that new users can quickly become familiar with the platform. Upon signing up, users are guided through a series of steps to create their profiles. They are prompted to enter basic information such as age, the type of exams they are preparing for (e.g., CAT, GRE), personal interests, and specific study goals. This initial data collection is crucial for building a comprehensive user profile that will enhance the effectiveness of the matching algorithm. To increase trust and credibility within the platform, users have the option to connect their LinkedIn and GitHub profiles for verification purposes. This not only helps in authenticating user identities but also provides additional context about users' academic and professional backgrounds. By doing so, PrepPal fosters a sense of security among its users, encouraging them to engage more openly and collaborate without hesitation. This verification step is vital in a digital learning environment where users may be hesitant to connect with strangers.

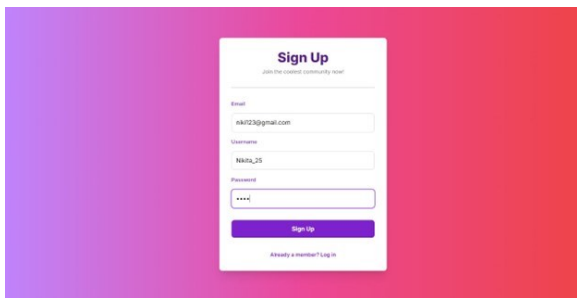


Fig: User Sign Up Page

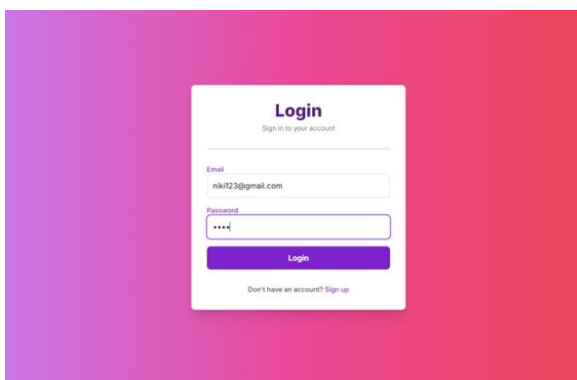


Fig: User Login Page

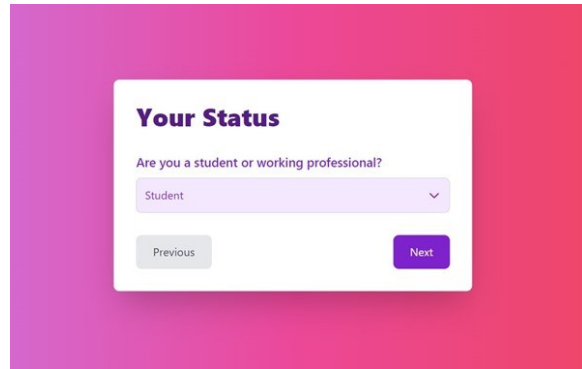


Fig: User Detail's Page

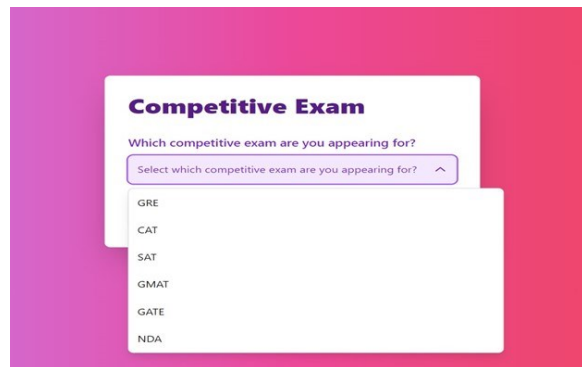


Fig: User Detail's Page

### 6.2 Productivity Features

PrepPal incorporates several integrated productivity tools that aim to enhance the overall study experience. These features are designed to cater to various learning styles and preferences, ensuring users can manage their time effectively while studying.

#### 6.2.1 Task Manager:

The Task Manager is a powerful tool that allows users to organize their study tasks efficiently. Users can create detailed lists of tasks, set deadlines, and prioritize activities based on their urgency and importance. This functionality promotes a structured approach to studying, helping users to break down their study goals into manageable segments. Additionally, the task manager includes progress tracking features that allow users to view their completion rates on a daily or weekly basis. This visual representation of progress serves as a motivational tool, encouraging users to stay on track with their study goals. Users can also receive reminders for upcoming deadlines, ensuring they remain accountable for their learning objectives.

### 6.2.2 Pomodoro Timer:

The integration of a Pomodoro Timer is another innovative feature of PrepPal that employs a popular time-management technique designed to enhance focus and productivity. Users can set study intervals (typically lasting 25 minutes) followed by short breaks (5 minutes), allowing them to maintain concentration while reducing the risk of burnout. This method has been shown to improve overall retention of information and make studying feel more manageable. Users can customize their study intervals and breaks based on personal preferences, creating a study schedule that works best for them. Additionally, the Pomodoro Timer includes a streak tracking feature, which motivates users to engage in consistent study practices. By visually displaying streaks of successful study sessions, users are encouraged to maintain their commitment and build positive study habits over time.

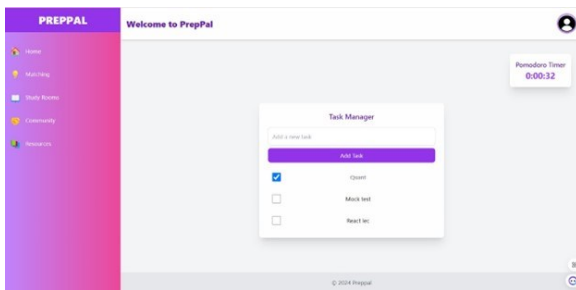


Fig: Home Page

### 6.3 Study Room Functionality

One of the standout features of PrepPal is its Study Room functionality, which facilitates real-time collaboration among users. This feature is particularly beneficial for those who thrive in social learning environments. Users can create or join study rooms, where they can interact with their matched study partners through video calling and chat functions, enabling seamless communication.

Study rooms are designed to accommodate various user preferences. Users can either join open rooms, where they can meet and collaborate with new study partners, or create private sessions tailored to their specific study needs. This flexibility allows users to engage in group study sessions that best suit their comfort levels, whether they prefer to study with familiar peers or meet new study companions.

In addition to video calling, study rooms also support collaborative tools such as shared documents and resources, enhancing the learning experience. This environment fosters a sense of community and belonging, motivating users to engage actively in their studies. By providing a space where users can discuss concepts, share insights, and motivate each other, PrepPal helps break down the isolation often associated with online learning.

### 6.4 Matching Algorithms

Matching algorithms have become increasingly prevalent in various domains, including social networking, dating applications, and job recruitment, due to their effectiveness in connecting individuals based on shared characteristics or preferences. In the context of educational platforms, effective matching algorithms can significantly improve user experience by pairing students with compatible study partners, thus fostering collaborative learning.

PrepPal utilizes Cosine Similarity, a mathematical method that assesses the degree of similarity between user profiles by analyzing vectors of data, such as interests, goals, and academic backgrounds. This approach enables the platform to make personalized recommendations, helping users find study partners whose profiles align closely with their own. By focusing on the multidimensional aspects of user profiles, Cosine Similarity facilitates a more nuanced understanding of compatibility compared to traditional algorithms.

Other algorithms, such as Pearson Correlation and K-Means Clustering, were considered during the design phase. However, these methods proved less effective for the specific requirements of PrepPal. Pearson Correlation is primarily focused on determining statistical relationships between variables, which may not capture the qualitative aspects necessary for meaningful connections in a study context. Meanwhile, K-Means Clustering segments users into distinct groups based on shared characteristics but does not provide the individualized matching that PrepPal aims to achieve. Therefore, Cosine Similarity was chosen for its ability to create tailored matches that enhance the collaborative learning experience.

## VII. THEORETICAL BACKGROUND

### 7.1 Matching Algorithm: Cosine Similarity

Cosine Similarity is a widely-used technique in data analysis and recommendation systems, particularly for measuring the similarity between two non-zero vectors. In the context of PrepPal, it operates by calculating the cosine of the angle between vectors that represent user attributes, such as interests, study goals, and academic backgrounds. The principle behind this approach is that the smaller the angle between two vectors, the greater the similarity between the corresponding users.

This algorithm converts user attributes into a multi-dimensional space, where each dimension corresponds to a different attribute. For example, attributes may include the types of exams being prepared for, subjects of interest, preferred study methods, and personal learning goals. By comparing these vectors, PrepPal can identify users with similar profiles, thereby facilitating connections that are more likely to result in productive study partnerships.

The use of Cosine Similarity allows PrepPal to provide highly personalized matching recommendations, enhancing user experience and satisfaction. Users are not just paired randomly; instead, they are matched based on a thorough analysis of their unique characteristics. This tailored approach is critical for fostering collaboration, as users who share similar study goals and interests are more likely to engage effectively, stay motivated, and support each other throughout their study journeys.



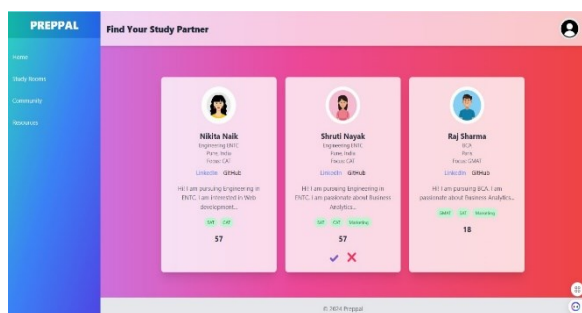


Fig: Matching Profiles

## VII. FLOWCHART

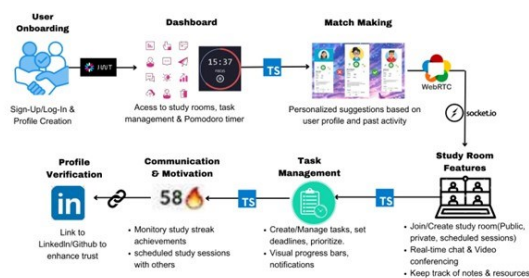


Fig: PrepPal Feature overview

### 7.2 Technology Stack

The technology stack of PrepPal has been meticulously selected to ensure optimal performance, scalability, and user experience. The architecture includes:

- **Frontend:** The user interface is built using Next.js and Tailwind CSS. Next.js, a powerful React framework, facilitates server-side rendering, enabling faster loading times and better SEO performance. Tailwind CSS provides a utility-first approach to styling, allowing for rapid and responsive design without sacrificing customization. Together, these technologies create a seamless and user-friendly experience, making it easy for users to navigate the platform and access its features.
- **Backend:** The backend of PrepPal is powered by the Python Django framework, which handles server-side logic and data processing efficiently. For real-time communication, WebRTC is integrated to enable video calling functionality, allowing users to connect face-to-face during study sessions. Socket.io is utilized for real-time chatting, providing instant messaging capabilities that enhance interaction among users. Additionally, MongoDB Atlas serves as the database management system, offering scalable and secure storage for user data, profiles, and study resources. This combination of technologies ensures that PrepPal can handle a growing user base while maintaining performance and reliability.
- **Hosting:** The platform is hosted on Vercel, a cloud platform that specializes in serverless deployment and provides continuous integration and deployment capabilities. Vercel's infrastructure ensures smooth scalability, allowing PrepPal to efficiently manage increased traffic as user engagement grows. The hosting solution also supports features like automatic scaling and edge caching, which improve the overall performance and reliability of the application, ensuring that users can access the platform seamlessly regardless of demand.

The flowchart illustrates the workflow and main features of the PrepPal platform. Users begin by creating profiles through a sign-up or login process, with the option to link their LinkedIn or GitHub profiles for increased trust and authenticity. Upon logging in, they gain access to a dashboard that offers tools such as study rooms, task management features, and a Pomodoro timer to enhance productivity during study sessions. The platform includes a matchmaking feature that uses user profiles and past activity to offer personalized study companion suggestions, supported by WebRTC and Socket.io for real-time interaction. Users can also track their progress, monitor study streaks, and schedule study sessions to stay motivated. Additionally, PrepPal's task management system helps users prioritize and manage tasks effectively with deadlines, visual progress indicators, and notifications. The platform's study rooms allow users to join or create public, private, or scheduled sessions with options for real-time chat, video conferencing, and resource tracking to foster collaborative and focused study environments. PrepPal fosters a collaborative learning experience by connecting users with like-minded study companions through its intelligent matchmaking. The integration of communication tools such as real-time chat and video conferencing enhances interaction, making study sessions more engaging. By incorporating tools like task prioritization, productivity timers, and progress monitoring, PrepPal ensures users can maximize their study efficiency and stay motivated.

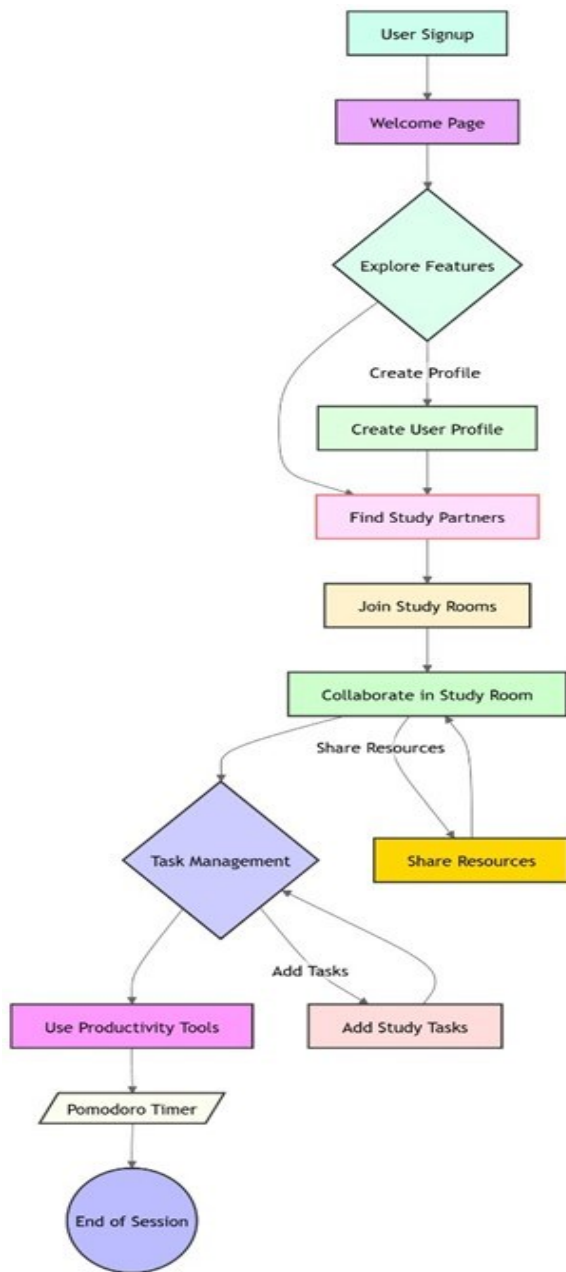


Fig: PrepPal User flow

### VIII. FUTURE SCOPE

PrepPal aims to expand its offerings through integration with leading EdTech providers, delivering a broader range of specialized resources and expert-led sessions. Future developments include AI-driven personalized recommendations to optimize user learning and mentorship programs to foster guidance within the community. To boost engagement, gamification features such as badges and competitive challenges will be introduced. PrepPal also envisions leveraging augmented and virtual reality for immersive learning experiences, ensuring it stays at the forefront of collaborative and lifelong education.

### ACKNOWLEDGEMENT

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### CONCLUSION

PrepPal represents a significant advancement in addressing the challenges faced by students in online learning environments. By integrating community-driven features with essential productivity tools, the platform fosters a collaborative atmosphere where students can connect, share resources, and enhance their study efficiency. The ability to match users with compatible study partners based on their interests, goals, and academic backgrounds creates a tailored experience that not only combats the isolation often associated with online studying but also cultivates a sense of accountability and motivation.

With features such as task management, Pomodoro timers, and real-time collaboration through study rooms, PrepPal empowers students to take control of their learning journeys. The platform's focus on community and collaboration positions it uniquely in the educational technology landscape, making it an invaluable resource for students preparing for competitive exams like the CAT and GRE. As we progress into Phase II, our commitment remains strong in refining these features and ensuring that PrepPal meets the diverse needs of its users, ultimately contributing to their academic success.

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