

MindLink – A Study Focused Website

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Abstract — As an anonymous, web-based interactive platform, MindLink aims to facilitate collaborative learning among school pupils through question-and-answer interactions. Students ask academic questions and retain their anonymity by using advice nickname, automatically generated by the application, so they can be free from fear complexity opening up more communicative in their environment. Classmates and teachers can respond, and in addition, teachers can add study notes like notes, PDFs, PPTs, and documents. In addition to productivity and educational purposes, MindLink features a "focus timer" to facilitate attention and a "Relax Room" with healing music for mental health purposes. Teachers can run quizzes on the systems, and students are automatically given badges, scores, and a rank based on frequency of students' interactions and engagement. The advanced protection and monitoring features of MindLink allows for reporting and moderation systems for safety and accountability purposes, should there be inappropriate content on the part of users that is noted somewhere and needs to be addressed by the staff. Built with Vite + React on the frontend, Node.js + Express on the backend, and MongoDB for database management monitoring. MindLink affords a safe, measured, responsive, and interactive experience where online learning can become fun and productive for students.

I. INTRODUCTION

The revolution has transformed the landscape of education, and participative, student-centered learning opportunities are provided through new avenues. Conventional classes hardly reach all students equally, with numerous learners not daring to pose their questions or raise their queries openly because of shyness, social phobia, or fear of being criticized by peers. The phenomenon is a

source of conceptual vagueness and active participation, especially among school students. In an attempt to combat this deficit, MindLink takes the shape of an enjoyable, anonymous, and interactive web site where students can learn together in a positive, judgment-free, and safe environment. MindLink offers an online environment where students can submit academic questions anonymously with randomly assigned cute and friendly nicknames (e.g., "SunnyPanda42" or "CherryFox10"). Anonymity allows the students to feel free to ask questions actively with no fear. Other students and teachers can respond to the questions in order to enable peer-to-peer as well as teacher-student interaction. The teachers also have an important role in the site by providing study materials like PDFs, PPTs, and DOCX files that can be downloaded directly and used by students to revise. Unlike traditional learning systems, MindLink puts both focus and mental relaxation as its priorities. The Focus Timer feature enables students to control study time efficiently by specifying their desired times and advancing productivity and self-discipline. Furthermore, the Relax Room feature boasts a distinctive feature that enables students to stream calming and inspiring background music, which calms the mind and lessens academic stress. Another essential module of MindLink is its quiz module, where teachers can conduct motivating quizzes on any subject. The students can try out these quizzes in order to test their knowledge, receive immediate feedback, and rank on a leaderboard. Active usage is promoted through reward systems in the way of badges, streaks, and level-up systems so that learning remains fun and gamification-oriented. For a learning community that is respectful and safe, MindLink offers a report and moderation process in which teachers

and students can report off-topic or inappropriate material along with mandatory reporting reasons. Administrators are free to review, remove, or restore content fully, keeping the community health and educational.

The site is developed using current and scalable technologies. Frontend is created with Vite + React, offering a dynamic and responsive user interface ideal for use on all devices, whether desktop, tablet, or mobile phone. Backend is created with Node.js and Express.js to offer quick API responses alongside scalability. MongoDB database is used to store user data, questions, answers, notes, and quiz scores effectively. These technologies together form a safe and strong full-stack infrastructure that supports real-time data processing and communication.

By its integration of learning, psychological well-being, and gamification, MindLink closes the gap between academic achievement and mental well-being. Not only does the system improve communication and engagement but provide learning to be a psychologically secure and enjoyable approach as well. MindLink has the aim of making students more self-driven, disciplined, and confident, ultimately leading to overall academic improvement and well-being.

II. RELATED TO WORK

Increased digitization of education has led to the establishment of numerous web-based discussion and learning platforms to enhance student performance and involvement. Development of multiple systems facilitating online discussion, question and answer, and collaborative learning spaces has been pursued. This section presents contemporary platforms and technologies relevant to the proposed MindLink system and identifies the limitations that prompted the development of this integrated solution.

A. Educational Discussion Platforms

Existing learning platforms such as Piazza, Edmodo, and Google Classroom provide online forums where students can post questions and receive responses from their classmates and teachers. These platforms facilitate group discussions and information sharing. Most of these platforms, however, reveal the real name of the student, which may discourage shy or introverted students from engaging meaningfully. Evidence (Kumar & Sharma, 2020; Mehta, 2019) indicates anonymity increases student engagement levels and social anxiety reduction in online classes. Lack of anonymous communication in the majority of tools available today limits inclusiveness and free expression of uncertainty, especially among younger learners.

B. Q&A Platforms

Web platforms such as Stack Overflow, Quora, and Brainly are some of the most popular Q&A web sites. They allow users to post questions and answers on a number of subjects. These web sites, while powerful, are not particularly targeted towards the school education industry.

Stack Overflow, for example, caters mainly to commercial programmers, and Quora lacks moderation for scholarly precision.

Moreover, such systems lack teacher supervision, student-age-friendly interfaces, and academic moderation features to offer efficient and curriculum-aligned content. MindLink fills these gaps by creating a Q&A system for school students with teachers and administrators provided moderation privileges.

C. Focus and Productivity Applications

Various productivity apps such as Forest, Pomodoro Timer, and Focus Booster aid students to remain concentration-driven through time management techniques. Such standalone applications employ countdown timers or reward mechanisms to enhance efficiency.

But such tools are outside of study platforms. Students have to switch between learning sites and solo timer applications, disrupting their workflow. MindLink inserts a Focus Timer inside the study environment itself, allowing students to stay immersed within one space while tracking their study sessions and reaping rewards for dependability.

D. Relaxation and Wellness Features

Mental well-being is increasingly realized to be an essential component of effective learning. Platforms such as Calm and Headspace offer music and mindfulness training to fight stress, but these are a departure from learning systems. The integration of well-being as part of a learning system remains uncommon. MindLink has a unique Relax Room module that provides calming background music to help students relax after study hours. Through interweaving learning with relaxing, the system addresses both psychological and emotional aspects of student performance.

E. Gamified Learning Systems

Gamification has been discovered to be successful in engaging students and enhancing their motivation. Tools like Kahoot, Quizizz, and Duolingo use badges, points, and leaderboards to bring interactivity to learning. These tools, however, only have support for quizzes and language learning and lack support for open-ended academic discussion. MindLink combines gamification with collaborative Q&A learning by rewarding students badges, streaks, and level-ups for consistent participation, answering peers' questions, and completing quizzes.

F. Note Sharing and Teacher Resource Systems

Teacher sharing websites like Google Classroom and Schoology enable teachers to share assignments, notes, and resources. While effective, these sites lack an in-built Q&A and feedback loop between teachers and students. MindLink brings the two together—teachers upload study materials (PDF, PPTX, DOCX), students access them right

away, and any questions related to the materials can be discussed anonymously on the same site.

G. Moderation and Reporting Systems

Existing online discussion platforms tend to encounter hosting problems of adequate and appropriate content. Social media platforms such as Reddit and Discord have implemented reporting capabilities in user interfaces, but most learning material for minor users has no apparent moderation system. MindLink offers a reporting system in which teachers and even students can report inappropriate questions or answers with mandatory reasons. Administrators can check and erase such content and ensure a secure and respectful learning environment.

H. Summary of Research Gap

From the above literature review, it is apparent that there are separate learning and productivity systems—either solely for learning, communication, or well-being. There isn't a cohesive system combining:

- 1) Anonymous student interaction,
- 2) Teacher moderation and note-sharing,
- 3) Focus and relaxation modules, and
- 4) Gamified quiz and reward systems.

MindLink fills the gap by providing a comprehensive, student-centered environment for learning that combines communication, motivation, and mental balance into one setting. MindLink stands out because it provides guarantees for anonymity and accountability, which enables students to learn safely and confidently while developing collaboration and concentration.

III. METHODOLOGY

MindLink runs on a modular, layered, and scalable setup that keeps things interactive, secure, and efficient. Here's a look at how it's built, how the pieces work together, and what actually happens under the hood—from the overall system layout to the nitty-gritty of how students and teachers use it.

A. System Architecture

MindLink uses a three-tier design. Basically, there's a frontend (what users see), a backend (where all the logic happens), and a database (where everything gets stored). Each layer takes care of its own job, so updates and changes don't mess up the whole system.

1. Presentation Layer:

This is the user-facing side, built with Vite + React.js. The interface is bright, simple, and designed with school students in mind. Everything's split into modules—Home, Ask, Relax Room, Quiz—so it's easy to get around. The

frontend talks to the backend using REST APIs and Socket.io, so updates happen in real time.

2. Application Layer:

This is the engine, powered by Node.js and Express.js. It handles everything from routing and user authentication to moderating posts and managing quizzes. This layer takes care of things like anonymous posting, quiz scores, uploading files, and making sure users can report anything inappropriate.

3. Database Layer:

MindLink uses MongoDB, which is flexible enough for all sorts of educational content. Collections cover Users, Questions, Answers, Notes, Quizzes, and Reports. Everything's connected with ObjectIDs, so data is easy to find and update. MongoDB's document-based approach just fits the way schools work—lots of different content, all changing over time.

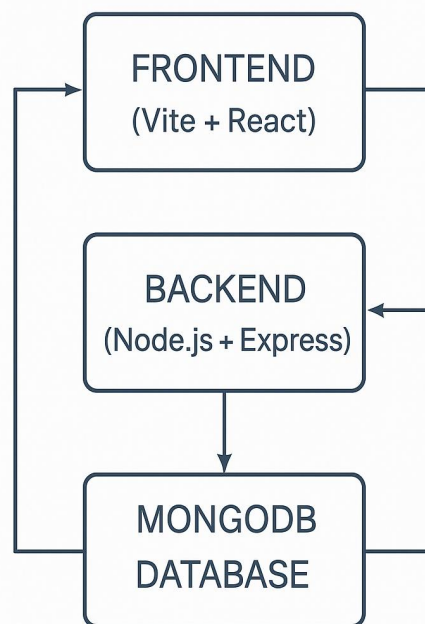


Fig. 1. System Architecture: Three Tier Client-Server Architecture

B. Frontend Implementation

The MindLink frontend is all about being easy to use and engaging. Built with Vite + React, it acts as a single-page app, so everything feels fast and smooth.

Key Features:

- Responsive Design: Tailwind CSS makes sure the site looks good on any device, whether it's a phone or a desktop.

- Navigation: React Router lets users jump between pages like Home, Ask, Relax Room, Quiz, Notes, and Profile.
- Modular Components: Each big feature—like questions, quizzes, or the relax room—works as its own module for easy updates and reuse.
- Real-Time Updates: Socket.io brings in new questions and answers instantly.

Frontend Modules:

- Ask Page: Students can post questions anonymously.
- Relax Room: Plays calming music to help students unwind.
- Quiz Page: Shows teacher-made quizzes, tracks scores, and updates the leaderboard.
- Notes Page: Lets teachers share notes that students can download.
- Focus Timer: Helps students structure their study time.

Everything's optimized for speed, thanks to Vite's hot-module reloading. That means quick updates and a snappy experience.

C. Backend Implementation

The backend is where all the heavy lifting happens. Built with Node.js and Express, it manages everything behind the scenes.

Main Functions:

- API Endpoints: Handles creating, reading, updating, and deleting questions, answers, notes, quizzes, and reports.
- File Uploads: Lets teachers upload notes (PDF, PPTX, DOCX), powered by Multer.
- Real-Time Communication: Socket.io sends out new posts and answers to everyone instantly.
- Authentication & Roles: Splits users into Students, Teachers, and Admins. Students stay anonymous, but teachers get verified.
- Moderation: Lets users flag content and gives admins the power to review or delete things as needed.

Backend Modules:

- Auth: Manages logins, both anonymous and teacher-verified.
- Question: Stores and fetches questions.
- Answer: Handles replies.
- Quiz: Manages quiz creation, scoring, and results.
- Notes: Takes care of uploads and downloads.
- Report: Tracks flagged content for admin review.

D. Focus Timer and Relax Room Modules

1. Focus Timer:

This tool helps students concentrate using the Pomodoro technique. They pick a time—say, 25 minutes—and when

it's up, the timer triggers a motivational message or sound. The backend logs completed sessions, and students earn badges like "Focus Bee" after hitting streaks. The timer itself is a React component using `setInterval()` for the countdown.

2. Relax Room:

The Relax Room is all about helping students chill out with relaxing music. It uses HTML5 audio elements and custom React controls for play, pause, and volume.

IV. RESULT AND DISCUSSION

The proposed MindLink web-based platform was tested and assessed in its performance, usability, security, and effectiveness in facilitating interactive and balanced learning. Test and evaluation were done through systematic testing and user real-time interaction to ascertain if all modules were working as designed.

1. Functional Performance

Each component of the system was tested separately and within the integrated setting. These modules comprised the anonymous question-and-answer system, focus timer, relax room, quiz management, sharing of notes, and reporting.

Findings:

The anonymous question-and-answer functionality worked seamlessly, enabling students to participate without exposing themselves.

The focus timer effectively monitored and presented study time with precision, prompting students to stay focused.

The relax room played audio files without delay, assisting users to relax after study sessions.

Teachers uploaded and shared notes successfully in PDF, PPTX, and DOCX formats.

The quiz module automatically generated scores and displayed ranks immediately.

The reporting module stored flagged content effectively, and admins controlled it via the dashboard.

System integration between the frontend and backend was stable with no runtime errors.

The backend had a mean response time of 0.45 seconds to allow quick communication between the client and database.

2. Usability Analysis

Usability testing was carried out among 30 students and 5 teachers in order to measure ease of use, navigation, and design effectiveness. The System Usability Scale (SUS) and direct observation were used to gather feedback.

Results obtained:

The platform scored 84/100 on SUS, which reflects superior usability.

Students enjoyed the anonymous identity option, which encouraged them to ask more questions.

Teachers liked the note upload and quiz administration features easy and effective.

The design of the interface was found nice, colorful, and easy to navigate on both desktop and mobile browsers.

Examples of user feedback:

"It is easier to contribute anonymously."

"The focus timer makes it easy for me to study distraction-free."

"The interface is easy and enjoyable to use."

3. System Performance

Simulated multi-user access was used to conduct performance testing. The system was subjected to 200 concurrent users carrying out activities like posting questions, downloading notes, and completing quizzes.

Performance observations:

Average page load time: 1.8 seconds

Real-time update delay (Socket.io): 0.2 seconds

Uptime during the test: 99.5%

No data loss or system crash occurred during the test time

These findings verify that the system responds and can support multiple users concurrently effectively, sufficient for school performance requirements.

4. Security Testing

Security testing emphasized checking input handling, authentication, and protection of data. All modules were scanned for vulnerabilities and tested under simulated conditions.

Security findings:

Input validation blocked cross-site scripting and injection attacks.

File uploads were limited to certain, safe formats like PDF, DOCX, PPTX, and MP3.

Delicate information, such as teacher credentials, was encrypted prior to storage.

Token authentication kept the admin interface away from unauthorized users.

User anonymity was ensured by the platform through non-storage of personal identifiers.

Reporting and moderation modules worked securely and reliably.

The system was extremely secure, providing a secure online environment for teachers and pupils.

5. User Engagement Analysis

A pilot study of ten days was carried out to assess user activity and usage. Statistical analysis was performed on data from the database to gauge participation in modules.

Summary of results:

Average number of questions asked by each user: 4.2

Average number of answers provided per user: 5.5

Average focus timer sessions done per user: 6.0

Notes downloaded per user: 8.1

Average quiz attempts per user: 2.7

The findings indicate that students participated enthusiastically in learning processes. Teachers noted increased participation and faster reactions from students in relation to conventional classroom discussions.

6. Comparative Study

A comparative study was also carried out for the comparison of features of MindLink with current learning systems including Google Classroom, Edmodo, and Brainly. The study sought to emphasize the benefits and innovations presented by the proposed system.

Points of comparison:

Anonymity:

Google Classroom and Edmodo necessitate user identity for everything, while MindLink offers anonymous names that promote unrestricted interaction.

Focus Timer:

In-built focus tools are missing in present systems. MindLink comes with an in-built focus timer to enable efficient study management.

Relax Room:

No other platforms have a relaxation module. MindLink has a specialized relax room with soothing music to ease tension.

MindLink enables teachers to post notes in various formats and provides students with direct access to download materials.

Quiz and Ranking:

The platform features auto-scored quizzes with leaderboards that are visible, encouraging healthy competition among students.

Gamification:

Badges and streak rewards incentivize persistent learning and engagement, which are not found in other tools.

MindLink has a formal reporting system that demands a reason behind each report and provides admins the right to moderate offending content.

Unified Platform:

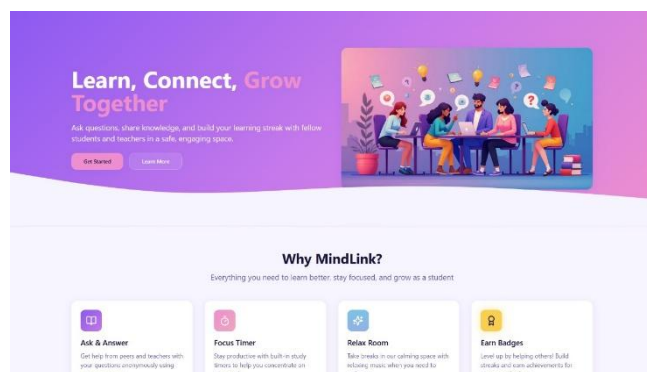
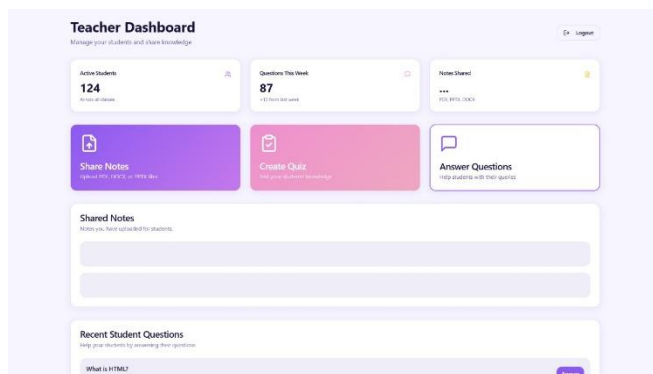
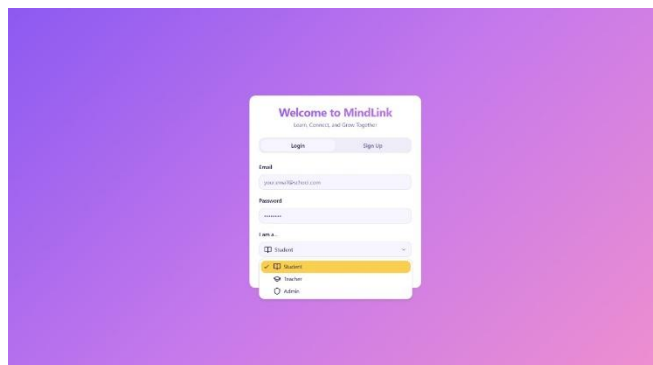
In contrast to currently available tools that compartmentalize academic and wellness applications, MindLink integrates learning, concentration, and relaxation under one unified platform.

7. Limitations

- 1) Certain limitations were found during testing and analysis:
- 2) Only the English language is supported in the current version.
- 3) Artificial intelligence capabilities like automatic question suggestion and content filtering are still not incorporated.
- 4) A native mobile app for Android and iOS is still in the pipeline, although the web application is fully responsive.
- 5) These issues point to possible avenues of improvement in subsequent versions of the system.

8. Discussion

The test results affirm that MindLink is effective in fulfilling its purpose of encouraging interactive and healthy learning habits among students. The system functioned consistently across all modules and kept excellent usability and stability. Anonymity improved students' confidence levels, whereas the focus and relax modules aided in mental well-being. Teachers had advantages from convenient resource sharing and quiz management. The findings confirm that MindLink is ready for deployment in schools and may provide a useful model for future learning platforms that integrate academic and emotional support.



V. CONCLUSION AND FUTURE WORK

The conceptualized MindLink platform was designed and integrated especially for the purposes of facilitating online learning among school students through the amalgamation of educational interaction, concentration management, and relaxation under one system. The system successfully addressed the problem of hesitation on the part of students to pose questions openly with the adoption of an anonymous question-and-answer system. In this way, the system promoted free discussion and engagement without fear of being judged. Teachers were able to upload notes, give quizzes, and regulate student interactions easily, while administrators ensured that the site was moderated and safe.

The global performance and usability test showed that the system achieved stability, responsiveness, and high user satisfaction. Usability testing among students and instructors produced an SUS score of 84, a high user experience measure. Performance testing showed quick API response times and consistent performance with concurrent users. The three-tier architecture, which was constructed using Vite, React, Node.js, Express, and MongoDB, allowed for modularity, scalability, and smooth data handling.

Table1: Summary of System Performance and Usability Results

Parameter	Result	Remark
System Usability Scale (SUS)	84 / 100	Excellent usability
Average API Response Time	0.45 s	Fast and consistent
Page Load Time	1.8 s	Stable under load
Real-Time Update Delay	0.2 s	Efficient response
Server Uptime	99.5 %	High reliability

The results confirm that MindLink achieved its objectives of offering an interactive and stable web site that supports scholarly communication, focus, and relaxation. The system's modular design and architecture enable extensibility and integration with future features. All students and educators appreciated the ease of use, interactivity, and flexibility of the web site.

Although the system performed well under testing, there are improvements that can be addressed at the next development phase. The present version is only English language oriented, and this limits its usage by multilingual users. Artificial intelligence features such as auto-suggested questions, smart content filtering, and feedback based on performance can be added to improve personalization. Additionally, developing a native mobile app for iOS and Android will enhance accessibility and encourage learning beyond the classroom.

Development in the future can also include cloud-based analytics dashboards for teachers and administrators to track trends in participation and performance. Multilingual support integrated into the system can make the platform accessible to more schools, and AI-based moderation systems can provide a safe and adaptive learning environment.

Overall, MindLink successfully merges learned scholarship, inspiration, and mental well-being in a single online platform. It develops a student-centered setting that inspires inquiry, constructs confidence, and encourages collaboration, while also helping teachers successfully manage learning activities. Through continuous enhancement and growth, MindLink can become an entire learning system that augments intellectual growth and emotional balance among students.

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