

Online Collaboration System

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Abstract— This online collaboration system is tailored for university students, faculty, and staff to enhance communication and cooperation. It offers various tools like real-time document sharing and chat rooms. Accessible through web browsers, it boasts a user-friendly interface for easy navigation and resource location. Users can create profiles, join interest groups, and benefit from robust security measures. In essence, it fosters a culture of teamwork and innovation within the university community.

Keywords—Online Collaboration System, Communication, Cooperation, Document sharing, User-friendly interface, Teamwork, Interest groups

INTRODUCTION

An online collaboration system is a web-based platform that enables individuals or groups to work together in a virtual environment. It typically provides tools for communication, file sharing, and project management, allowing users to collaborate on tasks regardless of their location. online collaboration systems are a powerful tool for promoting teamwork, productivity, and innovation in a variety of settings, from education to business and beyond.

1. Methodology

1 Planning a project and gathering requirements:

Clearly state the goal and parameters of the university's online collaboration system while defining the project's scope. Determine the main features, user roles, and goals.

Collect Requirements: Work with faculty, students, and university stakeholders to compile thorough requirements. Create use cases and user stories to record certain requirements.

Technology Stack Selection: Confirm the MERN stack's use and set up any other tools or libraries that might be required.

2 Designing a system:

Database Design: Design the MongoDB database while taking into account the data models for users, courses, assignments, discussions, and other pertinent things.

Backend Design: Establish the routes, controllers, and authentication procedures for the API architecture using Express and Node.js.

Fronted Design: Create wireframes and mockups for the user interface (UI) using React in frontend design. Select the overall design, navigation, and layout elements.

3 Development:

Backend Development: Create the server-side elements, such as user authentication, API endpoints, and database interactions, using Node.js and Express.

Frontend Development: Develop the user interface using React in front-end development. Add functions like user registration, login, course management, assignment submission, and discussion forums.

Integrate MongoDB: Connect the backend to the MongoDB database to integrate MongoDB, providing adequate data archiving and retrieval.

User Authentication: Implement user authentication and authorisation processes to grant users secure access to the system.

4 Testing:

Unit Testing: Write and run unit tests for the frontend and backend components to make sure they work properly.

Integration Testing: Integrative testing examines how various system components interact with one another and data validity.

5 Positioning:

Setting Up Hosting: Deploy the system on a hosting platform of your choice (such as AWS, Heroku, or a university server).

Database Deployment: Set up a suitable platform or server on which to deploy the MongoDB database.

Domain Configuration: If necessary, configure the DNS settings, SSL certificates, and domain name.

6 Security & Compliance:

Implement Security Measures: Address security issues such as user data protection, data encryption, and preventing typical web application vulnerabilities (such XSS and CSRF).

Compliance: Verify the system conforms with any applicable data protection and privacy laws, such as the GDPR or HIPAA.

7 User Documentation and training:

To guarantee that students, instructors, and administrators can use the system efficiently, provide user manuals and documentation for them.

2. Survey

Yan Tingmin¹ and Chen Zihé, Journal: Design studies and intelligence engineering [1] describe The internet has become integral for innovation in various aspects of life, leading to the emergence of "Internet + N" forms. With increased mobile internet usage and advancements like big data and artificial intelligence, traditional culture is now disseminated through digital media technology. This reliance on the internet has also led to the development of apps promoting traditional culture. However, rapid growth has resulted in declining quality. Effectively spreading traditional culture has become a pressing issue, with users seeking enhanced experiences. It's crucial to meet their expectations in this regard.

Peter Tolstrup Aagesen, Clint Heyer, Journal: User Experience and Performance [2] describe The Practicing designers typically have a link to branding, as their creations are expected to positively reinforce the brand and enhance brand experiences. This strategic alignment holds significant value for the organization owning the brand. Despite the importance of visual branding skills for interactive devices, there is a lack of systematic techniques to develop an interaction aesthetic that promotes a brand, as noted in interviews with skilled practitioners.

Ons Al-Shamaileh, Alistair Sutcliffe, A Survey on user experience [3] describe The study investigates how website design, branding, and user culture influence perceptions of health websites. 86 respondents from Jordan and the UK evaluated three health websites. Key findings emphasized the significance of recognizable branding, comprehensive content, and interactive features in shaping user judgments. Cultural backgrounds had a minor impact compared to these factors.

Cai Xinyuan, Journal: IADIS International Conference on Applied Computing 2005 [4] describe The Live websites' variability constrained the study, yet brand's strong impact remains reliable. Design must consider user personas and cultural nuances. Interactive elements enhance engagement, but efficacy depends on tasks. Complex, dynamic designs suit diverse customer needs, while simplicity benefits sites like C4L with intuitive navigation.

Hasana Tania, Journal: Tiers information tech journal [5] describe Information technology disruption has led to shifts in market dynamics across sectors. Integrated IT is expected to streamline workflows by enhancing availability and accessibility. Global adoption of IT has intensified industry competition, necessitating the development of robust marketing and development plans to stay competitive.

Essie Wai-ching CHOI, Journal: English Language Teaching, [6] describe The study focused on a 36-student ESL writing class at a community college in Hong Kong. Students participated in three online collaborative writing activities, exchanging drafts and providing feedback via email. The study highlights the potential benefits of shared online platforms for enhancing learning outcomes.

Idongesit E. Eteng¹, *and Samuel O. Oladimeji¹, Journal: Journal of Management Science and Business Intelligence [7] describe The study aims to tackle the lack of suitable collaboration platforms in academia. It proposes an online platform where students collaborate on research, supervised by academics. This facilitates sharing research activities conveniently, anytime and anywhere.

Mustakim*, Trisnarningsih, M. Mona Adha, Journal: Advances in Social Science, Education, and Humanities Research [8] describe This qualitative study investigates how online learning facilitated collaborative learning during the Covid-19 pandemic. Data was collected through Google Forms distributed to 57 subject teachers and interviews with students engaged in online learning. Despite successful implementation of online learning applications by teachers, fostering student collaboration remains a challenge, despite its importance in promoting active learning behavior.

Yakob Utama Chandra, Cadelina Cassandra and Meyliana, Journal: International Journal of Mechanical Engineering and Technology (IJMET) [9] describe Communication is essential for collaboration within organizations. Employees' expertise and willingness to share contribute to achieving company goals. Trust among stakeholders is crucial, facilitating effective collaboration and goal attainment. Collaboration enables efficient collection of contributions and identification of relevant documentation.

Adrian Pratama¹, Aviv Kusuma Sutopo², Kevin Surja Tirtawidjaja³, Tanty Oktavia⁵, Ford Lumban Gaol⁶, Takaaki Hosoda⁷, Journal: EPiC Series in Computing [10] describe The demand for remote interaction has led to an investigation into collaborative technologies. This research aims to identify success factors for such tools, ensuring effective communication. According to Takari (2019), clarity in information presentation is key to effective communication. Collaborative technologies are highly effective when utilized by employees.

Christina Wiethof, Journal: AIS Transactions on Human-Computer Interaction [11] describe The study investigates how gamification components influence collaborative processes and user retention in systems. It explores integrating gamification into collaborative story writing through iterative action design research, revealing the effectiveness of digital collaboration methods compared to analog ones.

Maura R. Cherney, Journal: Small Group Research [12] describe This article conducts a meta-synthesis of 41 publications to critically evaluate small group work in online courses. With enrollment in university online courses outpacing traditional ones, the need for such evaluation is pressing. The meta-synthesis highlights criticisms and suggests research directions for online student collaboration, drawing from relevant literature.

Jennifer Beckmann and Peter Weber, Journal: International Conference e-learning [13] describe The paper introduces the 'Net Economy' virtual collaborative learning environment within an international learning network spanning seven universities. Guided by the Community of Inquiry framework, the online course's discussion forum is assessed using Canonical Action Research (CAR) for its impact on critical thinking. Utilizing the model by Newman et al. (1995), which delineates 40 critical thinking indicators across 10 categories, the study measures critical thinking.

Krzysztof Jankowski, Antti Knutas, Jouni Ikonen, Jari Porras, Journal: 16th International Conference [14] describe The paper presents the architecture of an automated social network analysis and visualization tool designed for educational social media contexts. It allows for the real-time analysis and visualization of online social situations. The tool enables instructors to better understand changing social dynamics in online classrooms and take timely action based on automated insights.

Hassan Abuhassna1*, Waleed Mugahed Al-Rahmi1, Noraffandy Yahya1, Megat Aman Zahiri Megat Zakaria1, Azlina Bt. Mohd Kosnin1 and Mohamad Darwish2, Journal: International Journal of Educational Technology [15] describe This study explores factors influencing students' academic success and satisfaction in online learning, drawing from Transactional Distance Theory and Bloom's Taxonomy Theory. Quantitative research with 243 college students identifies 11 criteria for enhancing performance and satisfaction in online platforms. Results suggest that students' backgrounds, experiences, group projects, interpersonal connections, and autonomy affect satisfaction, while academic success is linked to application, retention, understanding, analysis, and enjoyment.

Mohammed Saqr1,2*, Uno Fors1, Matti Tedre3, Jalal Nouri1, Journal: PLOS One [16] This study examines the practical application of social network analysis (SNA) in online collaborative learning across three courses over a full term. It aims to assess efficacy, identify issues, and guide interventions. Despite its theoretical potential, previous research in education has overlooked SNA's practical benefits.

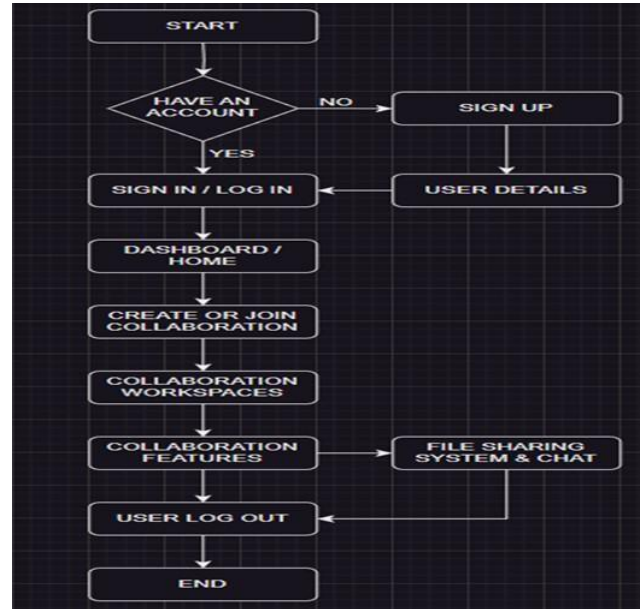
Geralyn .E. Stephens, Kathryn L. Roberts, Journal: Jorنال Of Educators Online [17] The popularity of online programs and courses for postsecondary certifications and degrees has grown significantly over the years. In fall 2003, just over 10% of students were enrolled in online courses, a number that increased to nearly 30% by fall 2011. Many institutions now offer full online programs, with almost all providing online courses. This trend indicates that online learning will continue to play a significant and expanding role in higher education.

Van Dat Tran', Journal: International Journal of Higher Education [18] This study investigates the effect of cooperative learning on the motivation of 72 second-year Vietnamese higher education students in a research methods course. Divided into experimental and control groups, the experimental group showed significantly higher learning motivation compared to the control group..

Heather A. Robinson, Whitney Kilgore, and Scott J. Warren, Journal: Online Learner Journal [19] This study explores higher education teachers' perspectives on collaborative learning opportunities in online classrooms. Through semi-structured interviews, teachers shared their experiences and insights related to online collaborative activities. Data analysis employed a multi-phase coding approach, including constant comparative coding, to identify emerging themes and categories.

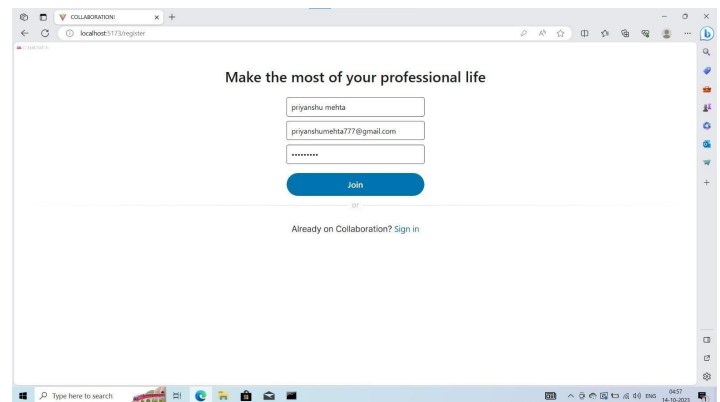
Mar'ia Angeles Mestre-Segarra, Miguel F. Ruiz-Garrido, Journal: SYSTEM[20] This essay examines students' perspectives on language and content use, transdisciplinary skills, and cultural sensitivity in the global Virtual Business Professional (VBP) project. It explores the experiences of two students from diverse racial and cultural backgrounds enrolled in a business master's program. The project combines Integrating Content and Language in Higher Education (ICLHE) and Collaborative Online International Learning (COIL) techniques.

3. Analysis & Design

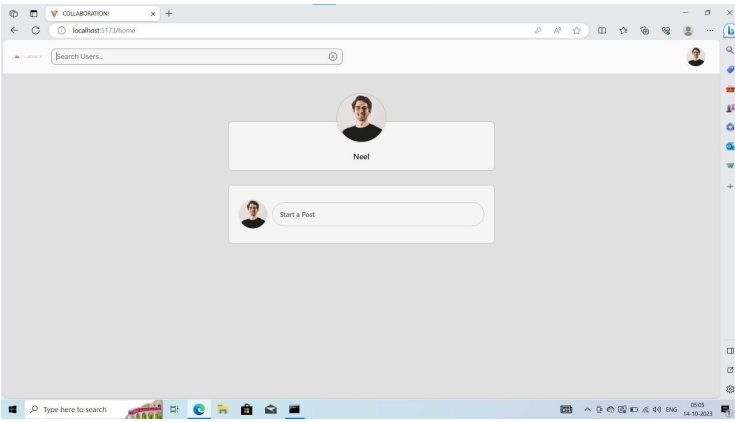


3.1 Flowchart Of The System

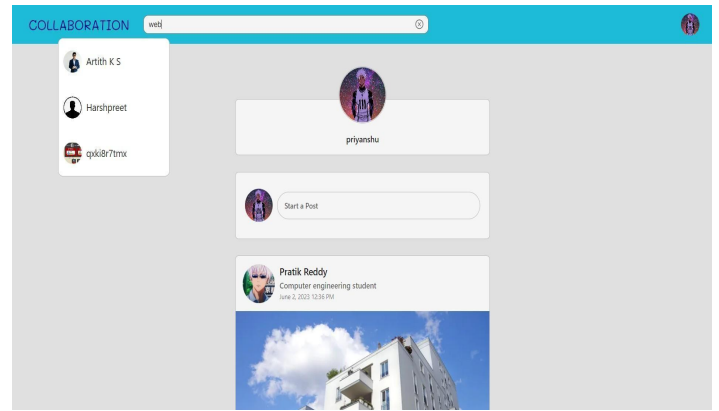
4. Implementation



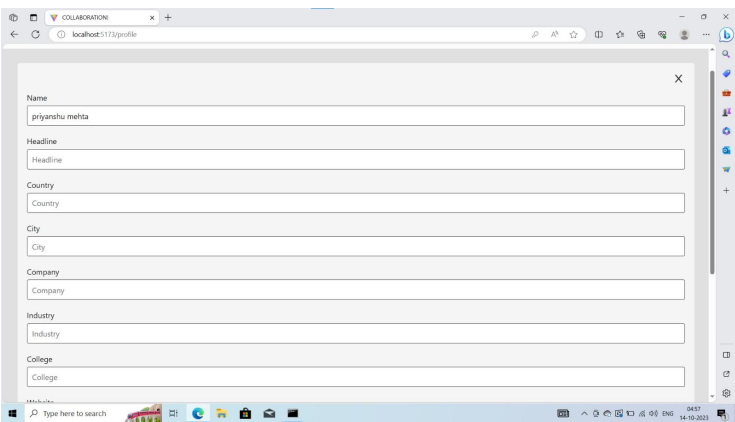
4.1 Login Page



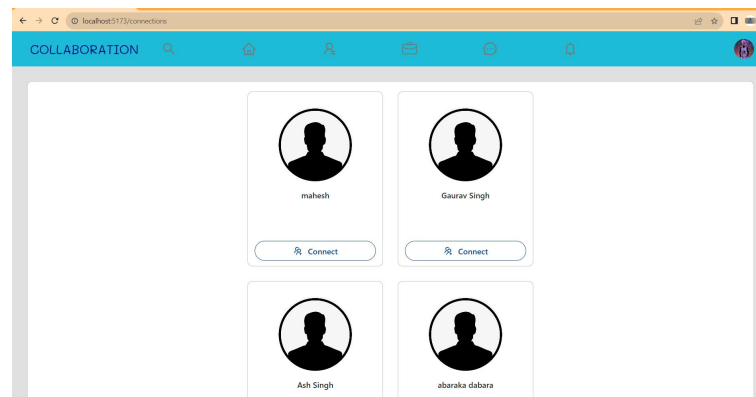
4.2 Home Page



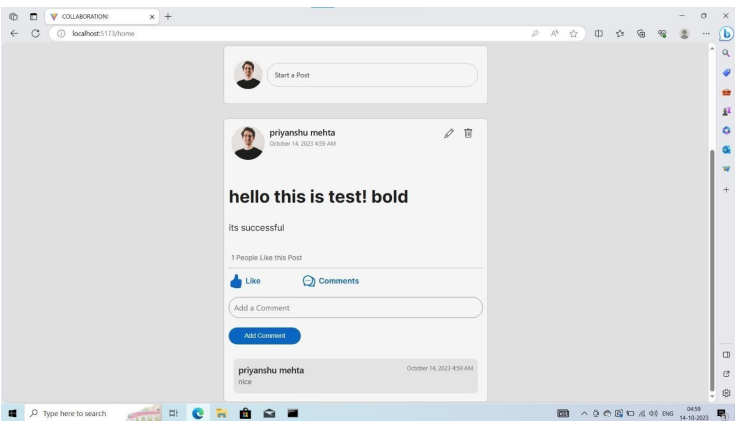
4.5 Search Bar And Filter Page



4.3 Edit Profile Page



4.6 Connection Page



4.4 Blog Page

5. Applicable Area

Research collaboration: The online collaboration system can be used to support research collaboration among faculty and researchers from different departments. It can provide a platform for sharing research papers, collaborating on research projects, and organizing research events.

Administrative collaboration: The online collaboration system can be used to streamline administrative tasks and facilitate communication among university staff. It can provide a platform for managing tasks, scheduling meetings, and sharing documents.

Distance learning: The online collaboration system can be used to support distance learning by providing a platform for delivering lectures, hosting virtual discussions, and facilitating group projects.

Alumni engagement: The online collaboration system can be used to engage alumni by providing a platform for alumni to connect, share career advice, and mentor current students.

6. Conclusion

An effective online collaboration system is essential for modern work environments, particularly in remote and distributed teams. It enables seamless communication, efficient document sharing and real-time collaboration, leading to increased productivity, improved project management and enhanced team collaboration. By addressing the limitations of the existing systems, such as difficulties in coordination, version control, and accessing project information, a well-designed online collaboration system can empower teams to work together more efficiently, streamline workflows, foster creativity and innovation.

7. Future Scope

Future enhancements for an online collaboration system tailored for universities include:

Integration with Learning Management Systems (LMS): Incorporating compatibility with popular LMS platforms like Blackboard, Canvas, or Moodle to streamline access to course materials, assignments, grades, and facilitate communication among students and instructors.

AI-powered Recommendations: Utilizing AI and machine learning algorithms to offer personalized suggestions, such as relevant resources, groups, or mentors, based on user interests, past interactions, and performance.

Social Network Integration: Integrating with social media platforms like LinkedIn, Twitter, or Facebook to leverage users' social connections, promote networking, facilitate resource sharing, discussions, and updates.

Virtual Reality and Immersive Experiences: Exploring the integration of virtual reality (VR) and immersive technologies to elevate learning and collaboration experiences through virtual simulations, 3D modeling, and augmented reality exercises.

Accessibility and Inclusivity: Prioritizing accessibility features like screen reader compatibility, closed captioning, and language translation to ensure inclusivity. Providing support for users with disabilities or diverse learning needs to foster an inclusive environment.

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