

GP-CONNEX: A COLLEGE-CENTRIC SOCIAL MEDIA PLATFORM FOR CAMPUS COMMUNICATION

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Abstract - In today's digital academic environment, effective communication and collaboration within educational institutions play a crucial role in enhancing student engagement and knowledge exchange. Traditional communication approaches such as noticeboards, classroom announcements, and informal messaging groups often lead to fragmented information flow, limited interaction, and privacy concerns. Generic social media platforms are not tailored for academic use, while learning management systems lack integrated social networking features.

To address these limitations, GP-Connex was evaluated as a college-centric communication platform designed to provide a secure and centralized environment for students, faculty, seniors, and alumni. The system was implemented using the MERN stack and integrated real-time communication through socket-based messaging. Functional testing and user-based evaluation were conducted as a pilot study involving 37 active users, focusing on metrics such as message relevance and user satisfaction.

Experimental results indicate improved communication efficiency and higher user satisfaction compared to conventional messaging platforms commonly used in college settings, demonstrating the platform's potential to enhance structured academic interaction.

Key Words: College Social Media Platform, Campus Communication, MERN Stack, Web Application, Academic Networking, Real-Time Interaction.

1. INTRODUCTION

Communication and collaboration play a crucial role in enhancing interaction, engagement, and productivity within educational institutions. Traditionally, colleges rely on noticeboards, classroom announcements, and

informal messaging groups for communication. However, these approaches are often inefficient, fragmented, and lack proper organization and privacy, making it difficult to ensure timely and structured information dissemination.

With the advancement of web technologies, educational institutions are increasingly adopting digital platforms to streamline communication and improve collaboration. Social networking platforms designed specifically for academic use enable students and faculty to interact, share knowledge, and remain updated in real time, thereby fostering a more connected and interactive learning environment.

GP-Connex is a college-centric social media platform developed using MERN stack (MongoDB, Express.js, React.js, and Node.js). The platform provides a secure and structured environment where users can register, share posts, interact through likes and comments, and communicate using real-time messaging. By integrating academic communication with social interaction, GP-Connex aims to enhance campus connectivity and establish an efficient digital communication ecosystem.

1.1 Need for a College-Centric Communication Platform

Existing communication methods in educational institutions, such as noticeboards, classroom announcements, and informal messaging groups, often lead to fragmented information flow and delayed updates. These systems lack structured organization and fail to provide a centralized platform for academic interaction.

Additionally, widely used social media platforms are not designed specifically for academic environments. They introduce distractions, lack institutional control, and raise concerns related to privacy and data security. Learning management systems, while useful for academic content delivery, do not support interactive social networking or real-time informal communication.

These limitations highlight the need for a dedicated platform that combines secure access, structured communication, and real-time interaction within a college ecosystem. GP-ConneX addresses this gap by providing a focused and controlled communication environment tailored to academic institutions.

1.2 Objectives of the Proposed System

The primary objective of GP-ConneX is to develop a secure and efficient communication platform that enhances interaction among students, faculty, seniors, and alumni within a college environment. The system aims to achieve the following:

- To provide a centralized platform for academic communication and information sharing
- To enable real-time messaging for quick and efficient interaction
- To support content sharing and engagement through posts, likes, and comments
- To ensure secure access by restricting usage to verified institutional users
- To reduce dependency on external social media platforms
- To improve organization and visibility of academic information

By achieving these objectives, the system enhances collaboration, reduces communication gaps, and promotes a more connected campus environment.

2. LITERATURE REVIEW

Various communication platforms have been developed over time to enhance interaction, collaboration, and information sharing within educational environments. However, each system exhibits certain limitations when applied to structured academic communication. The major categories of existing systems are discussed below.

2.1 Manual / Offline Communication

Traditional communication methods such as noticeboards, classroom announcements, and face-to-face interactions have been widely used in educational institutions. While these methods are simple and cost-effective, they suffer from several limitations. Information dissemination is often delayed, lacks proper organization, and is difficult to track over time. Additionally, these methods do not support real-time updates and fail to reach all students efficiently, especially in large institutions.

2.2 Messaging Platforms (WhatsApp, Telegram)

Modern messaging applications such as WhatsApp and Telegram have significantly improved communication speed and accessibility. These platforms support instant messaging, group chats, and media sharing, making them widely used among students for academic coordination.

However, these platforms are not specifically designed for academic environments. Conversations often become cluttered, important messages get buried within continuous chats, and there is no structured way to organize academic discussions. Moreover, privacy concerns arise due to the use of personal phone numbers, and institutional control over communication is limited.

2.3 Generic Social Media Platforms (Instagram, Facebook)

Social media platforms such as Instagram and Facebook provide features like content sharing, commenting, and networking, which can support peer interaction. These platforms offer high user engagement and familiarity among students.

Despite these advantages, they are not suitable for academic communication. The presence of non-academic content and distractions reduces productivity, and there is no mechanism to restrict access to a specific institution. Additionally, these platforms lack structured discussion formats and do not provide adequate privacy or control for academic use.

2.4 Learning Management Systems (LMS)

Learning Management Systems such as Moodle and Google Classroom are designed to support formal academic activities, including assignment submission, course materials, and announcements. These systems are effective for structured academic content delivery.

However, LMS platforms offer limited support for informal communication, peer interaction, and real-time collaboration. They lack social networking features such as dynamic discussions, instant messaging, and community engagement, which are essential for a connected campus environment.

2.5 College-Specific Platforms

Some institutions have developed dedicated platforms to connect students, faculty, and alumni. Platforms such as AlmaConnect focus on mentorship and professional networking.

While these systems provide more relevant interactions compared to generic platforms, they often lack comprehensive real-time communication features and social engagement capabilities. In some cases, access may be restricted or require paid subscriptions, limiting widespread adoption.

Table 1: Comparison of GP-ConneX with Existing Communication Platforms

Feature	WhatsApp	Instagram	GP-ConneX
College Restricted	No	No	Yes
Academic Focus	Low	Very Low	High
Real-Time Messaging	Yes	Yes	Limited
Structured Discussion	Yes	Limited	Yes

3. PROBLEM STATEMENT

Effective communication and collaboration among students, faculty, seniors, and alumni are essential for the smooth functioning of educational institutions. However, most colleges continue to rely on traditional methods such as noticeboards, classroom announcements, and informal messaging groups for information dissemination.

These approaches often result in scattered and unorganized information, making it difficult for users to access relevant updates efficiently. Important messages are frequently delayed or overlooked, leading to communication gaps. Additionally, the use of third-party messaging and social media platforms raises concerns related to privacy, data security, and lack of institutional control. Such platforms also do not support structured academic discussions, causing information to become cluttered and difficult to manage.

Furthermore, existing systems lack a centralized and dedicated environment that integrates real-time interaction, academic networking, and organized communication within a single platform.

Therefore, there is a need for a secure, centralized, college-specific digital platform that enables efficient communication, structured interaction, and improved collaboration within academic institutions. GP-ConneX is proposed to address these challenges by providing a focused and controlled communication ecosystem.

4. PROPOSED SYSTEM

GP-ConneX is a web-based, college-centric social media platform designed to provide a secure and structured environment for communication and collaboration within academic institutions. The system aims to overcome the limitations of traditional communication methods and generic social media platforms by offering a dedicated and controlled digital space for students, faculty, seniors, and alumni.

The platform restricts access exclusively to verified institutional users, ensuring data privacy, authenticity, and a trusted communication environment. It enables users to create profiles, share posts, and interact through likes and comments, thereby promoting engagement and knowledge sharing within the campus community.

To enhance communication efficiency, GP-ConneX integrates real-time messaging functionality, allowing instant interaction between users. A notification system is incorporated to ensure that users receive timely updates regarding posts, messages, and other activities.

The system is designed with a focus on structured communication, reducing information clutter and improving the organization of academic discussions. By combining social networking features with academic requirements, GP-ConneX provides a balanced and efficient communication ecosystem tailored specifically for educational institutions.

5. SYSTEM ARCHITECTURE

The architecture of GP-ConneX follows a three-tier client-server model, which divides the system into presentation, application, and data layers. This layered approach improves scalability, maintainability, and overall system performance.

Client Layer (Presentation Layer):

The client layer consists of a web-based user interface developed using React.js. It enables users to interact with the platform through features such as profile management, post creation, real-time messaging, and notification. The interface is designed to be responsive and user-friendly, ensuring smooth navigation and accessibility.

Application Layer (Backend Layer):

The application layer is implemented using Node.js and Express.js. It handles core functionalities such as business logic, user authentication, API request processing, and real-time communication. This layer acts as an intermediary between the client and the database, ensuring secure and efficient data processing.

Data Layer:

The data layer is responsible for storing and managing application data, including user profiles, posts, messages, and media content. MongoDB is used as the primary database, while cloud-based storage is utilized for handling large media files such as images. This separation improves performance and scalability.

Communication between these layers is facilitated through RESTful APIs, while real-time features such as messaging and notifications are implemented using socket-based communication, ensuring efficient and instant data exchange.

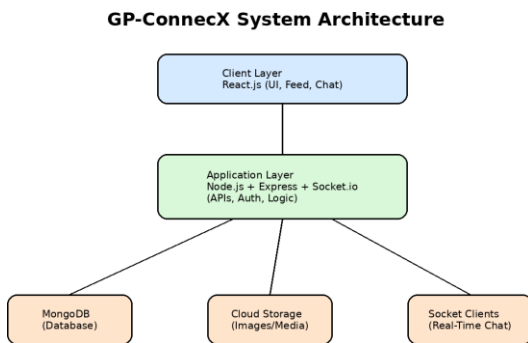


Fig. 1: Architecture of GP-ConneX

5.1 TECHNOLOGY SELECTION

The technologies used in GP-ConneX were selected based on Flexibility, scalability, and performance requirements of a modern web application.

MongoDB (Database):

MongoDB was chosen due to its schema-Elexible document model, which efEciently handles dynamic and unstructured data such as posts, comments, user proEiles, and messages. This Flexibility simplifies data modeling and improves scalability.

Cloud Storage Integration:

Cloud-based storage is used to manage user-uploaded images and media content. Instead of storing large files directly in the database, only secure media URLs are stored, reducing database load and improving retrieval performance.

RESTful APIs:

REST APIs are used for communication between the frontend and backend layers. This ensures clear separation of concerns, improves maintainability, and allows future expansion to other platforms such as mobile applications.

Authentication and Security:

Token-based authentication mechanisms are implemented to ensure that only authorized users can access the system. This enhances security and maintains controlled access within the college-restricted environment.

Real-Time Communication:

Socket-based communication (e.g., Socket.IO) is used to implement real-time messaging and notifications. This enables instant data exchange and efficient handling of concurrent user interactions.

6. SYSTEM MODULES

The GP-ConneX platform is divided into multiple functional modules, each responsible for handling specific operations within the system. These modules

collectively ensure smooth interaction, data management, and real-time communication among users.

6.1 User Authentication Module

The User Authentication Module manages user registration and login processes. It ensures that only verified institutional users can access the platform. Secure authentication mechanisms are implemented using token-based validation, which protects user data and prevents unauthorized access.

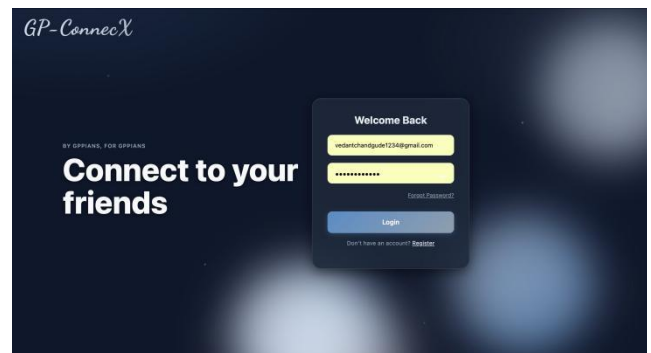


Fig. 2: Login Interface of GP-ConneX

6.2 Profile Management Module

The Profile Management Module allows users to create, update, and manage their personal and academic information. This module supports user identity representation within the platform and enables personalization of the user experience.

6.3 Post and Interaction Module

The Post Module enables users to create, view, and interact with content within the platform. It serves as a central component for information sharing, allowing users to publish posts related to academic updates, announcements, events, and discussions. This module supports structured content dissemination, ensuring that important information is easily accessible to all users.

In addition to content sharing, the module provides interactive features such as likes and comments, which encourage user engagement and participation. These interaction mechanisms facilitate collaborative communication, enabling users to exchange ideas, provide feedback, and actively contribute to academic discussions. Overall, the Post Module plays a crucial role in enhancing connectivity and promoting an interactive campus communication environment.

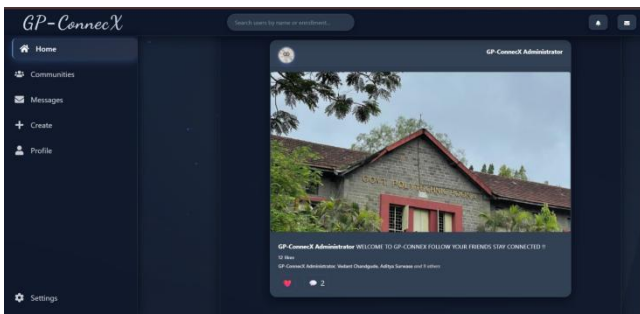


Fig. 3: Main Feed Showing Posts and User Interaction

6.4 Real-Time Communication Module

The Chat Module provides real-time messaging functionality, allowing users to communicate instantly. This module uses socket-based communication to enable fast and efficient message exchange, supporting both one-to-one and group interactions.

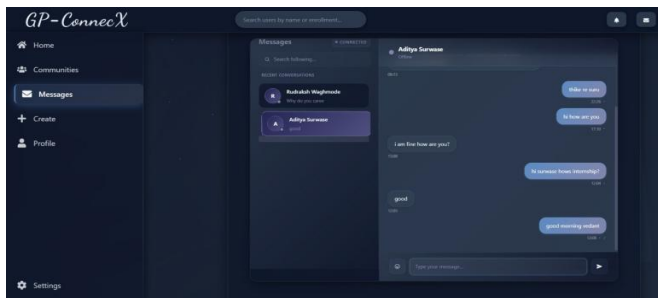


Fig. 4: Real-Time Chat Interface of GP-ConnecX

6.5 Notification Module

The Notification Module keeps users informed about platform activities such as new posts, comments, messages, and updates. It ensures timely delivery of information, helping users stay engaged and aware of relevant events within the system.

7. RESULTS AND EVALUATION

The GP-ConnecX platform was implemented and evaluated in a controlled academic environment as a pilot study involving 37 active users. The evaluation aimed to assess the functional correctness, performance, and usability of the system under normal usage conditions.

7.1 Functional Evaluation

Functional testing was conducted on all core modules of the system, including user authentication, profile management, post creation, real-time messaging, and notification handling. All participating users were able to successfully register and log in using the authentication mechanism. The platform's features,

including post sharing, likes, comments, and messaging, operated correctly without any observed errors.

No system crashes, authentication failures, or data inconsistencies were recorded during the testing phase, indicating reliable system functionality.

7.2 Performance Evaluation

The system demonstrated stable performance during concurrent usage by multiple users. Real-time messaging functionality enabled smooth and uninterrupted communication between users.

Message delivery was observed to occur in near real-time conditions. Latency measurements were obtained using client-side timestamps and browser network monitoring tools during live testing sessions, indicating efficient data transmission and responsiveness of the system.

7.3 Usability Evaluation

From a usability perspective, the platform provided a clean and intuitive user interface, allowing users to navigate features with ease. Feedback collected from participants indicated that the system offered a more organized and structured communication experience compared to traditional messaging groups and generic social media platforms.

Users reported improved visibility of academic announcements and discussions, resulting in reduced information clutter and more effective communication within the campus environment.

Table 2: Quantitative Evaluation of GP-ConnecX Platform

Parameter	Value
Users	37
System Crashes	0
Authentication Failures	0
Success Rate	100%

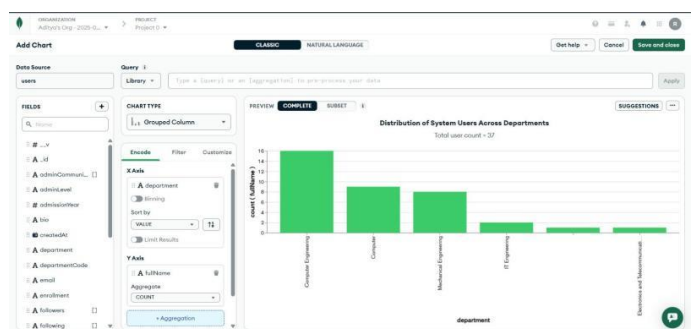


Fig. 5: Distribution of Users (n = 37) Across Platform

8. ADVANTAGES & LIMITATIONS

Advantages:

The GP-ConneX platform offers several advantages that make it suitable for academic communication within educational institutions:

- Secure and Controlled Environment:

The platform restricts access to verified institutional users, ensuring data privacy and maintaining a safe communication space.

- College-Specific Communication:

Unlike generic social media platforms, GP-ConneX is designed specifically for academic use, enabling focused interaction among students, faculty, seniors, and alumni.

- Organized Information Flow:

The system provides structured communication through posts, comments, and notifications, reducing information clutter and improving accessibility of important updates.

- Real-Time Interaction:

Integrated real-time messaging allows instant communication, enhancing collaboration and enabling quick exchange of information.

Limitations:

Despite its advantages, the system has certain limitations that can be addressed in future enhancements:

- Web-Based Application Only:

Currently, the platform is available only as a web application, which may limit accessibility for users who prefer mobile applications.

- Dependence on Internet Connectivity:

The system requires a stable internet connection for proper functionality, particularly for real-time communication features.

- Limited Evaluation Scope:

The system was evaluated as a pilot study involving 37 users within a single institution. Larger-scale deployment is required for broader validation and performance analysis.

9. FUTURE SCOPE

The GP-ConneX platform provides a strong foundation for further enhancements aimed at

improving functionality, accessibility, and scalability. As communication needs within educational institutions continue to evolve, the system can be extended in several ways.

1) Mobile Application Development:

A dedicated mobile application for Android and iOS platforms can be developed to improve accessibility and user engagement. Mobile support would enable real-time notifications, better usability, and increased adoption among students and faculty.

2) Event Management System:

The platform can be extended to include event management features, allowing users to create, manage, and participate in college events, workshops, and seminars within a centralized system.

3) Alumni Networking Module:

Integration of an alumni network can facilitate mentorship, career guidance, and professional connections between current students and alumni, enhancing long-term engagement within the institution.

4) Multi-Institution Support:

The system can be scaled to support multiple colleges or universities, enabling inter-college communication, collaboration, and knowledge sharing while maintaining institutional boundaries.

These enhancements can transform GP-ConneX into a comprehensive digital ecosystem for academic communication, collaboration, and networking.

10. CONCLUSIONS

GP-ConneX is a college-centric social media platform designed to address communication and collaboration challenges within academic institutions by providing a secure and structured digital environment. The system successfully integrates essential functionalities such as user authentication, profile management, content sharing, real-time messaging, and notification handling within a controlled institutional framework.

The platform was implemented using modern web technologies and evaluated as a pilot study involving 37 active users. The results demonstrate stable system performance, reliable functionality, and an improved communication experience compared to traditional methods and generic messaging platforms.

By combining academic communication requirements with interactive social networking features, GP-ConnecX effectively supports organized information dissemination and real-time interaction within the campus community. The system establishes a strong foundation for future enhancements, scalability, and broader deployment across educational institutions.

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