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A WEB-BASED ANNOUNCEMENT SYSTEM: A CASE STUDY OF UNIVERSITI UTARA MALAYSIA

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ABSTRACT

Communication is essential for the operation of any learning institution, particularly in keeping students informed about institutional matters and engaged with activities within the university environment. Currently, Universiti Utara Malaysia uses a decentralised approach, with multiple platforms for disseminating information to students. This approach has frequently led to issues such as information overload, redundancy, and uneven message reach. To address these challenges, this paper develops and evaluates a prototype web-based announcement system that serves as a centralised platform for educational, administrative, and club-related announcements. The development process employs the Rapid Application Development methodology to accelerate progress and adapt to user feedback. Usability testing involving 33 respondents revealed high satisfaction with the system's usefulness, ease of use, smooth communication flow, elimination of duplicate postings, and improved accessibility and information retrieval. The results suggest that the system can effectively mitigate the identified problems and enhance information dissemination within the university environment. Its design and functionality offer broader applicability to other higher education institutions facing similar challenges in managing and communicating student-related information. In conclusion, the proposed prototype demonstrates the potential to streamline communication processes and improve the overall information experience for students across universities.

Keywords: Web-based Announcement System, Centralised Communication System, RAD Methodology.

INTRODUCTION

In recent years, one of the significant trends in higher education has been the adoption of centralised digital systems to improve information flow and reduce redundancy in communication processes (Semakuwa et al., 2014; Dinye et al., 2024). The integration of such systems has been shown to enhance student involvement, minimise confusion, and accelerate the dissemination of institutional updates. Underlying this trend is the recognition that communication is fundamental to the operation of any learning institution. Effective communication ensures that students remain well-informed about institutional matters and are actively engaged in activities within the university environment.

At Universiti Utara Malaysia (UUM), a decentralised approach is used, with multiple platforms disseminating information to students via WhatsApp, email, and physical notice boards. This approach has frequently led to issues such as information overload, redundancy, and uneven message reach. The decentralisation of announcements often results in students missing important updates, leading to low attendance and reduced participation in university events. Citing these challenges, the UUM Announcement System prototype was initiated to develop and evaluate a centralised, web-based platform to manage and facilitate all university-related announcements. Specifically, this system provides students with essential information, including administrative updates, club programs, and details on various school events, in a consistent, easily accessible manner. By consolidating notifications from university departments and student clubs into logical categories such as academic, sports, and cultural events, the system becomes more organised, discoverable, and easier to navigate. This practice aligns with the broader trend of establishing innovation hubs and digital platforms to promote resilience, facilitate communication, and enhance stakeholder engagement in public institutions (Nnanna et al., 2023).

The development employed the Rapid Application Development methodology, encompassing all stages, including requirements planning, user design, construction, and cutover. The prototype was primarily implemented in PHP, with support from other related tools. To ensure proper analysis and design, Unified Modelling Language (UML) diagrams were utilised, making the system more structured and easier to understand. For evaluation, usability testing was conducted with 33 respondents, including UUM staff, club representatives, and students, to ensure that the platform’s design and functionality meet stakeholder needs.

In conclusion, the system significantly benefits stakeholders by providing students with more effective and efficient access to crucial training resources. The proposed system has solved the issues of finding the latest documents and forms, receiving irrelevant announcements via WhatsApp, and disorganised Q&A. The project also improves the administrative and student user experiences through role-based functionality and user authentication. Regarding the system evaluation, most users agree that the system benefits them in terms of usefulness, user-friendliness, ease of use, and learning. Overall, the system enhances the institution's instructional quality. It promotes an environment favourable for learning and development by facilitating effective information distribution and user-friendly interactions.

The remainder of this paper is structured as follows: Section 1 provides the introduction, while Section 2 reviews the related work. Section 3 outlines the methodology, followed by Section 4, which details the system's design and development. Section 5 presents the system evaluation, and Section 6 offers the conclusion.

LITERATURE REVIEW

The effectiveness of student participation in higher education largely depends on the timely and systematic transmission of information. Nevertheless, many institutions continue to face significant challenges due to the absence of a coherent communication policy, often relying instead on tools such as WhatsApp, email, or bulletin boards. Although these tools offer the advantage of accessibility, they are unsuitable for structured and scalable information management or for managing information based on user roles. These limitations have encouraged researchers and institutions to propose digital systems to overcome such shortcomings.

Semakuwa et al. (2014) introduced the Online Announcement Display System (OADS) to replace traditional wall notice boards in Tanzanian colleges. The system facilitated faster, more organised dissemination of announcements and improved accessibility for students. However, although OADS enabled the digitalisation of information display, it lacked features such as category-based browsing, approval-based workflows, and multi-role access —capabilities now considered essential in large-scale academic environments. Similarly, Dinye et al. (2020) examined the communication infrastructure at the University for Development Studies in Ghana, where the uncoordinated use of tools such as WhatsApp and email led to information redundancy, inconsistent message delivery, and excessive message volumes. Their findings support the case for establishing centralised communication centres to ensure consistent access to messages, reduce uncertainty, and minimise message repetition. However, their analysis remained theoretical and did not propose a concrete digital framework to address these challenges.

Meanwhile, Kamarozaman et al. (2023) proposed the Selangor Matriculation College Information Announcement and Notification System (SMC-IANS). The system is expected to enable efficient management of academic announcements and other related features. It provides classification and broader coverage for students; however, the system lacks an approved workflow, controlled content access, and comprehensive search and archiving functions, making it difficult for administrators to scale up and manage effectively. In another study, Chandra et al. (2022) developed an automated Telegram-based announcement system, *Autopost*, which schools can utilise. The system reduced labour-intensive tasks and ensured that students were notified of announcements in real time. Nevertheless, it relied solely on Telegram, a single medium that lacks flexibility and the capacity to provide efficient content structuring and archiving. Therefore, it was not suitable for implementation at the university level. Similarly, Mohd Radzi (2004) developed a web-based announcement system for Universiti Teknologi Petronas, integrated with email and SMS. The system facilitated the remote publication of lecturer announcements to students, improving timeliness; however, it was constrained by technical limitations, particularly the mail server's capacity and the absence of a dashboard interface. Moreover, limited search capabilities and the lack of real-time monitoring of administrators' announcements reduced student interaction and engagement with the posted information. Husin et al. (2024) designed a prototype web-based industrial training management system for the School of Computing (SOC) at Universiti Utara Malaysia (UUM), aimed at streamlining announcements, documents, and communication processes that were previously fragmented across GitHub and WhatsApp. Within the announcement module, only one member of the industrial training committee is authorised to manage announcements for SOC students.

By contrast, commercial systems such as Google Calendar and Google Classroom offer scheduling and notification capabilities; however, these features are typically generic, non-institutional, and lack workflows that support multiple user roles and status-aware announcements (e.g., pending, approved, rejected). Furthermore, these systems are not fully integrated with student societies or administrative

approval processes common within university governance structures. Although the features of existing systems can be helpful in specific contexts, they often prove inadequate in addressing universal challenges such as the absence of role-based access for different stakeholders (administrators, staff, and students), the lack of approval mechanisms for validating announcements, and the resulting inability to automatically filter or display announcements based on their status (e.g., active, expired). Additionally, most of these systems do not support proper archiving or keyword search, and they pay limited attention to tracking student engagement with announcement posters.

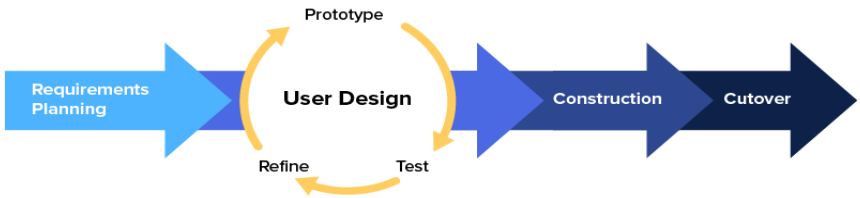
These gaps highlight the need for a web-based, centralised announcement portal tailored to Universiti Utara Malaysia, designed to address the shortcomings of existing solutions and enhance information management within the academic environment.

METHODOLOGY

The Rapid Application Development (RAD) methodology was employed to develop the UUM Announcement System. Figure 1 shows the RAD methodology, which emphasises a system development cycle with a relatively short time frame. This contributed to reduced development time and enhanced the efficiency of the system development process (Awaliah et al., 2019; Iskandar, 2022). The RAD approach to software design made system development and maintenance more effective. Usually, developing an application takes at least 180 days, but with the Rapid Application Development (RAD) approach, it can be completed in just 30 to 90 days (Wahyuningrum et al., 2021). With this approach, the system was quickly developed and released, as RAD facilitated ongoing feedback and collaboration throughout the project lifecycle, ensuring it met students' needs.

Figure 1

The RAD Methodology phases



The first phase, requirement planning, focused on identifying the needs of target users, including staff, club representatives, and students. Examples of message overload, redundancy, and inconsistent reach, among others, were discussed through interviews and observations of how the current communication tools are primarily WhatsApp and emails. This understanding was used to develop the main functional requirements. Use case diagrams and sequence diagrams were generated to describe and visually illustrate how users will interact with the system, with the possibility to correlate them with real-life scenarios. In the next phase of user design, low-fidelity wireframes were prepared based on the gathered requirements to sketch the layouts and functions of each interface. The wireframes depicted user dashboards and the process flows for various user types, including admin, staff, club representatives, and students. All the screens were designed to facilitate important activities such as creating announcements, managing approvals, categorising events, and providing links to registration activities. Visual representations of the announcements in the form of posters were also included in the layout, along with the category filters (Academic, Sports, Cultural) and the logical division of active and past programs by date. Such a design mock-up, created in Canva and observed during development, served as a guide to maintain uniformity in layout, navigation, and user interaction. The wireframes served as the foundation for prototypes and user feedback loops in RAD.

During the construction phase, the system's frontend was developed using HTML, CSS, and JavaScript, with a focus on responsiveness and cross-device compatibility. PHP handled server-side logic, while MySQL served as the relational database for storing user credentials and announcements. The development process followed an incremental approach, with testing performed after each iteration. Integration of features was carried out progressively to maintain functionality. The entire development was done incrementally, with testing performed after each increment. Integration of features was carried out over time to maintain the system's functionality. During the testing phase, the system was thoroughly tested to ensure it worked as intended and met users' needs.

Finally, the cutover phase encompasses several activities, including final testing and deployment. Before the system is released, it undergoes final testing to ensure that all functional requirements are met. This includes usability and user acceptance testing with the system stakeholders. The usability testing questionnaire addressed key aspects of the system, including its usefulness, ease of learning, and ease of use. A quantitative method was employed to analyse the results. A total of 33 stakeholders participated in the evaluation process by responding to a series of structured questions. After passing all tests and obtaining stakeholders’ approval, the system was deployed to a live web server and hosted.

DESIGN AND DEVELOPMENT OF UUM ANNOUNCEMENT SYSTEM

The UUM Announcement System was designed and developed using a seven-phase development methodology to ensure it met all specified requirements. To ensure the system satisfied the requirements, consultations and discussions were held to gather requirements from staff, club representatives, and students. Then, the requirements were documented systematically.

The requirements were classified into three priority levels: mandatory (M), desirable (D), and optional (O). That prioritisation allowed defining development goals as objectives, setting priorities to implement the necessary features first, and then involving improvements. Based on these specifications, the system's features were clearly described and charted in Table 1, ensuring that all important functions were captured and accounted for.

Table 1

List of Requirements for a UUM Announcement System

No	Requirement ID	Requirement Description	Priority
1	**UAH_01**	**Login**	
	UAH_01_01	Admin, HEA staff, and Club Representative must log in to access the system.	M
	UAH_01_02	If users forget their password, they can click the forgot password link to reset it.	M
2	**UAH_02**	**View Announcements**	
	UAH_02_01	Students can view all announcements.	M
	UAH_02_02	For each announcement, students need to choose its relevant category, and then all related announcements are displayed via the main poster.	M
	UAH_02_03	The student chooses the desired announcement poster, and the detailed information, including the program title, description, date, venue, and Google Form registration link, will be displayed.	M
3	**UAH_03**	**Search Announcements**	
	UAH_03_01	Students, Admin/HEA Staff, and Club representation can search announcements using keywords.	M
4	**UAH_04**	**Register For the Program**	
	UAH_04_01	During the UAH_02_03 process, students use the provided Google Form link to register for the program.	M
5	**UAH_05**	**Add Program Announcement**	
	UAH_05_01	HEA Staff or club representative can add UUM-based or Club-Based program announcements by entering required information, including Category, Program Name, Description, Date, Venue, Poster, and Registration Link.	M
	UAH_05_02	The system validates all required fields before submission and displays an error message if any are missing.	M
6	**UAH_06**	**Edit Program Announcement**	
	UAH_06_01	Club Representatives and HEA staff can edit their club-based program announcements to update or correct details.	M
	UAH_06_02	Only pending announcements (not yet approved by Admin) can be edited by Club Representatives.	M
7	**UAH_07**	**Delete Program Announcement**	
	UAH_07_01	HEA Staff and Club Representatives can delete program announcements in the Past Program section.	M
8	**UAH_08**	**Manage Club Program Announcement**	
	UAH_09_01	HEA Staff can approve announcements submitted by Club Representatives.	M

	UAH_09_02	HEA Staff can reject announcements and optionally provide rejection comments.	D
9	**UAH_09**	**Manage User**	
	UAH_09_01	A specific interface will be displayed for Admin to handle HEA Staff accounts, and for HEA Staff to handle Club Representative accounts, based on their valid login credentials.	M
	UAH_09_02	Admin can add HEA Staff accounts by providing details such as name, staff ID, role, email, username, and password. In contrast, HEA Staff can add Club Representative accounts by providing details such as name, student ID, club, email, username, and password.	M
10	**UAH_10**	**View Announcement Status**	
	UAH_10_01	Club Representatives can view the status of their program announcements, which are categorised as Pending, Approved, or Rejected.	M

The subsequent phase in the development process involved visualising and modelling system requirements. To achieve this, a use case diagram was used to represent the system's functional requirements from the users' perspective. Figure 2 illustrates the interactions between the system and its user roles, along with the tasks each role is permitted to perform. The UUM Announcement System identifies four primary actors. The students can view and search for announcements and register for events. The HEA staff, equipped with login credentials, can search, add, edit, and delete announcements, approve programs, and manage club representatives. The club representatives are authorised to log in, add, edit, and delete announcements for their respective clubs, as well as view announcement statuses. Lastly, the admin holds the highest level of access, enabling them to log in and manage HEA staff accounts, including adding and deleting staff members. Overall, the diagram effectively demonstrates the relationships between actors and system functions, thereby confirming that each user role is appropriately aligned with the system's intended operations.

Figure 2

Use Case Diagram

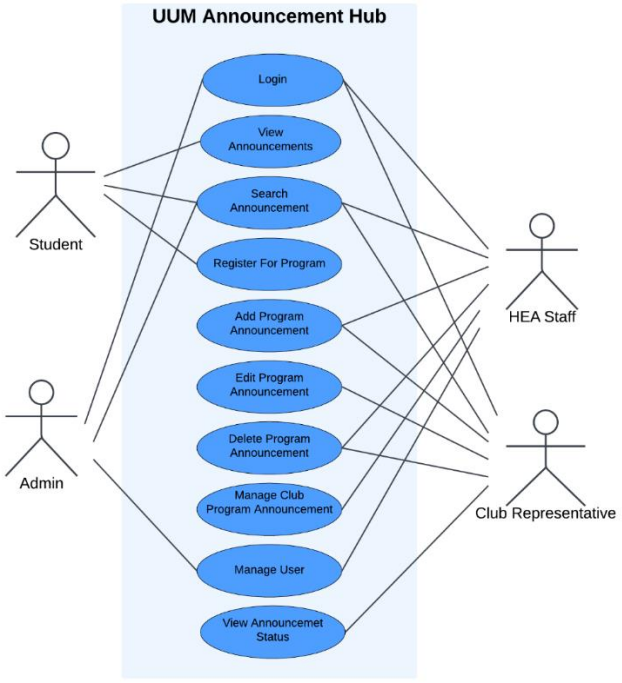
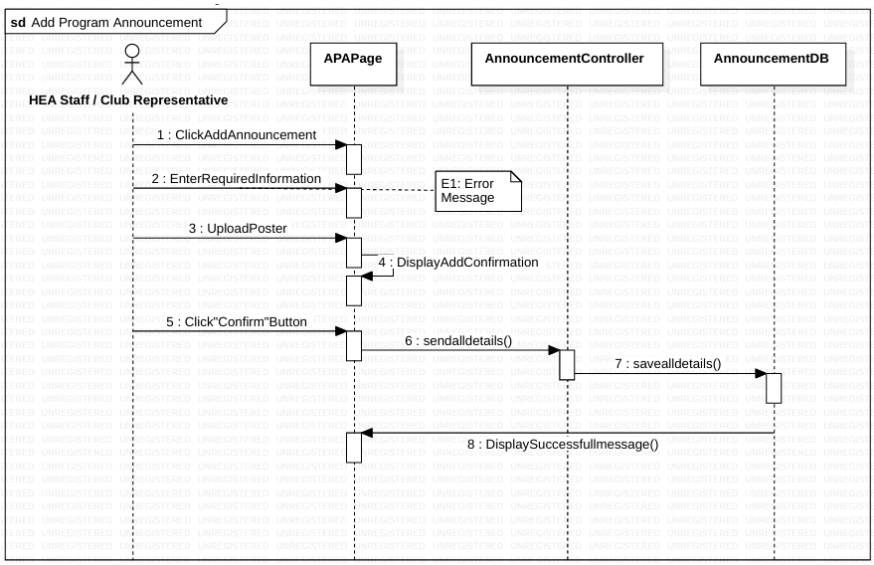


Figure 3 shows the sequence diagram for adding an announcement for a program that will be handled by HEA staff or a club representative. Generally, users will fill in the required information when posting the program poster. After users verify the information, the system processes and stores the details in the announcement database. Once the announcement is saved, the system will notify users that it has been added.

Figure 3

Sequence Diagram of Add Program Announcement functionality



The sequence diagram was then translated into the corresponding user interface page, as illustrated in Figure 4. This page allows users to add new announcements with required information, including Category, Name, Description, Start/End Date, Start/End Time, Venue, and Poster Upload. After entering the required information, users can post the announcement by clicking the Add Announcement button.

Figure 4

Screenshot of Add New Announcement

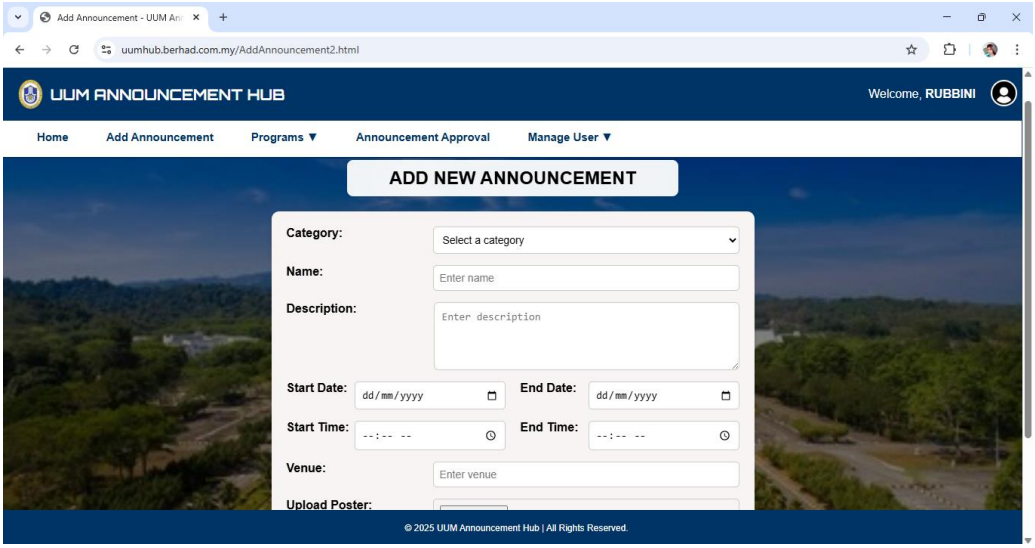
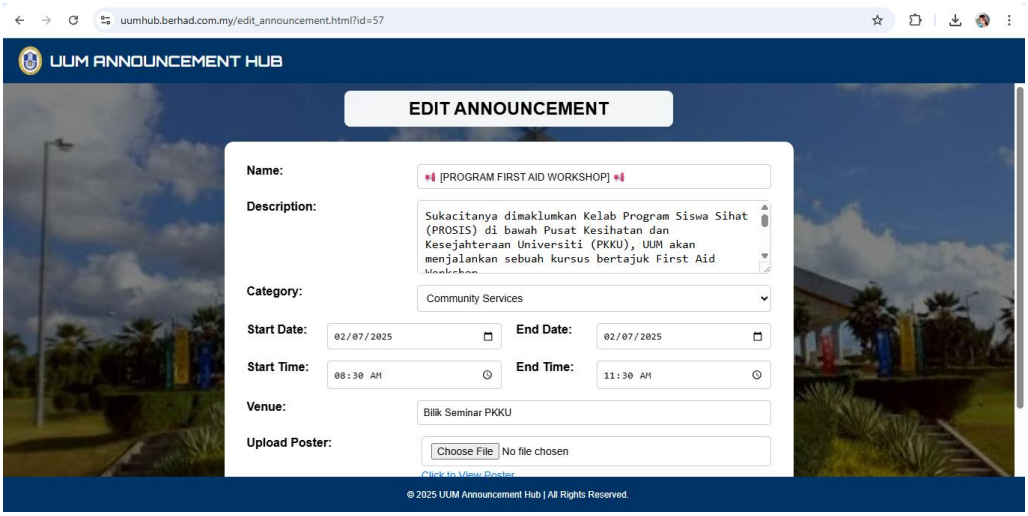


Figure 5 shows the Edit Announcement page of the UUM Announcement System, accessible by both HEA staff and club representatives. This functionality allows users to modify the details of an existing announcement whenever changes are required.

Figure 5

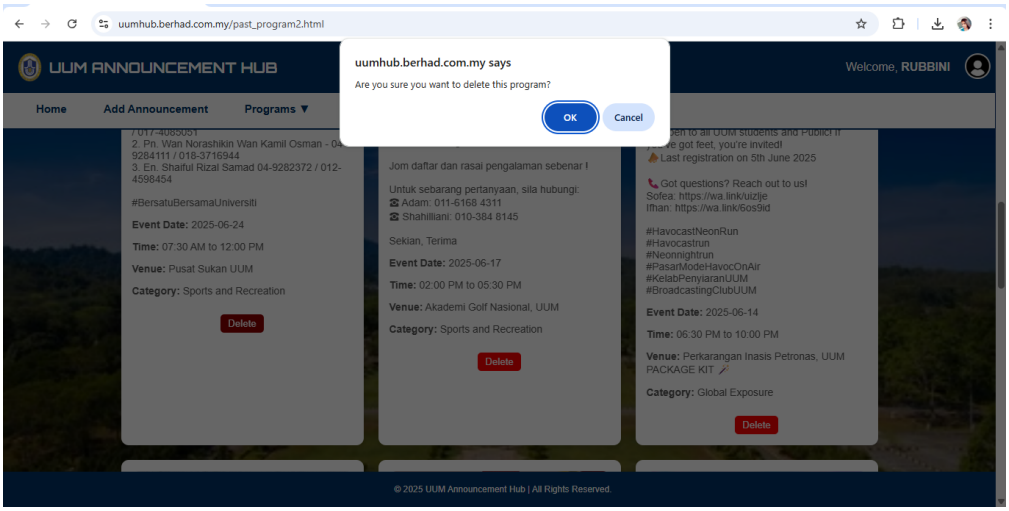
Screenshot of Edit Announcement



Meanwhile, Figure 6 presents the Delete Program feature of the UUM Announcement System. To delete a program, users must first locate it. Once found, they can click the program's delete button. A confirmation message will then appear, prompting the users to either proceed with the deletion or cancel the action.

Figure 6

Screenshot of Delete Announcement



EVALUATION OF THE UUM ANNOUNCEMENT SYSTEM

Two evaluation techniques used to assess the UUM Announcement System are Usability Testing and User Acceptance Testing (Otaduy & Diaz, 2017). Respondents across user roles were invited to participate in

the study, including students, club representatives, and HEP staff. A total of 33 participants took part in this online survey. Every respondent was asked questions on demographic factors, functional suitability, performance efficiency, Reliability, usability and interface, and total satisfaction. Section A collected demographic data; Section B was conducted using a five-point Likert Scale on which the respondent rated his or her opinion on the UUM Announcement System using the scoring of SD: (Strongly Disagree), D: (Disagree), N: (Neutral), A: (Agree), SA: (Strongly Agree). They were shown how the system works, and after observing it and assessing its functionality, they responded to the associated questions using Google Forms.

In section one, the demographic analysis of the respondents showed that 18 were female and 15 were male. A total of 17 participants fell in the 21-23 age category, and 13 in the 24-26 age category. There were 2 participants in the 18-20 age range, as well as participants aged 27 or older. As for the roles, 21 respondents were students, 11 were club representatives, and 1 was HEP staff. Moreover, a good number of respondents were experienced with the system, which was relevant for sharing knowledge about how various users use it.

The next part focused on the responses collected in Section B of the post-task questionnaire during usability testing. This section presents the respondents' views on the functional appropriateness and performance effectiveness. Table 2 indicates that there was outright agreement in all statements or a strong agreement. Respondents firmly believe in the UUM Announcement System because they can easily view their announcements; it shows the details of all important events, including the venue, date, and title, and they can also easily search announcements using keywords. These findings indicate the platform's practicality in achieving its primary goals.

Table 2

Functional Suitability

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The platform allows me to view announcements relevant to my needs.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
I can easily search announcements using keywords.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The system displays all important event details (title, date, venue, poster, registration link).	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
Registering for programs via the system is convenient and straightforward.	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	33 (100%)

As shown in Table 3, the UUM Announcement System is expected to be highly effective. Most of them strongly agreed that the site loads quickly, that the system response is not delayed or lagging, and that interactive features such as images, buttons, and other elements load smoothly. Also, users noted that they are delighted with the system's easy-to-use interface, even after switching sections, indicating the platform's high performance and user-friendliness.

Table 3

Performance Efficiency

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The website loads quickly.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The system responds without delays or lag.	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (9.09%)	30 (90.91%)
Images, buttons, and interactive elements load correctly and without glitches.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The interface remains smooth and responsive even when switching between sections.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)

As Tables 4 and 5 indicate, the UUM Announcement System has high ratings for reliability and usability. In Table 4, respondents strongly agree or agree that they never had a crash or technical error when using the system, that the system accurately showed or recorded their actions and inputs, and that the information viewed (e.g., event information or statuses) was current and correct. Such outcomes indicate the platform's reliability, as users are confident in its stability and act accordingly. A similar level of rating for usability and interface was observed in Table 5. Most participants who strongly agreed or agreed that they liked the interface, that it was user-friendly and easy to navigate, that directions for using the platform were clear, and that the layout and design made the differentiation and completion of tasks go smoothly. That text, buttons, and icons on the interface were readable and were of a good size. These findings suggest that the platform is highly user-friendly and easy to operate, which is one of the reasons it works so well as a tool for managing announcements.

Table 4

Reliability

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I did not experience crashes or technical errors while using the system.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The system correctly displays or saves my actions and inputs.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
I trust that the data shown (such as event information or statuses) is accurate and up to date.	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (6.06%)	31 (93.94%)

Table 5

Usability & Interface

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The interface is user-friendly and easy to navigate.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
Instructions for using the platform are clear.	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (6.06%)	31 (93.94%)
The layout and design help me complete my tasks effectively.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The text, buttons, and icons on the interface are readable and appropriately sized	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)

Table 6 shows that the UUM Announcement System has received a high level of overall satisfaction from the respondents. Most people strongly agreed or agreed with documents like whether they were satisfied with their experience in using the platform, whether they would use the platform in the future and whether they were finding the platform something that fulfilled their need to gain access to announcements and also whether they would recommend the system to other students or staff. The consistently high ratings indicate that users are delighted with the platform's performance and consider it helpful in managing and accessing announcements.

Table 6

Overall Satisfaction

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am satisfied with my experience using the UUM Announcement System.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
I would continue using this platform in the future.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
The platform meets my needs for accessing announcements.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)
I would recommend this system to other students or staff.	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.03%)	32 (96.97%)

Overall, the positive usability results indicate that the system can effectively address the identified issues and enhance information dissemination within the university environment. Beyond this specific context, the system’s design and functionality are adaptable to other higher education institutions facing similar challenges in managing and communicating student-related information. Therefore, the proposed prototype demonstrates strong potential to streamline communication processes and improve the overall student information experience across universities.

CONCLUSION

The development of the UUM Announcement System marks a significant step toward reducing information fragmentation and overload by centralising announcements into a single, accessible platform. Usability evaluation revealed high user satisfaction across performance efficiency, accessibility, reliability, and overall usability, confirming the system's effectiveness in improving communication flow and information dissemination. This study contributes both practically and academically by presenting a case study of RAD-based system development in a higher education context and offering insights into the design and implementation of a centralised communication platform. However, the findings are limited by the small sample size of 33 respondents, which may not fully represent the broader university population. Future work should expand usability testing to a larger, more diverse user base and incorporate advanced features, such as automated notifications, a document repository, and administrative tools, to improve management. Overall, the proposed system demonstrates strong potential to serve as a scalable model for other higher education institutions seeking to enhance communication efficiency and information accessibility.

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