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DESIGN AND EVALUATION OF A WEB-BASED MEMBERSHIP MANAGEMENT SYSTEM

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ABSTRACT

In today's fast-paced and connected world, membership management systems are essential for clubs, associations, non-profits, and sports teams to streamline operations and enhance member experiences. The requirement for a membership management system arises due to the challenge of efficiently managing many members. As organisations grow and diversity, traditional manual record-keeping and event management methods become impractical and error-prone. A membership management system offers a comprehensive and automated solution to handle membership-related tasks effectively. This paper aims to develop a system that provides an intuitive and user-friendly experience for administrators and members, enabling them to manage their profiles seamlessly, access personalised services, and participate in various activities. Also, it can streamline administrative processes, automate manual tasks, and centralise data to enhance association efficiency. By simplifying these aspects, associations can focus on strategic initiatives and foster more robust engagement within their community. A usability evaluation was conducted on 32 respondents. During the testing phase, participants explored the application and interacted with the website, testing its features, usability, ease of use and functionality. The evaluation findings show a positive outcome for the membership management system, with users expressing high satisfaction and providing positive feedback about the website's usability, ease of use, and functionality.

Keywords: Digital Era, Membership Management System, Organizations Administration.

INTRODUCTION

The Membership Management System is a comprehensive web-based platform designed to handle and enhance organisations' membership-related operations efficiently. This system aims to provide an intuitive and user-friendly experience for administrators and members, enabling them to manage their profiles seamlessly, access personalised services, and participate in various activities. Key features of the system include user registration and secure login functionalities, allowing individuals to create accounts and access them confidently. Administrators are equipped with tools to manage member data, manage event details, and track financial transactions, while members can easily update their profiles, view upcoming events, and make donations. The primary objective of the Membership Management System is to streamline administrative processes, automate manual tasks, and centralise data to enhance association efficiency. By simplifying these aspects, associations can focus on strategic initiatives and foster more robust engagement within their community. The system offers a seamless user experience, starting with a straightforward user registration process. Members can create their accounts securely with customisable profile information and login credentials. Once registered, they access a personalised dashboard to update their details and view their membership status. For administrators, the system provides tools to manage member data efficiently. They can effortlessly search, filter, and edit member profiles, ensuring accurate and up-to-date information. Additionally, the system allows administrators to monitor and track member participation in events, activities, and financial transactions. This level of data management empowers organisations to make informed decisions, identify trends, and tailor offerings to suit member preferences better. An essential aspect of the system is its event management capabilities. Administrators can create and publish upcoming events, along with details such as date, location, and description, while members can view and interact with these events. Overall, the Membership Management System is a comprehensive solution that optimises membership management, enhances member experiences, and empowers associations to build a thriving and engaged community. The system helps associations strengthen their impact and achieve their goals most efficiently and effectively.

BACKGROUND AND RELATED STUDIES

This section describes the background and related studies about the Membership Management System. In research conducted by Sharin Yap et al. (2020), the MACMA Membership Management System with QR Code manages events. It monitors members in the state with a small team of just two individuals, leading to challenges and issues in the organisation's administration. To address these challenges and create a more convenient and systematic approach, the MACMA Membership Management System is proposed. This web-based system incorporates QR Code technology to record member attendance at MACMA events efficiently. Its plug-and-play capabilities make implementation hassle-free. After thorough testing, the system has successfully met all requirements and functions as intended. The hope is that this system can bring significant benefits and be adopted by other MACMA organisations in different states across Malaysia to streamline their management processes effectively.

In research conducted by Sihotang et al. (2019), they developed a membership information system using Node Js as the programming language. The UML design method was employed to ensure a structured and purposeful system. The results showed that Node Js can create membership information systems and produce reports on members and financial data efficiently managed by the system administrator. The membership management information system functions well, covering member data collection, finance, activities, and donations. The admin records the members' activity history,

including registration time, update time, login time, financial transactions, donation history, and activity participation. The author suggests further system development, including adding a notification function for easier access to requested data and creating a mobile version. This will enhance the system's usability and accessibility, benefiting organisations and their members.

Research conducted by Ardhianti et al. (2022) developed a web-based system called the Membership Information System (MIS) that provides a marketing platform for companies with a membership business model. MIS streamlines the control and management of member transactions, automates promotions, and facilitates automatic rewards for member sales. The development process uses the Agile method, involving various phases such as system requirements, design, development, testing, deployment, and review. The MIS features include product marketing content management, category and product data management, order management, reward management, retail order and sales data tracking, shopping carts, payment gateways, and shipping gateways. The unit and API automation testing of MIS have been successfully executed, ensuring the system's functionality and reliability. Research conducted by James Cowling et al. (2009) has shown that they have developed a membership service and a multicast mechanism, both crucial for seamless system operations. The membership service ensures that all nodes have a unified and up-to-date view of the system membership, which can be globally shared or divided into location-based regions. Census efficiently manages membership updates, ensuring quick propagation of changes while remaining resilient to failures. Through comprehensive simulations and real-world testing on PlanetLab, Census demonstrates minimal bandwidth overhead, rapid response to node failures and membership changes, and scalability to handle large-scale deployments. Census simplifies the design of applications in multi-site data centres and similar extensive setups.

In another research conducted by Hiroaki Oiso et al. (2009), they implemented a web-based membership registration system to manage its extensive membership base, consisting of approximately 300,000 members, including children, students, housewives, professional players, staff, and others. Additionally, the system handles around 30,000 members from JVA-affiliated teams and approximately 500 groups categorised by district or age group. This web-based system successfully achieved centralised management of member information and provided comprehensive administrative support for competitions within the large and intricate organisation of JVA.

Table 1

Related Works

Study	Key Findings
QR Code (2020)	She proposed a web-based system with QR Code technology for efficient attendance recording.
Sihotang et al. (2019)	We developed a Node Js-based membership information system. - Efficiently managed member data, finances, activities, and donations. -
Ardhianti et al., (2022)	We developed a web-based Membership Information System (MIS) for companies with a membership business model. The system Streamlines member transactions and facilitates rewards.

James Cowling et al., (2009)	We have developed a membership service and multicast mechanism for seamless system operations. - Ensured a unified view of system membership, globally shared or location-based.
Hiroaki Oiso et al., (2009)	We have implemented a web-based membership registration system for a large organisation and successfully achieved centralised management of member information.

In summary, the studies in this area provide insightful information about Membership Management Systems (MMS), but a few points demand in-depth analysis. First, the MACMA Membership Administration System with QR Code successfully handles the difficulties associated with event administration and member monitoring. It would be advantageous to look more closely at this to ensure the system is scalable and can meet the growing demands of more prominent organisations or those with more intricate membership arrangements. Second, Sihotang et al.'s Node Js-based MMS highlights the system's features while recommending additional work for improved usability and accessibility. Understanding the continual need for development and adaptability in the quickly changing technology context is essential. Lastly, Ardhianti et al.'s MIS deserve praise for their thorough approach to marketing and transaction automation. Still, a more accurate image of its success would come from real-world deployment and user feedback. These studies offer insightful information but should be considered building blocks for ongoing MMS improvement and adaptation to fit changing organisational demands. For that, the proposed system should be designed to accommodate the evolving needs of larger organisations or those with intricate membership structures. Additionally, incorporating feedback mechanisms and regularly updating the system to address emerging technological trends and user preferences would contribute to its long-term effectiveness. These enhancements would ensure the system remains flexible and robust in meeting organisations' diverse and dynamic requirements.

METHODOLOGY

The methodology is a method for systematically resolving research issues. The rules must be followed for the project's success and to produce the most outstanding results. The system methodology is a paradigm for structuring, organising, and managing an information system procedure.

System Development Life Cycle (SDLC) has been chosen as the methodology for this project. The SDLC comprises five phases: feasibility study, analysis, design, implementation, support and operation. During the feasibility study stage of the SDLC, the main goal is to determine whether the proposed membership management system is viable and feasible to develop. This stage involves gathering all the necessary information about the design and scrutinising it to assess its potential success and alignment with user requirements. The analysis consists of collecting factual data and understanding the system development flow. It aims to identify issues in the existing system and provide suitable suggestions for improving its functionality during development. This includes studying operational data, understanding information flow, and devising solutions to achieve the project's goals. Furthermore, research, journals, and internet reviews are analysed to identify techniques and methods suitable for the project. The web-based system will be developed using PHP and HTML, and a rule-based system will be implemented to facilitate decision-making within the system. In the design phase, all information studied and analysed was transformed into graphical details. User interface (UI) design, database design (ERD),

and other visual illustration samples are produced during this phase. During the implementation stage, the project system started with coding using JavaScript, HTML, PHP and the local server XAMPP to get a host to the database. Therefore, a web-based will be created. The implementation ensures that the system satisfies the objective and that the user demand has been fulfilled. The support and operation phase involves maintenance and requires a system update. This stage focuses on the system's performance and fulfils user requirements. A usability evaluation questionnaire was adapted from an existing literature review (Sharin Yap et al., (2020) to help determine how well the system works and meets its objectives. Also, to measure the effectiveness and performance of the system.

Design and Development of Membership Management System

This section describes the design and development of a web-based Membership Management System. The development process follows the first five phases of the development methodology. The requirements for the system were gathered through a requirement-gathering process, which involved analysing relevant documents, conducting interviews, and researching existing membership systems. The gathered requirements are categorised into critical functionalities: registration, login, profile management, event management and financial transactions. During the requirement-gathering process, various sources were consulted, including academic papers, industry reports, and existing membership.

Figure 1

The Phases of the Methodology



Open-ended questions were used to gather information on the desired features and functionalities of the Membership system. Additionally, interviews were conducted with domain experts and potential users to gain further insights into their requirements and expectations. The gathered requirements were carefully analysed and organised based on relevance and priority. The conditions obtained from the requirement-gathering process are presented in Table 2, along with their respective priority levels. These requirements reflect the critical functionalities of the Membership Management System. The needs shown in Table 2 were translated into the computer system functionality.

Table 2

List of Requirements for Membership Management System

Requirements ID	Description	Priority
MMS_01	Create new account	
MMS_01_01	The system allows the admin to create an account for the new admin by providing a username, password, and name.	High
MMS_01_02	The system allows users to create an account by providing a user ID, password, and association name.	High
MMS_02	Login	
MMS_02_01	The system allows the admin to log in by using a username and password	High
MMS_02_02	The system allows the user to log in by using the user ID and password	High
MMS_03	Edit Profile	
MMS_03_01	The system allows the admin to edit personal information such as username, password, and name.	Optional
MMS_03_02	The system allows the user to edit personal information such as name, profile picture and password.	Optional
MMS_04	Input Membership Fees	
MMS_04_01	The system allows the admin to input the amount of fees	High
MMS_04_02	The system allows users to view the fees	High
MMS_05	Input Donation	
MMS_05_01	The system allows user to input the donation amount	High
MMS_05_02	The system allows users to input donations using the FPX payment method	High
MMS_06	Input and Update Event	
MMS_06_01	The system allows the admin to manage event details, such as the event name, location, date, time and description.	High
MMS_06_02	The admin can update or delete the event information	Optional
MMS_07	Input and update transaction	
MMS_07_01	The system allows the admin to input the transaction information such as the status, deadline date and membership fees.	High

MMS_07_02	The admin can view the updated transaction information on the transaction page.	Optional
MMS_08	Logout	
MMS_08_01	The system allows the admin to log in from the session	High
MMS_08_02	The system allows the user to logout from the session	High

The following process is visualising and modelling the requirement using the appropriate modelling method and tools. For this purpose, the types of Unified Modelling Language (UML) diagrams were employed: use case diagrams and a class diagram. The use case diagram enabled a clear representation of the website's functional requirements from its users' perspective, illustrating the interactions between actors and specific use cases, which represent the functionalities offered by the website. Figure 2 shows the use case diagram and the communication between the use case diagram and the communication between the user and the actor that can be used to create and manage the website. The use case diagram is detailed to show the website's dynamic behaviour. The structural components of a website for a membership management system are represented in a class diagram, as illustrated in Figure 3. The class diagram in Figure 3 shows the attributes and operations of the website. The interactions between the classes are defined clearly in the chart.

Figure 2

The Use Case Diagram of a Membership Management System

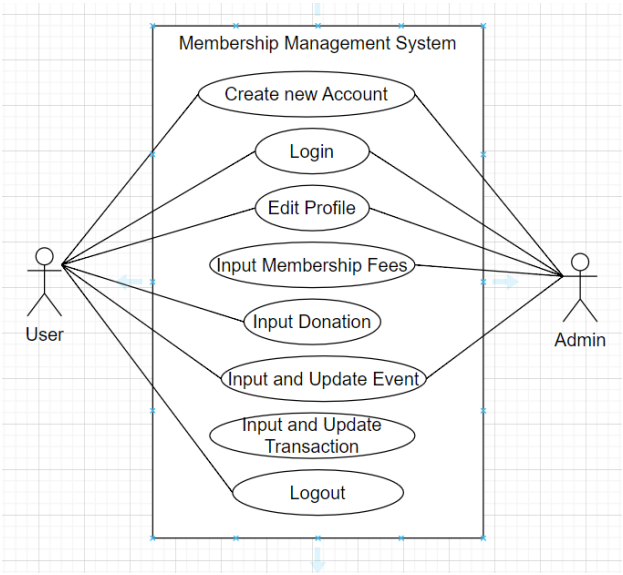
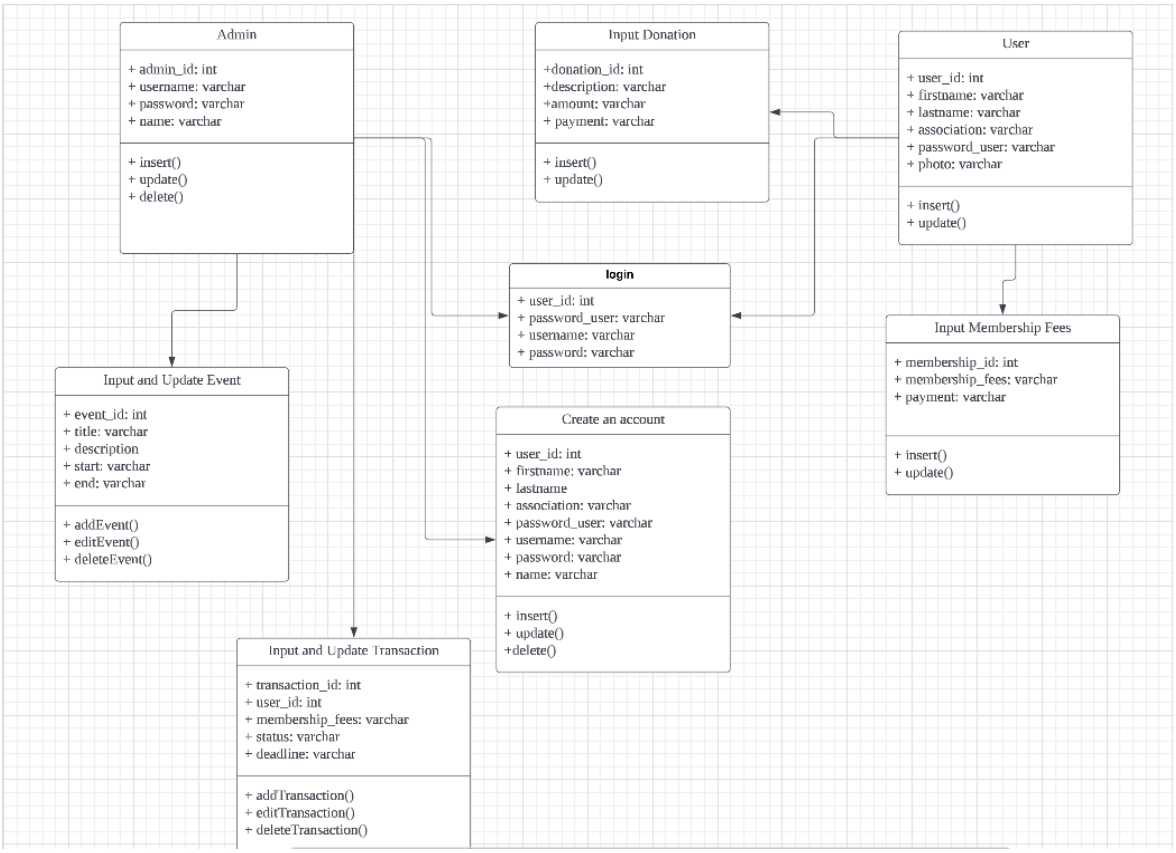


Figure 3

The Class Diagram of a Membership Management System



Development of Membership Management System

A website prototype for creating and managing a membership management system was developed. It represents the requirements explained in the previous subsection. Software prototyping is a standard way of demonstrating the software requirements so that users can provide further comments and suggestions. Visual Studio Code was used as the leading integrated development tool. Furthermore, XAMPP was used as the database for data storage. Users and administrators have distinct login functionalities in the membership management system. Users can access their accounts through a user login page where they input their registered user ID and password. Upon successful authentication, users gain access to personalised services and information. On the other hand, administrators utilise an admin login page with their unique admin credentials. Once authenticated, administrators gain access to the system's backend, which allows them to manage user data, view event details, and track financial transactions. New users can register on the system through a user registration page. During registration, users provide necessary information such as User ID, First Name, Last Name and Password.

Figure 4

Login Page for User and Admin

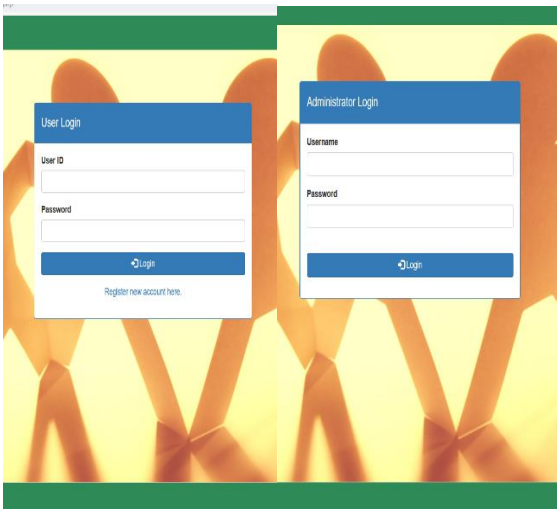
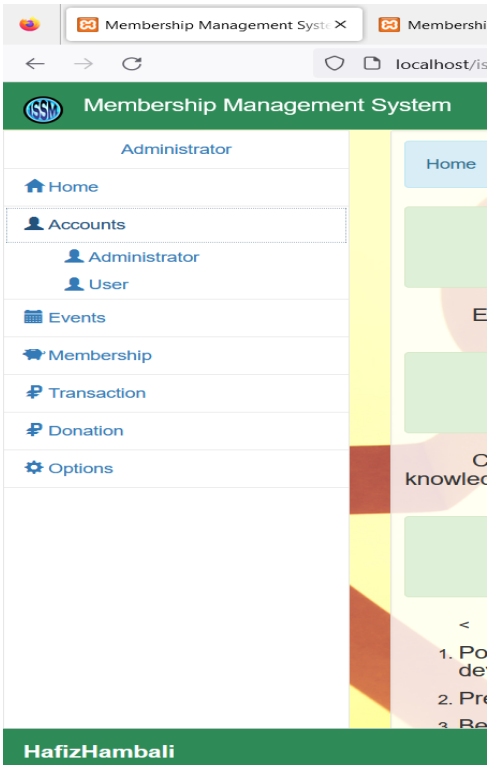


Figure 5

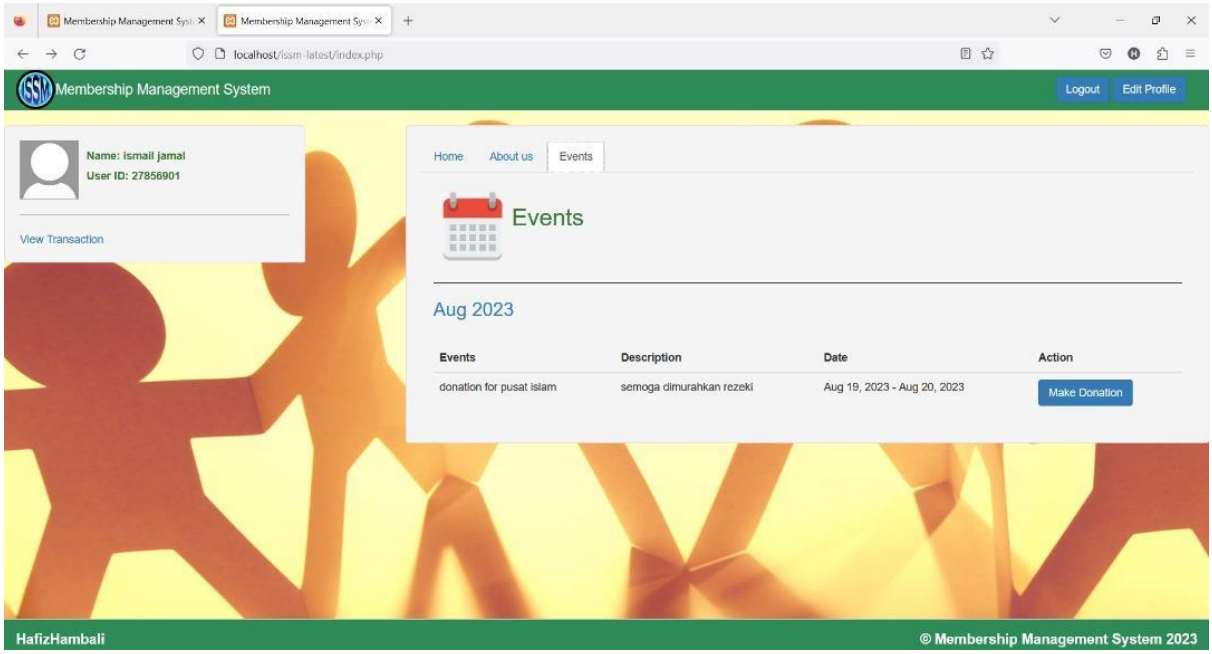
The Sidebar for the Admin Page



The admin functionality in this system has been excellent, and user and admin accounts are efficiently managed. The admin can delete and edit reports to maintain the platform's integrity and security. The events feature allows administrators to create and manage various events organised by the organisation. They can add event details such as date, time, location, and description. This feature enables seamless communication between organisers and participants and ensures smooth event coordination. The membership functionality enables administrators to handle member data efficiently. It allows the admin to input details, price and deadline. The transaction functionality in the membership management system will allow administrators to manage financial transactions related to membership fees. The administrator can input the payment amount specified by the user for a particular transaction. The donation feature facilitates fundraising and financial support for the association. It allows members to make monetary contributions through the system. Users can specify the donation amount of their donation. Administrators can track and manage donation records, ensuring transparency and accountability.

Figure ~~5~~ 6

The Sidebar for the Admin Page



After a user logs in, they can perform various actions and access different functionalities within the membership management system. Users can see their profile information, including their name, profile picture and user ID. This gives them an overview of their account details. Users have the option to update their profile information. They can modify their name, profile picture, password, and other relevant information. Users can review their transaction details, including membership fees. The system displays transaction amounts, months, payments and status. Users can explore a list of upcoming events organised by the association. The system provides event details such as dates, times, and locations. Users can contribute to the association by making donations. They can specify the donation amount and complete the donation process securely. When done using the system, users can log out to ensure the security of their account information.

EVALUATION OF THE MEMBERSHIP MANAGEMENT SYSTEM

A usability evaluation was conducted on 32 respondents. However, demographic information only includes Age, Highest level of education and gender. During the testing phase, participants explored the application and interacted with the website, testing its features, usability, ease of use and functionality. After the test, participants were instructed to fill out a Google Form to provide feedback on various aspects of the website. Google Forms includes sections covering demographics, usability testing, system functionality, and ease of use. Descriptive statistical methods are used in the analysis of the data. The data collected will be presented as bar Graphs and pie charts. The evaluation aims to assess usability, collect user feedback, identify usability issues, and measure user perception of the website. Analysis of the respondents' demographic information revealed that for gender, 22 respondents identified as male, and ten respondents identified as female. Out of the total number of respondents, 26 individuals fell within the age range of 21-23, 5 individuals within the age range 24-28 and 1 individual age range 19-20. The last demographic is the highest level of education, with respondents with degrees.

The Usability of Membership Management System

An analysis was conducted on the respondents' responses in Tables 3,4 and 5 of the post-task questionnaires. The section measures the respondents' perception towards the system's usability, ease of use and functionality. Respondents rated three or four of the post-task scales for the three aspects: usability, ease of use and functionality. The evaluation findings revealed from Tables 3, 4 and 5 show a positive outcome for the membership management system, with users expressing high satisfaction and providing positive feedback about the website's usability, ease of use, and functionality. The registration, login, and profile features were identified as user-friendly and efficient, allowing users to navigate and manage their personal information effortlessly. These survey results confirm the system's effectiveness in providing a valuable resource for individuals and organisations. They will guide future enhancements to ensure ongoing user satisfaction and further elevate the overall user experience. Tables 3, 4, and 5 reported the frequency and average of the responses with the following abbreviation - SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, and SA = Strongly Agree.

Table 3

Usability Evaluation Results

Statement	SD	D	N	A	SA
How easy was it to navigate through the membership system?	0	0	2	20	10
Please rate the clarity and readability of the user interface	0	0	4	12	16
How easily could you find the information or features you were looking for?	0	0	3	14	15
How intuitive was the membership system in terms of performing tasks and actions?	0	0	2	15	15

Table 4

Ease of Use Evaluation Results

Statement	SD	D	N	A	SA
How easy was it to understand the instruction and guidance provided by the membership system?	0	0	0	18	14
How easily were you able to complete the registration process for membership?	0	0	7	15	10
How straightforward was it to update your account information or preferences?	0	0	2	14	16
How user-friendly was the membership system overall?	0	0	0	12	20

Table 5

Functionality Evaluation Results

Statement	SD	D	N	A	SA
Please rate the performance and responsiveness of the membership system.	0	0	0	18	14
How well does the membership system meet your specific needs and requirements?	0	0	5	15	12
How satisfied are you with the membership system's range of features and functionalities?	0	0	6	14	12
Please rate the reliability and stability of the membership system.	0	0	0	15	17

CONCLUSION

In conclusion, the Membership Management System offers a revolutionary solution that addresses the changing needs of modern organisations and associations. By seamlessly integrating technology into administrative tasks, the system proves its ability to enhance user experiences and encourage greater involvement. The system simplifies member registration, event planning, financial transactions, and donation processing through its user-friendly interface and comprehensive features. The positive feedback from users highlights its effectiveness in simplifying complex tasks and providing a convenient platform for administrators and members. Moreover, the system's role in providing personalised services and efficient event coordination emphasises its potential to foster meaningful interactions and strengthen organisational connections. By automating routine tasks and centralising information, the Membership Management System empowers organisations to focus on their core objectives and enhance their overall effectiveness. As organisations adapt to the digital landscape, the

Membership Management System showcases technology's positive impact on administrative processes and member engagement. Its ongoing development, shaped by user input and evolving needs, ensures it remains a valuable tool for associations looking to optimise their operations and thrive in an increasingly digital era. While the Membership Management System offers significant benefits, it also has limitations. One limitation is the potential for data security concerns, especially when handling sensitive member information and financial transactions. Ensuring robust cybersecurity measures is crucial to address this limitation. Additionally, as technology evolves rapidly, the system may face challenges in keeping up with emerging trends and ensuring compatibility with new devices and platforms. While looking into the future, several areas of improvement and development are essential. Most of this improvement system should continue enhancing its AI capabilities to provide even more personalised services to members, improving user engagement.

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