

**MUKUBA UNIVERSITY**

**SCHOOL OF MATHEMATICS AND COMPUTER SCIENCE**

**TITLE: DESIGN AND IMPLEMENTATION OF AN ONLINE WEB BASED NOTICE SYSTEM FOR UNIVERSITIES.**

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**Research Problem:**

Effective communication in schools and universities continues to pose a major challenge on the everyday operation of schools and universities. In most institution the primary way in which administration sends out information is through paper stuck on noticeboards which bears a cost on paper and is not environmentally friendly or through Facebook which would be easily missed because it is sat among other attention-grabbing posts, entertainment and news. On this system posts and you make to announcement pages are shown chronologically, starting with the most recent, on announcement pages. An announcement page, for instance, would be ideal for keeping track of weekly announcements and enabling rapid access to the most recent meeting information.

**Hypothesis**

A web-based web application is an effective way of delivering announcements and meeting information to staff and students of learning institutions.

**Background**:

Today's college students who use traditional bulletin boards are subject to a number of issues. The most serious issue is that professors might want to post an announcement but they might not be at the university or might be working at the time. Therefore, they can or cannot update the announcement board in real time. The pupils should also constantly be in close proximity to the notice board. The goal of this research is to create a distinctive mobile application that serves as a virtual bulletin board for universities. The server-side (PHP with MySQL) and client-side Android applications make up the majority of this program. The university personnel can send announcements to students directly through the suggested application, and the message will be transmitted to students' smartphones in real-time via push notification. Instructors will have the option of announcing a single student, a group of students, or all of the students from various stages and departments. The suggested application was created and tested on an actual mobile device running the Android operating system.

**Aims**: This project's goal is to develop a thorough noticeboard system that is especially suited for educational institutions like colleges and universities. The system attempts to improve communication between students, employees, and administrators by streamlining how information, announcements, and vital alerts are distributed throughout the school. It offers a central location for publishing, managing, and reading notifications, ensuring that the right information reaches the right people in an orderly and timely way..

**Objectives:**  
Development of an application and database for communicating information to school stakeholders.

Implementation of an effective methodology of implement an online school notice system.

**Research Questions:**

How relevant are online communication in delivering information to staff and students?

What is the most effective way of delivering such a system?

What methodologies can be deployed in the development of an online notice board system?

**Literature Review**

**Konda Mesh, Web Based Wireless Display Board, Journal for Science and Engineering, Vol. 1 Issue 4, Vol 13, Issue 04, APRIL /2022.**

Notice boards are playing very important role in our day-to-day life. By replacing conventional Analog type notice board with digital notice board, we can make information dissemination much easier in a paperless community. Here the admin can control notice board through internet. Therefore, the information can be sent anywhere in the world and can be displayed within seconds. Information is in the form of text. PC is used for sending information and Arduino is connected to internet at the receiving side using Wi-Fi Module. By creating a web-application on the server end, the user can login using his login credentials and then type in the message that has to be displayed on the display unit. Once he clicks on the submit button the information from the server is received by the Arduino using Wi-Fi module and then it is passed to the display unit.

**N. Jagan Mohan Reddy et al, “Wireless electronic display board using GSM technology”, International Journal of Electrical, Electronics and Data Communication, vol. 1, no. 10, pp. 50-54, 2013.**

This paper carries out a detailed review of the various techniques employed in the recent years in GSM technology. It discusses the current innovations in technology, and within this context, the operation of wireless electronic display boards using GSM technology has been reviewed. The

important techniques used in past are also tabulated. Various technical papers and articles on wireless technology have been analyzed. The paper takes an inquisitive approach to the notice systems, which can be used in public areas for information dissemination. Although this review paper cannot be all-inclusive, it may serve as a reference for further analysis in the domain of GSM and its application in wireless notice boards.

**Gamini Jayasinghe et.al. “A GSM alarm device for disaster early warning,” in IEEE conference on Industrial and Information Systems, pp. 383-387, 2006.**

The paper describes the design and development of an alarm device that can disseminate disaster early warnings to threatened communities over the GSM network. The device is capable of generating audible, high-volume alarms, flashlights and turning on an in-built radio in response to a warning message from an authorized entity via GSM s short message service (SMS) or cell broadcast

(CB). The design of the device follows international guidelines on emergency communications, such as the ability to reach a large number of people very fast, awaken sleeping communities, and be able to acknowledge warning messages. The alarm has been designed as a last-mile technology in a larger Disaster Early Warning network (DEWN). It is intended to be place in selected locations such as police stations, places of religious places and community centers. Thus the DEWN System and thus the Alarm Device presents a unique opportunity to test the concept of GSM for Warning".

**3). N. Khera, A. Verma, “Development of Simple and Low Cost Android Based Wireless Notice BoardInternational**

**Conference on Reliability, Infocom Technologies and Optimization. 978-1-5090-1489-7/16, 2016.**

In this paper, the development of simple and low-cost Android based wireless notice board is presented. The proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication. For this purpose, Android based application programs for Bluetooth and Wi-Fi communication between Android based personal digital assistant devices and remote wireless display board ar used. At receiver end, a low-cost microcontroller board (Arduino Uno) is programmed to receive and display messages in any of the above communication mode. Using the developed system, two different applications for displaying messages on a remote digital notice board and wireless person calling has been implemented. The developed system will therefore aims in wirelessly sharing the information with intended users and also helps in saving the time and the cost for paper and printing hardware.

**Z.Wanli, “The design of communications dispatch module based on GSM”, in IEEE conference on Computer Technology and Development, pp. 583-585, Nov. 2010.**

This paper introduces a kind of intelligent communications dispatch terminal equipment. The equipment is applied to taxi. Its core technology is GSM short message module. The paper describes the overall design of this application in detail. And it studies the power system in terminal blocks, the overall circuit design, short message sending and receiving control. The module of taxi communications scheduling provides an economical and practical technical project for vehicles tracking, call and management [4].

**N. Deblauwe, “GSM-based Positioning: Techniques and Applications”, Vubpress, Brussels university press, 2008.**

This dissertation reports on the opportunities for GSM‐based positioning techniques anno 2008. Practically, this means that both the typical structure of dense (sub)urban networks and the possibilities of modern handsets are taken into account. The potential of the techniques under study is every time evaluated for the stringent demands of the upcoming generation of location‐based service (LBS). Though privacy issues are not explicitly dealt with, it is noteworthy that all developed techniques focus on a terminal‐based implementation. This means that a user keeps full control over his position information. This work shows that GSM‐based positioning techniques – especially in a terminal‐based implementation – have their use within a context of location‐based service.

**6) Transmission Policies for Multi-Segment Short Messages [2015]:**

This paper proposed analytic models to investigate two multi-segment XI short message transmission policies. The analytic models were validated against by more than 100 million measured data obtained from a 6-month commercial SMS operation. This analytic model can effectively speed up network planning for commercial SMS operation.

**A.S. Khandagale etal, Design E - Notice Board using Effective web Technologies for Educational Organizations, International Journal of Innovative Research in Science Engineering and Technology Vol. 9, Issue 3, March 2020**

This paper highlights the current technology trend a need of digital notice board that is smart enough is E – Notice boar notice which saves time, energy and hence environment. Cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips. Thus, we can conclude that this paper gives an idea to make use of GSM in communications to a next level.

This project divides into two major parts. First is super admin, in that super admin adds notice in the form of text as well as image. While adding notice admin add date and expiry time of particular date. Second part of system is staff/faculty; staff adds students with name and contact number. Department wise notice send to student who belongs to that department.

**A, J, Yaser et.al. ON ANNOUNCEMENT FOR UNIVERSITY WHITEBOARD USING MOBILE APPLICATION**

**April 2020 CSRID (Computer Science Research and Its Development Journal) 12(1):63-78**

**DOI:10.22303/csrid.12.1.2020.63-78**

According to this paper, the university students who use traditional announcement boards nowadays are exposed to various problems. The most severe problem is that the instructors may want to publish an announcement, but they may not exist in university, or maybe they are after a work time. So, they cannot or can inform to the announcement board moment by moment. Moreover, the students should be near the announcement board all the time. The scope of this research is to build a unique mobile application that acts as a digital university announcement board. Where this application mainly consists of two sides; the server-side (PHP with MySQL) and client-side Android Applications. Through using the proposed application, the university staff can send announcements to students directly, and the announcement will be delivered to student devices in real-time with push notification.

**Puleng, J, M Mobile Notification System; Dissertation submitted in partial fulfillment of the requirements for the Bachelor of Technology (Hons) (Information & Communication Technology) May 2012.**

The number of mobile users increases each day, we can observe this growth especially among young people. A mobile device is a very useful tool not only for entertainment but for academic matters in universities. Possessing a mobile device can be extremely important to establish a better communication among lecturers and students.

This project addresses Mobile Notification System (MNS) which will be used by lecturers and students in universities, specifically in Universiti Teknologi Petronas. In case the lecturer needs to make an academic announcement in a more flexible an faster way, this system can be used to send notifications to students using SMS based platform.

**METHODOLOGY:**

Brief description of the development plan for the proposed project. i.e., which software methodology and why, and the plan of work, specifying a timetable and milestones.

Hardware, software and the costs associated, access to information / expertise, user involvement etc.)

The following will be the technologies that will be employed to develop the system:

i) Bootstrap: HTML, CSS framework for the interface.

ii) JavaScript: For dynamic functionality of the interface.

iii) PHP: Backend programming language.

iv) MYSQL: Database.

v) PHPMyAdmin: Database Management System.

vi) Apache/NGINX: Server Software.

**Development Methodology**

The Waterfall methodology depends on the belief that all project requirements can be gathered and understood upfront. The project manager does their best to get a detailed understanding of the project sponsor’s requirements. Written requirements, usually contained in a single document, are used to describe each stage of the project, including the costs, assumptions, risks, dependencies, success metrics, and timelines for completion.

Design.

Here, software developers design a technical solution to the problems set out by the product requirements, including scenarios, layouts, and data models. First, a higher-level or logical design is created that describes the purpose and scope of the project, the general traffic flow of each component, and the integration points. Once this is complete, it is transformed into a physical design using specific hardware and software technologies.

Implementation.

Once the design is complete, technical implementation starts. This might be the shortest phase of the Waterfall process because painstaking research and design have already been done. In this phase, programmers code applications based on project requirements and specifications, with some testing and implementation taking place as well. If significant changes are required during this stage, this may mean going back to the design phase.

Verification or testing.

Before a product can be released to customers, testing needs to be done to ensure the product has no errors and all of the requirements have been completed, ensuring a good user experience with the software. The testing team will turn to the design documents, personas, and user case scenarios supplied by the product manager to create their test cases.

Deployment and maintenance.

Once the software has been deployed in the market or released to customers, the maintenance phase begins. As defects are found and change requests come in from users, a team will be assigned to take care of updates and release new versions of the software.

**TIME FRAME**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Project Name* | *University Clinic Student Information Management System.* | | | *Project Supervisor:* | *Mr.: Pamba* |
| *Project Deliverable* |  | | | | |
| *Scope* |  | | | | |
| *Start Date* | ***01/10/2022*** | ***End Date*** | ***30/07/2022*** | ***Overall Progress*** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Task Name | Assigned To | Start Date | End Date | Duration | Status |
| Project Proposal | Maidie Banda |  | - |  | Pending Approval |
|  |  |  |  |  |  |
| Requirements Specification | - |  |  |  |  |
| Project Development | - |  |  |  |  |
| Documentation | - |  |  |  |  |
| Presentation | - |  |  |  |  |

**BUDGET:**

|  |  |
| --- | --- |
| Item | Cost |
| Transport and logistics | K300 |
| Web Hosting and Domain | K500 |
| Internet Bundles | K200 |
| Total | K100 |

**ETHICAL CONSIDERATIONS:**

A code of conduct is a set of guidelines for its intended audience. In the case of SE, a code of conduct for software engineers is a set of rules for the software professionals to follow. However, many other stakeholders are involved in the development, release, and usage of software including customers, software development organizations, and users. There is therefore a need for tools and methods to reflect, implement, and validate the ethical values of these parties, who are not disciplined by the existing code of .

PUBLIC - Software engineers shall act consistently with the public interest.

CLIENT AND EMPLOYER - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.

PRODUCT - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.

JUDGMENT - Software engineers shall maintain integrity and independence in their professional judgment.

MANAGEMENT - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.

PROFESSION - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.

COLLEAGUES - Software engineers shall be fair to and supportive of their colleagues.

SELF - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.”

3.3 TECHNOLOGIES AND FRAMEWORKS

To run the Notice Board application, the following technology requirements were used:

The Notice Board application needed the following technical specifications to function:

1. Web Server: In order to host and serve PHP files, you need web server software. Apache, Nginx, and Microsoft IIS are a few examples of popular web server software.

2. PHP: The web server has PHP installed since PHP was used to create the application. The environment in which the application was created made use of PHP 8.2.4. This application will be compatible with PHP 8.X, if there is one available.

3. MySQL Database: The program stores post data in a MySQL database. The server must have MySQL installed and operational. ensuring that you have the rights required to build and administer databases.

4. File System Access: In order to upload and save cover photographs, the program needs read and write access to the file system. Make that the destination directory where the photos will be placed on the web server has the proper rights to view it and write to it.

5. Support for HTML, CSS, and JavaScript: The application's user interface and interaction are provided by HTML, CSS, and JavaScript. A web server should be able to provide HTML, CSS, and JavaScript files. Apache was utilized as the file server when developing the app.

6. Bootstrap: To layout the user interface, the program makes use of the well-known CSS framework Bootstrap. The application must be able to access the JavaScript and Bootstrap CSS files that are referenced in the code. You have two options for hosting the Bootstrap files: either download them and host them locally, or utilize a CDN (Content Delivery Network).

7. Browser Compatibility: The program must work with the most recent versions of Chrome, Firefox, Safari, and Edge. To verify correct operation and presentation, test the application on several browsers.

3.4 REQUIREMENT SPECIFICATIONS

The requirements for a web-based notice board application can vary depending on the specific needs and goals of the application. However, here are some common requirement specifications to consider:

1. User Management:

* User registration and authentication.
* Different user roles (e.g., administrators, moderators, regular users).
* User profile management.

2. Notice Creation and Management:

* Ability for authorized users to create, edit, and delete notices.
* Support for various types of notices (e.g., announcements, events, notifications).
* Rich text formatting options for notices.
* Option to attach files or multimedia content to notices.

3. Notice Display:

* Publicly accessible notice board to display notices.
* Categorization or tagging of notices for easy navigation.
* Sorting and filtering options to find specific notices.
* Pagination or infinite scrolling to handle large numbers of notices.

4. Search Functionality:

* Ability to search notices based on keywords, categories, or dates.
* Advanced search options, such as filtering by author or relevance.
* Search result presentation and ranking.

5. Notifications:

* Email or push notifications for important notices or updates.
* Ability to subscribe or unsubscribe from specific notice categories.

6. User Interaction:

* Comments or discussion features for notices.
* Ability to like, share, or bookmark notices.
* Reporting or flagging inappropriate notices.

7. Administration and Moderation:

* Admin dashboard for managing users, notices, and settings.
* Moderation tools to review and approve notices before publication.
* User activity monitoring and logging.

8. Responsive Design:

* Support for various devices (e.g., desktop, mobile, tablet).
* Responsive layout and adaptive design for optimal user experience.

9. Security:

* Secure user authentication and authorization mechanisms.
* Protection against common web vulnerabilities (e.g., cross-site scripting, SQL injection).
* HTTPS encryption for secure data transmission.
* Regular data backups and disaster recovery procedures.

10. Performance and Scalability:

* Efficient handling of concurrent user requests.
* Caching mechanisms for improved performance.
* Scalable architecture to accommodate future growth.

3.5 SYSTEM ANALYSIS

System Analysis of the Notice Board Application:

The Notice Board application is a web-based blogging platform that allows users to create, manage, and view posts. Here is a system analysis of the application:

1. User Management:

* The application provides user registration and authentication functionality.
* Users can create an account by providing a username and password.
* User authentication is implemented using session management.
* User data is stored in a database, allowing for secure and persistent user management.
* The application includes features to edit and delete user accounts.

2. Post Management:

* Users can create new posts by providing a title, content, category, cover photo, and importance status.
* Posts are stored in a database, enabling efficient retrieval and management.
* Users have the ability to edit existing posts, allowing them to update the title, content, category, cover photo, and importance status.
* The application supports post deletion, giving users the option to remove unwanted posts.
* Important posts are managed in a way that ensures a maximum of four posts are marked as important at any given time. If the limit is reached, the oldest important post is automatically marked as not important.

3. Post Viewing:

* The application provides a user-friendly interface for users to view posts.
* Posts are displayed in a list format, showing their titles, content, authors, categories, cover photos, and other relevant details.
* The application supports filtering posts based on categories, allowing users to focus on posts of their interest.

Users can easily navigate through multiple pages of posts if there is a large number of posts.

4. File Management:

* The application allows users to upload cover photos for their posts.
* Uploaded images are stored in a designated directory on the server.
* Each uploaded file is given a unique name to avoid conflicts and overwrite existing files.

5. Technology Stack:

* The application is built using PHP for server-side scripting.
* MySQL is used as the database management system to store user and post data.
* Bootstrap framework is utilized for responsive and visually appealing user interfaces.
* The application utilizes HTML, CSS, and JavaScript to create the web interface.
* Session management is implemented to handle user authentication and maintain user state.

Overall, the Notice Board application provides a comprehensive solution for managing and viewing posts in a blog-like format. It offers user management features, post creation and editing capabilities, efficient post retrieval, and a user-friendly interface for seamless user interaction.

3.6 SYSTEMS DESIGN

In order to meet the functional and non-functional requirements, the architecture and components of a web-based notice board application must be designed. A high-level summary of the system design is given below:

Initial Front-End

* User Interface (UI): Use HTML, CSS, and JavaScript to create a responsive and user-friendly interface.
* UI Components: Create and put into use components for making, showing, and interacting with notifications.
* Client-Side Validation: Use client-side validation logic to make sure that data is accurate before it is sent to the server.
* API Integration: Use MYSQL to communicate with the back-end server.

**2. Back-End:**

* Use a server-side technology, such as PHP built on the XAMPP Stack, to handle HTTP requests and responses on the web server.
* Application Logic: Implementation of the notice board application's business logic, which includes user administration, notice creation, editing, and deletion.
* Database: Pick an appropriate database system such as MySQL to store user data, notifications, and associated information. Create the database schema according to the needs of the application.
* Application security is achieved by implementing user authentication and authorization procedures. Use methods like token-based authentication, role-based access restriction, and password hashing.

3. Notice Board Management:

* Notice Storage: Keep notices, together with essential metadata like the author, creation date, and category, in the database.
* Search Functionality: Add the ability for users to look for notifications using keywords, categories, or other criteria. Use databases or search-enabled search engines, like Elasticsearch.
* Categorization and Tagging: Create a method for classifying alerts into groups and applying tags to make it easier to organize and find information.
* Pagination or endless Scrolling: Implement a system that divides a huge number of notices into pages or uses endless scrolling to efficiently manage them.

4. User Management and Authentication:

* User Registration and Login: Create features for user registration and login with the proper procedures for authentication and validation.
* User Roles and Permissions: Implement a role-based access control system to give users (such as administrators, moderators, and normal users) access to various levels of content.
* User profiles: Create and save user profiles with personal information (such name, email, and profile picture).

5. Admin Dashboard and Moderation:

* Admin Dashboard: Establish a management interface for users, alerts, categories, and system preferences. The statistics, user activity tracking, and moderating features on this dashboard should all be available.
* Moderation Tools: Implement tools that allow you to evaluate and provide your approval before posting notices in order to preserve the integrity and reliability of the information.

7. Performance

* Performance Optimization: Optimize the application's performance by employing techniques such as code optimization, database indexing, and query optimization.

**3.7 IMPLEMENTATION**

1. User Registration and Authentication:

* User registration and login features are available in the Notice Board application. Before visiting particular pages, a simple login verification check is included. The 'username' session variable is checked to see if it is set in order to accomplish this. In that case, the user is taken to the login page.

2. Create and Publish Posts:

* Users may write and publish postings using the Notice Board application. The relevant data, including title, content, category, author, cover photo, and significance status, is gathered using the form on the "Create Post" page.
* The "process\_post.php" script receives the form data and processes it before using SQL statements to validate the data and store it to the database. The cover image for the article is uploaded to the server and kept in a predetermined directory.
* The program satisfies this requirement by offering a simple form for entering post information and managing the data storage and upload procedure.

3. View and Display Posts:

* Users can access and display postings on the home page ("get\_posts.php") using the Notice Board application.
* In order to show posts, the program receives post data from the database and creates HTML markup on the fly. Each post's title, content, author, category, cover photo, and other pertinent information are all visible.
* This need is satisfied by retrieving and displaying post data from the database while constructing an eye-catching layout to display the posts.

4. Categorize and Filter Posts:

* Users of the Notice Board system can group posts under subcategories like "Staff," "Students," and "General."
* A dropdown menu on the "Create Post" form lets users choose the category they want for their article.
* Users can filter articles by category from the home page using navigation buttons that take them to filtered views of posts according to the chosen category.
* By enabling users to categorize their posts and provide category-based filtering options for users to browse posts, the program satisfies this need.

5. Mark Posts as Important:

* Users may mark posts on the Notice Board application as essential. This serves to draw attention to important news or announcements.
* An essential post designation checkbox is available on the "Create Post" form.
* The "process\_post.php" function in the application contains logic to handle significant posts. If the count of posts that have been identified as essential exceeds a certain threshold, it discovers and changes the oldest important post to remove its significance status.
* By enabling users to flag posts as important and limiting the quantity of important posts within a certain range, this need is satisfied.

6. Responsive Design:

* The Bootstrap CSS framework is used by the Notice Board application to offer a responsive and mobile-friendly design.
* The style and components of the program are made to adjust to various screen sizes and devices, offering a consistent user experience on PCs, tablets, and mobile devices.
* By using Bootstrap's CSS classes and components, responsive design concepts are applied to fulfill this need.

**Based on our implementation the following actions are the necessary files for running our application.**

1. User Management:

- `register.php`: This file contains the user registration form where users can create a new account.

- `process\_register.php`: This file processes the user registration form data and handles the creation of a new user in the database.

- `login.php`: This file includes the login form where users can enter their credentials to authenticate themselves.

- `process\_login.php`: This file validates the login credentials and starts a session for the authenticated user.

- `logout.php`: This file handles the logout functionality, terminating the user's session.

- `manage\_users.php`: This file displays a list of users with options to edit or delete each user.

- `edit\_user.php`: This file contains a form to edit user details, including username and password.

- `process\_edit\_user.php`: This file processes the form data for editing a user and updates the user's details in the database.

- `delete\_user.php`: This file handles the deletion of a user from the database.

2. Post Management:

- `create\_post.php`: This file displays the form to create a new post.

- `process\_post.php`: This file processes the form data for creating a new post and saves it in the database.

- `edit\_post.php`: This file displays a form to edit an existing post, allowing users to modify the post's title, content, category, cover photo, and importance status.

- `process\_edit\_post.php`: This file processes the form data for editing a post and updates the post's details in the database.

- `delete\_post.php`: This file handles the deletion of a post from the database.

3. Post Viewing:

- `get\_posts.php`: This file displays a list of posts, including their titles, content, authors, categories, cover photos, and other relevant details. Users can view the posts on this page.

- view\_post.php: This files displays a particular post when one clicks on the **read more** link.

These files collectively provide the functionality to manage users, create/edit/delete posts, and view posts in the Notice Board application.

CONCLUSION

The Notice Board application's development offered beneficial training opportunities in file processing, user authentication, database administration, and web programming. It made it possible to use numerous ideas and technology in a realistic way in a real-world setting. The project offers file upload features, user-centric design, and efficient database administration. It also emphasizes how crucial thorough system analysis and documentation are to the creation and deployment of sophisticated web applications. The project's successful completion is evidence of the team's web development expertise and capacity to produce a useful and approachable blogging platform.

As a web-based blogging platform, the Notice Board application successfully integrates user administration, post authoring and editing, post reading, and file management capabilities. It makes use of a technological stack that makes responsive design and effective server-side scripting possible. The project provides beneficial web development learning experiences and has the potential for future improvements. It stresses the significance of accurate system analysis and documentation while demonstrating efficient database administration. The Notice Board application's completion shows the researchers' expertise in web development and their capacity to provide a useful and user-friendly platform.

RECOMMENDATIONS

Several suggestions for improving the Notice Board application can be put into practice. First off, adding more features can improve the system's usability and functionality. Users would have more involved and interesting alternatives if features like comment functionality, user roles and permissions, post search capacity, social network integration for sharing posts, and the ability for users to favorite or bookmark posts were included.

It is important to put security measures in place to safeguard user data and stop illegal access. Applications may be made substantially more secure by integrating user authentication mechanisms like two-factor authentication (2FA), input validation to avoid SQL injection and cross-site scripting attacks, and secure password storage utilizing hashing and salting.

Optimizing performance is crucial for a smooth user experience. Techniques such as caching, minimizing database queries, optimizing image sizes, and following efficient coding practices can improve the application's loading times and overall performance. Regular monitoring and analysis of the application's performance using tools like performance profiling can help identify areas for improvement.

By implementing these recommendations, the Notice Board application can be further improved, offering users a more interactive and secure platform with optimized performance. Continuous feedback, monitoring, and refinement will contribute to the application's evolution and success.

**REFERENCES**

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