



Web-Based Management Information System Design for Departmental Student Association Activities

Siti Ilmiyah^{1*}, Nur Cahyo²

¹ Student, Information Technology, UIN Walisongo, Semarang, Indonesia

² Lecturer, Student, Information Technology, UIN Walisongo, Semarang, Indonesia

Email: siti_Ilmiyah077@gmail.com¹, cahyo_Nur@gmail.com²

*Corresponding Author Email: siti_Ilmiyah077@gmail.com

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Abstract

The Information Technology Student Association (HMJ) at UIN XYZ is a vital organization for coordinating student aspirations and activities; however, its effectiveness is often hindered by fragmented, manual administrative management. This study aims to design and implement a web-based activity management information system capable of efficiently centralizing operational data. The system was developed using the Waterfall Software Development Life Cycle (SDLC) model, encompassing the stages of Requirement Analysis, System Design, Implementation, and Integration and System Testing. Key technologies employed include the PHP programming language with the CodeIgniter 3 framework and the MySQL database management system. Functional testing via Black Box Testing demonstrated that all features operated according to specifications, while User Acceptance Testing (UAT) yielded an average score of 92%. Based on this result, the system is categorized as "Highly Suitable" for implementation as a digital solution to enhance the organization's financial transparency and administrative orderliness.

Keyword: Information System, Activity Management, Website, Student Association.

1. Introduction

In the modern organizational landscape, Information Technology (IT) is no longer viewed merely as a technical support tool but as a strategic pillar that determines efficiency and competitiveness (Chichernea, 2016; Kettinger et al., 1994; Peak et al., 2005). Within the campus environment, web-based platforms serve as interactive nerve centers that bridge the information needs of administrators, students, and the bureaucracy—facilitating rapid and accurate communication (Eweoya et al., 2025; Habib et al., 2021; Muhammad et al., 2024). Centralizing data via a website has become a matter of substantive urgency for student organizations seeking to transform from conventional governance models toward data-driven and accountable management.

The development of this system is driven not only by technical demands but is also grounded in theological values regarding the mastery of knowledge. This is manifested in Surah Ali Imran, Verse 191, which encourages humanity to constantly remember Allah and utilize their intellect to contemplate the creation of the universe (*tafakkur*). From the researchers' perspective, mastering technology represents an act of gratitude for the intellect bestowed by the Creator. Maintaining orderly and systematic administration serves as a tangible implementation of the concepts of "critical" and "measured" thinking promoted by the verse. Managing organizational responsibilities through a precise system is a prudent step toward ensuring that no resources or information go to waste.

The Information Technology Student Association (HMJ TI) at UIN XYZ is a dynamically evolving organization. Originating as the Departmental Student Activity Preparatory Body (BPKMJ) in 2019, the institution formally transformed into the Information Technology Student Association (HMJ TI) in February 2022, following ratification by the Student Senate of the Faculty of Science and Technology. With a structure comprising an Executive Board and four primary departments, HMJ TI holds the mandate to serve as a platform for student aspirations, grounded in integrity and Islamic values. This change in status necessitates the modernization of management tools to accommodate an ever-increasing volume of activities.

An evaluation of the HMJ TI's operations revealed that its manual systems were causing systemic inefficiencies. Fragmented correspondence records made it difficult to track document history, while inefficient member registration frequently led to data inconsistencies. More critically, the absence of an integrated calendar caused scheduling conflicts between departments, and a lack of financial transparency compromised the board's accountability to faculty advisors. These obstacles were not merely technical issues but fundamental barriers preventing the organization from realizing its vision as a responsive and innovative institution. Without digitalization, the risks of data loss and administrative information leaks posed a genuine threat to the organization's sustainability.

The primary objective of this research is to centralize administrative and financial operations through an integrated web platform. Targeted strategic benefits include: 1) For the Executive Board: Achieving efficiency through the digitization of correspondence archives and more precise inter-departmental coordination of work programs. 2) For Faculty Members: Providing a mechanism to monitor financial transparency and activity progress in real-time. 3) For Students: Improving access to registration information and clarifying the student association's activity agenda. The urgency of this digital solution necessitates a robust theoretical foundation to ensure the developed system meets established Management Information System (MIS) standards.

2. Literature Review

The development of a sustainable information system must be grounded in a synthesis of Management Information Systems (MIS) theory capable of synchronizing interactions among people, software, and hardware to achieve organizational goals (DeSanctis & Jackson, 1994; Prahalad & Krishnan, 2002).

2.1 Theoretical Framework

Segars & Grover (1999) define an information system as a series of data processing activities encompassing the collection, processing, and dissemination of information for strategic purposes. In this context, Davidson (2001) emphasizes the role of websites as dynamic storage media that ensure rapid



information access. This study adopts the CodeIgniter 3 framework, which implements the Model-View-Controller (MVC) architecture (Prabowo, 2015; Subari et al., 2021). The MVC approach is highly relevant for organizational systems as it enables the independent separation of business logic (fund/correspondence processing) (Romsaiyud, 2014), data representation (user interface) (Thakur & Pandey, 2019), and database management (Singh & Iyer, 2016), thereby facilitating future system maintenance.

2.2 Comparison with Relevant Research (The "So What?" Layer)

An analysis of existing literature reveals a research gap that needs to be addressed. Although studies by Azis et al. (2021), Kuk & Banning (2009), Soesanto et al. (2019), and Susanto et al. (2023) have addressed student organization management, the majority focus primarily on general monitoring functions. The substantive advantage of the system developed in this study is the inclusion of an automated PDF generation feature for official letters—using specific codes (B-1, B-2, B-3)—that strictly adheres to the Standard Operating Procedures (SOP) of the HMJ TI (Departmental Student Association for Information Technology). This theoretical foundation validates the use of the Waterfall methodology, which will be explained in the next section.

3. Method

For this organizational software development project, a systematic approach was selected to minimize the gap between user requirements and the final system output.

3.1 Data Collection Techniques

Data were gathered using three primary instruments: direct observation of manual administrative workflows, a literature review of similar information systems, and structured interviews with the 2022 Chairperson of the Informatics Department Student Association (HMJ TI) to establish functional requirement parameters.

3.2 Waterfall Development Model (The "So What?" Layer)

This study employs the Waterfall SDLC model, comprising four key stages (Christanto & Singgalen, 2023; Langer, 2008): Requirement Analysis, System Design, Implementation, and Integration and System Testing. The justification for using the Waterfall model lies in the HMJ TI environment's characteristics, specifically its rigid and fixed Standard Operating Procedures (SOPs) as of the 2022 term. In such a strictly regulated environment, the linear Waterfall approach is superior to Agile methods; it provides developers with a clear structure to meet established specifications without the risk of frequent mid-project requirement changes. In accordance with the scope of this thesis, the process is limited to the fourth phase to ensure a focus on the quality of system integration and testing.

Table 1. System Analysis Design Based on User Requirements

Role	Key Responsibilities
Admin	User account management, member registration confirmation, and global monitoring.
Secretary	Management of incoming and outgoing correspondence archives and document number validation.
Treasurer	Management of fund transparency (Cash, DIPA, and Non-DIPA funds).
Department	Inputting activity matrices, activity registration, and automated document generation.
Lecturer	View-only access rights for financial and activity report transparency.
Student	Account registration and access to member selection announcements.

3.3 User Requirements Analysis & Logical Architecture

The system is designed to accommodate interactions among six user roles—administrator, secretary, treasurer, department, lecturer, and student—with interconnected task specifications (see Table 1).

The data architecture is built upon a foundation of 15 interconnected relational tables. Key tables include `data\_pengguna` for authentication, `dana\_dipa` and `non\_dipa` for financial management, `surat\_masuk` for archiving, and `laporan\_kegiatan` as the central repository for organizational performance data. Data flows are mapped in detail using Data Flow Diagrams (DFD) ranging from Level 0 to Level 5.

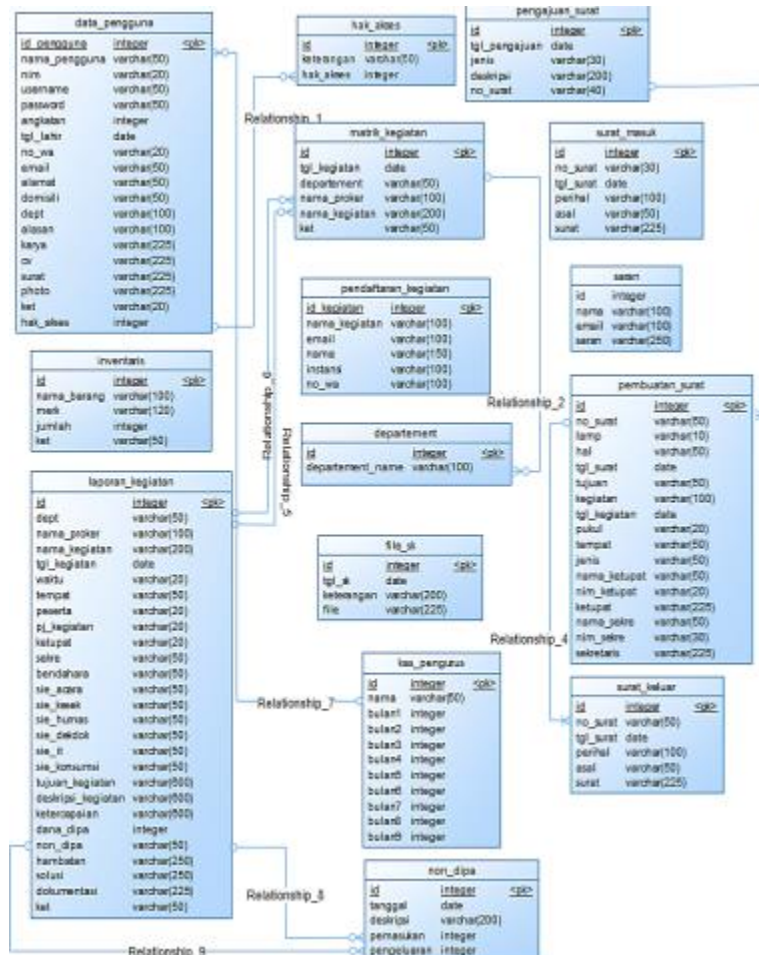


Figure 1. Implementation Design for Financial Database and Administrative Automation

4. Results and Discussion

The success of the system's implementation is measured by the alignment between technical specifications and operational effectiveness in addressing the administrative challenges faced by HMJ TI.

4.1 Implementation Environment Specifications



The system is implemented using a combination of hardware and software optimized for a student organization, as shown in Table 2 below.

Table 2. System Implementation Requirement Specifications

Component	Technical Specifications
Processor	Intel Celeron N4020
RAM	4 GB
Sistem Operasi	Windows 11
Bahasa Pemrograman	PHP v8.0.25 & HTML5
Database & Framework	MySQL & CodeIgniter 3

4.2 Database and Interface Implementation

Database implementation focuses on financial data integrity and administrative automation (see Figure 1). The `dana\_dipa` and `non\_dipa` tables are configured to automatically generate balance reports on the administrators' dashboard. The most impactful interface feature is the document automation module (see Figures 2 & 3), which enables administrators to instantly generate official PDF documents using parameters validated by the secretary.



Figure 2. Main Dashboard Interface Features

4.3 Analysis of Test Results (The "So What?" Layer)

The system evaluation in this study was conducted empirically to verify the platform's viability (see Table 3), comprising the following: First, Black Box Testing—covering all input-output features, from the login module to report generation—yielded a 100% success rate with no functional failures. Second, User Acceptance Testing (UAT)—conducted with respondents—resulted in very high satisfaction ratings. Analysis and evaluation of the system design yielded an average score of 92%, indicating that the system not only meets technical expectations but also delivers a positive user experience. High scores for printing functionality (98%) and reliability (98%) demonstrate the flawless execution of key features designed to address the issues associated with manual processes.

Table 3. Results of the System Design Testing Analysis

Indicator (P1-P10)	Score Percentage (%)
P1 (Ease of Access)	95%
P2 (Clarity of Information)	91%
P3 (Suitability of Features)	91%
P4 (System Reliability)	98%
P5 (Time Efficiency)	93%
P6 (Interface Design)	91%
P7 (Data Security)	95%
P8 (Print Function)	98%
P9 (Ease of Navigation)	82%
P10 (User Satisfaction)	89%
Average Feasibility	92%



Figure 3. Interface Feature Design for the Letter Automation Module

The digitalization of activity management has brought about a fundamental transformation in the organization's governance within the university setting. In practical terms, this system has overhauled the HMJ TI work culture, shifting it from a reactive to a proactive approach. Financial digitalization ensures absolute transparency, enabling advisors and committee members to monitor financial health in real time. Furthermore, the systematic organization of digital archives preserves the organization's track record for future leadership teams, thereby facilitating a smoother transfer of knowledge between terms.

5. Conclusion

The development of a web-based management information system for the Information Technology Student Association (HMJ TI) using the Waterfall methodology has successfully addressed issues regarding administration, data fragmentation, and a lack of financial transparency. Through the systematic structure it implements, the platform effectively automates correspondence processes and budget monitoring. The research's success is objectively demonstrated by a User Acceptance Test (UAT) score of 92%, confirming



that the system is "Highly Suitable" for full implementation in support of the Information Technology student organization's operations.

This research on developing a management information system for the activities of the Information Technology Student Association (HMJ TI) at UIN XYZ entails certain operational and methodological limitations that should be noted. Methodologically, the application of the Waterfall development model was limited to the fourth stage—Integration and System Testing. Consequently, the fifth stage of the Waterfall cycle—Operation and Maintenance—was not carried out within the scope of this study. Furthermore, regarding functionality, the system design and administrative features of the web application were strictly tailored to the work programs and Standard Operating Procedures (SOPs) specific to the HMJ TI administration of the current term. These limitations mean the system may not immediately accommodate regulatory changes or differing bureaucratic workflows in future administrative terms without restructuring the system itself.

Future research is expected to focus on continuous development and refinement. Subsequent researchers are advised to enhance and expand the application's existing functional features to ensure they remain relevant and adaptable to the evolving needs of users in future HMJ terms. In addition to functional improvements, special attention should be paid to visual aesthetics by refining and updating the user interface. Optimizing the visual design is crucial to ensuring the platform remains interactive, engaging, and user-friendly for all students and supervising lecturers. Finally, regarding future development, it is recommended to extend the development methodology cycle to include a periodic system maintenance phase, thereby ensuring long-term database security and system performance stability.

Acknowledgments

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