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# The Design of An Information System for Managing Teaching Staff Salaries

*Adi Maastrri, Ahmad S*

*Indo Global Mandiri University, Indonesia*

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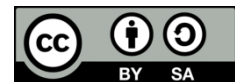
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## ABSTRACT

Effective management of teaching staff salaries is crucial for maintaining operational efficiency and ensuring employee satisfaction within educational institutions. Traditional manual systems often suffer from inefficiencies, data inconsistencies, and security risks, highlighting the need for a dedicated solution tailored to salary management. This study addresses this gap by designing a comprehensive information system that automates and streamlines salary-related processes. Utilizing the waterfall development methodology, the system was structured through sequential phases of analysis, design, coding, testing, and implementation. The proposed system incorporates key features such as user authentication, hierarchical access control, and automated periodic salary updates. It accommodates multiple user roles, including teachers, financial operators, and administrators, ensuring secure and role-specific access to salary data. Use case and activity diagrams were developed to illustrate the system's functionality, including login validation and the submission of salary update forms. By bridging the gap between theoretical frameworks and practical implementation, this study contributes a robust, user-friendly solution that enhances transparency and reduces administrative workload.

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## 1. Introduction

Efficient and transparent management of teaching staff salaries is critical for educational institutions to ensure timely and accurate compensation. Traditional manual systems for handling salary-related tasks often lead to inefficiencies, data discrepancies, and administrative bottlenecks. As educational institutions grow in size and complexity, the need for a robust information system

becomes paramount to address these challenges. In the context of this study, the focus is on designing an information system tailored for managing teaching staff salaries, offering automation and accuracy in financial management processes. Despite advancements in educational management systems, a significant gap remains in addressing the specific needs of salary management for teaching staff. Existing solutions often fail to integrate functionalities such as periodic salary updates, validation processes, and hierarchical access control.

\* Corresponding author: Adi Maastrri  
E-mail address: 2021210017@uigm.ac.id

Furthermore, many systems do not adequately accommodate the requirements of different user roles, such as administrators and teachers, leading to inefficiencies and potential security vulnerabilities. This research identifies the absence of a dedicated, user-friendly, and secure system as a critical gap in the current landscape.

The primary goal of this study is to design a comprehensive information system that streamlines the management of teaching staff salaries. This includes developing core features such as user authentication, hierarchical access control, and automated salary update processes. By incorporating modern design principles, such as use case and activity diagrams, the proposed system aims to enhance operational efficiency, minimize errors, and provide a seamless experience for its users. These goals align with the broader objective of improving administrative workflows in educational institutions. The key contributions of this study lie in the design and documentation of an information system that caters specifically to the salary management needs of teaching staff. The use case and activity diagrams presented in this study offer a clear blueprint for system functionality, enabling structured implementation. Additionally, the proposed system introduces a mechanism for periodic salary updates, ensuring that changes in staff compensation are efficiently handled. These contributions not only address the

identified research gap but also provide a practical framework for educational institutions seeking to adopt similar solutions.

This paper's findings and discussion highlight the results of designing an information system for managing teaching staff salaries, with detailed illustrations of the system's use case and activity diagrams. The design process, as depicted in Figures 1, 2, and 3, underscores the system's capabilities in user authentication, hierarchical role management, and salary update functionalities. By bridging the gap between theoretical design and practical implementation, this study offers valuable insights into developing effective solutions for administrative challenges in education.

## 2. Literature Review

The selected studies explore various innovative approaches to advancing information systems across diverse domains, from financial management to scientific information management. Chang and Liu [1] propose a financial management platform for electric power enterprises leveraging IoT, emphasizing modular architecture and robust data processing capabilities. Some related studies are shown in [Table 1](#).

**Table 1 – Some related studies**

Authors	Study	Contributions
Chang and Liu [1]	Management information platform based on Internet of Things	The article contributes to the field by proposing an innovative financial management information system tailored for electric power enterprises in the era of the Internet of Things (IoT). It introduces a comprehensive design framework encompassing a network topology, Android-based client functionalities, and a modular architecture. The system divides client operations into information interaction and data calculation units while segmenting functional modules into specific units such as account management, salary management, and revenue-expenditure management. The integration of hospital financial data warehouses into the application layer demonstrates a novel approach to handling large-scale data processing and storage. With a high safety factor, user satisfaction, and system flexibility (average factor of 0.94), the proposed system showcases robust performance, significantly enhancing operational efficiency and core competitiveness for electric power enterprises.
Huy and Phuc [2]	Insight into the impact of digital accounting information system on sustainable innovation ecosystem	This article contributes to the understanding of how digital accounting information systems (EDAIS) impact the development of sustainable innovation ecosystems (SIE) by introducing and validating a comprehensive model. It highlights the partially mediating role of green servitization (GS) in the relationship between EDAIS and SIE, as well as the moderating effect of recoverable slack (RS) on these relationships. Using data from 883 public sector employees in Vietnam and employing a two-step Structural Equation Modeling (SEM) approach with multi-group analysis (MGA), the study provides empirical evidence of the strong positive linkage between EDAIS and SIE. The findings emphasize the strategic importance of GS and RS in fostering sustainable innovation. By offering actionable insights, this research supports practitioners and policymakers in designing targeted strategies to enhance

		sustainable innovation through the effective implementation of EDAIS.
Lin [3]	Development of financial system for technology enterprises based on sensor networks and adaptive genetic algorithm	This article contributes by presenting a novel approach to developing high-performance financial systems for enterprises, leveraging embedded systems and genetic algorithms. It emphasizes the shift towards a data-driven paradigm in enterprise financial system development, highlighting how advancements in Internet technology and network platforms have transformed traditional practices. The integration of embedded systems offers enhanced human-computer interaction and robust data processing capabilities, addressing the increasing demand for efficient and scalable financial systems. By analyzing the application of genetic algorithms, the study provides innovative technical insights for optimizing financial system performance, offering enterprises a strategic advantage in adapting to the evolving information age.
Artopo and Wahyuni [4]	Internal turnover intention in Indonesian government organization	This article contributes to understanding the dynamics of internal turnover intention (ITI) among Civil Servants by highlighting the mediating role of job satisfaction. Through an analysis of 221 respondents using simple random sampling, the study identifies salary, working conditions, supervisor support, and organizational commitment as significant predictors of job satisfaction, which in turn negatively impacts ITI. Interestingly, factors such as recognition, promotion, and job involvement are found not to significantly influence job satisfaction or ITI, shedding light on nuanced employee behavior. These findings provide actionable insights for organizations aiming to mitigate ITI by prioritizing improvements in workplace conditions, supportive supervision, and fair compensation, ultimately fostering a more satisfied and stable workforce.
Guillaumet [5]	The power of generative AI for CRIS systems: a new paradigm for scientific information management	This article contributes by examining the transformative potential of artificial intelligence (AI), particularly generative AI, in enhancing Current Research Information Systems (CRIS). Through a review of European high-risk AI regulations, the Spanish AI strategy, and the IntelComp project, the study identifies critical domains where AI can significantly impact CRIS, such as data management, research assessment, and advanced analytics. By showcasing examples of generative AI applications, the paper highlights its role in optimizing scientific information management and addressing the growing complexity of data aggregation. Importantly, it emphasizes the need for ethical and responsible AI development to ensure sustainable integration within the research ecosystem, offering actionable insights for policymakers and stakeholders in the research domain.

### 3. Methods

The system development stage used is the waterfall model. The waterfall model is an SDLC method that has the characteristic that each result in Waterfall must be completed first before proceeding to the next phase. The Waterfall Model is a software development methodology that follows a linear and structured flow [6], [7], [8]. It consists of a series of phases that must be completed sequentially, and each phase is dependent on the

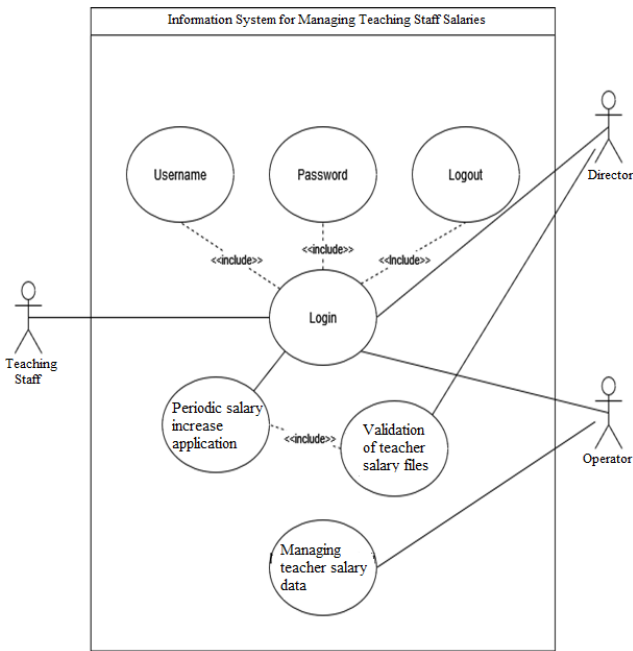
completion of the previous phase. Following are some of the main phases in the Waterfall model:

- a. Analysis: The stage where system requirements are gathered and thoroughly understood. It involves interaction with users and stakeholders to define functional and non-functional requirements [9], [10].
- b. Design: After the requirements are collected, the next step is to design the system architecture. This includes designing the system structure, identifying algorithms, and preparing the necessary technical specifications [11]-[13].

- c. Coding: This stage involves coding the software according to the specifications created at the design stage. The development team creates code based on the approved design.
- d. Testing: After implementation, the system is tested to ensure that all requirements have been met and that there are no significant bugs or errors. These tests include functional, performance, and security tests [14], [15].
- e. Delivery/Implementation: Once the system passes all the tests, it is ready to be implemented and released into a production environment or used by end users.

**4. Result and Discussion**

Once the objectives and stages for developing the information system were determined, the researchers proceeded to design the system. The process began with the creation of a use case diagram and an activity diagram. Figure 1 illustrates the use case diagram of the system, while Figure 2 and Figure 3 depicts a portion of the activity diagram for the system under development.



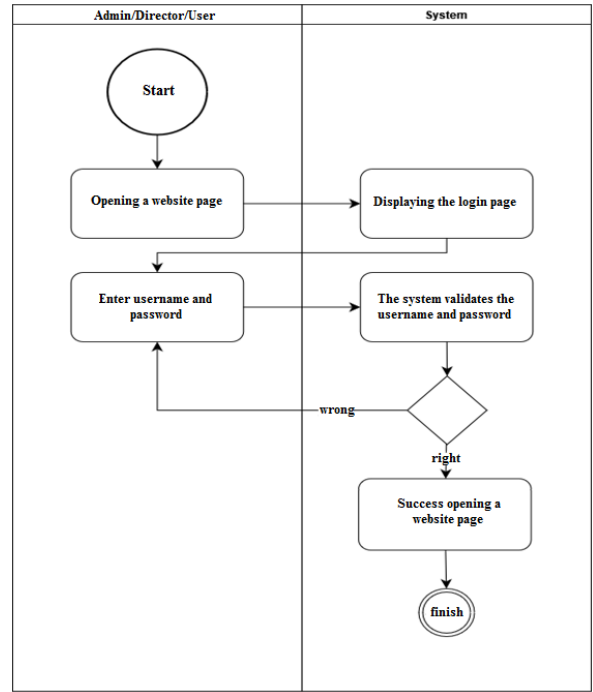
**Figure 1.** Use case diagram

The proposed use case diagram includes three actors: the Teacher, the Financial Operator, and the Director. It also features several use cases, such as Login, Username, Password, Logout, Submission of the Periodic Salary Increase Form, Validation of Teacher Salary Files, and Managing Teacher Salary Data.

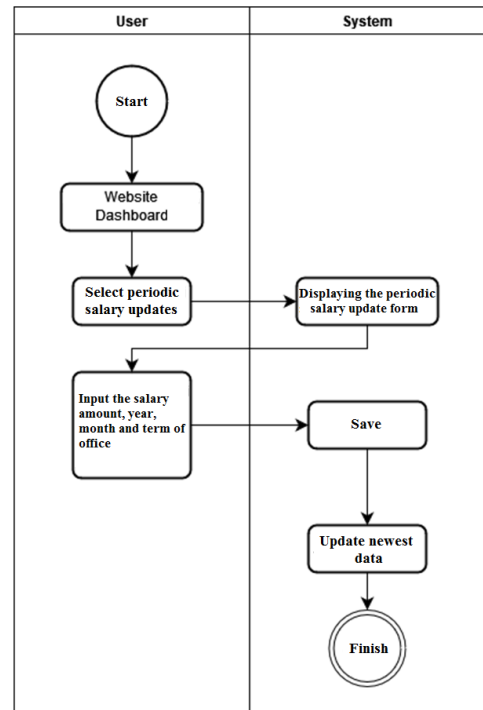
Before the user enters the first page, the user is required to log in first, login is used as a validation system, so that when logging in according to user data, the login data will be divided into 2 levels, including:

- Admin level, which is classified as staff from the Department or superior staff.
- User level, which is classified as teacher.

The Periodic Salary Update Form is utilized by users to input data, including the nominal salary, years of service, months of service, and term of office. This information is then updated on the website and reviewed by the admin or supervisor for verification.



**Figure 2.** Activity diagram: Login Form



**Figure 3.** The periodic salary update form

## 5. Conclusion

This study presents a comprehensive solution for addressing the challenges of managing teaching staff salaries in educational institutions through a tailored information system. By leveraging a structured development process based on the waterfall model, the research successfully designs a system with robust features such as user authentication, hierarchical access control, and automated salary updates. The proposed use case and activity diagrams offer a clear blueprint for implementation, ensuring efficiency, security, and user satisfaction. This system not only bridges the gap between traditional manual practices and modern technological needs but also provides a scalable framework for institutions to enhance administrative workflows and support timely and accurate salary management.

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