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Implementation of Teacher Attendance Monitoring Application at SMK Ibnu Sina Batam

Nofri Yudi Arifin*, Ghea Paulina Suri, Dasman Johan, Okta Veza, Larisang

Universitas Ibnu Sina

Correspondence Email: nofri.yudi@uis.ac.id*

Abstract

This study aims to analyze and design a web-based teacher attendance monitoring application at SMK Ibnu Sina Batam. We expect this application to enhance the efficiency and effectiveness of teacher attendance management through the use of digital technology. The research methods used include literature studies, interviews, and direct observation of the teacher attendance management process. We design the system using the Unified Modeling Language (UML), implement it using the CodeIgniter framework, and use MySQL as its database. We conduct testing using the Black Box method to verify that all functions operate as anticipated. The results show that this application can monitor teacher attendance in real-time and improve discipline. By cutting down on manual checks and enhancing transparency and accountability in school management, the implementation of this application significantly enhances the quality of education at SMK Ibnu Sina Batam.

Keywords: attendance monitoring, teachers, unified modeling language (UML).

INTRODUCTION

Education is the foundation that allows individuals to achieve a better life, a journey from the smallest to the largest things that every human being goes through. Today, it is impossible to separate information technology from the realm of education. The existence of information technology significantly influences the progress of education within a country. Education is the country's foundation and the key to long-term growth. The education system in Indonesia, as the main foundation for a nation's development, continues to strive to improve its quality, especially in this era of digitalization. A responsible individual, specifically an educator, must provide education. However, managing teacher attendance at school is still an obstacle that hinders learning optimization.

The spread of COVID-19 in 2020 has indirectly increased the popularity of online education. This situation forces adaptation in the arrangement of time and place for teachers and students, changing learning methods significantly. SMK Ibnu Sina Batam, a vocational high school institution committed to quality education, also faces this challenge. Teacher attendance is one of the supervisions that schools must provide. However, conventional methods appear superior due to their cost-effectiveness and increased reliability, as the

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observers are human. The biggest problem with traditional attendance recording methods is the tedious and impractical process of using this handwritten data and then calculating the percentage of attendance, sorting it, and transferring it to a computer for backup.

Increased supervision of learning is necessary in daily teaching to maintain its normal continuity. This includes arranging the teaching sequence properly and improving the quality and impact of teaching. The age of technology has had a significant impact on human life. Teacher attendance monitoring applications, which utilize technological advances, are an attractive alternative. With the help of Internet technology, the system can monitor and process attendance data in real time via a web page. Given these problems and the advancements in technology, the solution is to create a digital-based attendance application capable of real-time identification of teacher attendance. We hope that the adoption of this technology will significantly increase the efficiency and effectiveness of teacher attendance management at SMK Ibnu Sina Batam.

This study, in line with previous research on teacher attendance, implements a single platform. This study will develop a web-based attendance system using the Unified Modeling Language method. The title of this study is "Design and Analysis of Teacher Attendance Monitoring at SMK Ibnu Sina Batam." This study aims to assist schools, particularly attendance officers, in controlling teacher attendance during instruction. With this system, attendance officers do not need to go around the school to exercise control.

METHOD

The methods for presenting the data in this study consists of some phases. Literature Study, literature analysis on teacher attendance monitoring system. Study of theories related to attendance management and information systems. Interview, conducting interviews with school officials, including principals, administrative staff, and relevant teachers, to understand the needs and problems faced in managing teacher attendance. Interviewing information system experts to obtain views and suggestions regarding application design. Observation, a direct observation of the teacher attendance management process at SMK Ibnu Sina Batam. Monitoring the current manual process for recording teacher attendance. Data Processing Method, this approach adds structure to the research by processing the collected data. The data processing method used in this study comprises several stages, specifically communication (determination of research topics and objectives, data collection and literature study). Planning, establish system needs and goals through communication to determine resources and design specifications, ensuring development aligns with expectations. Modeling, the system is modeled using the Unified Modeling Language (UML). Visual Paradigm serves as the supporting application.

The processes carried out include Use Case Diagrams, Activity Diagrams, Sequence Diagrams, Class Diagram and Interface Design. Construction, this process involves converting the design into code and then testing both the system and the created code. We code using the CodeIgniter framework and MySQL as a database, supported by applications like Google Chrome, Visual Studio Code, and XAMPP. Implementation, the user will operate the system once analysis, design, coding, and testing are complete. The information system flow that is currently operating and proposed in the teacher attendance monitoring system is as follows:

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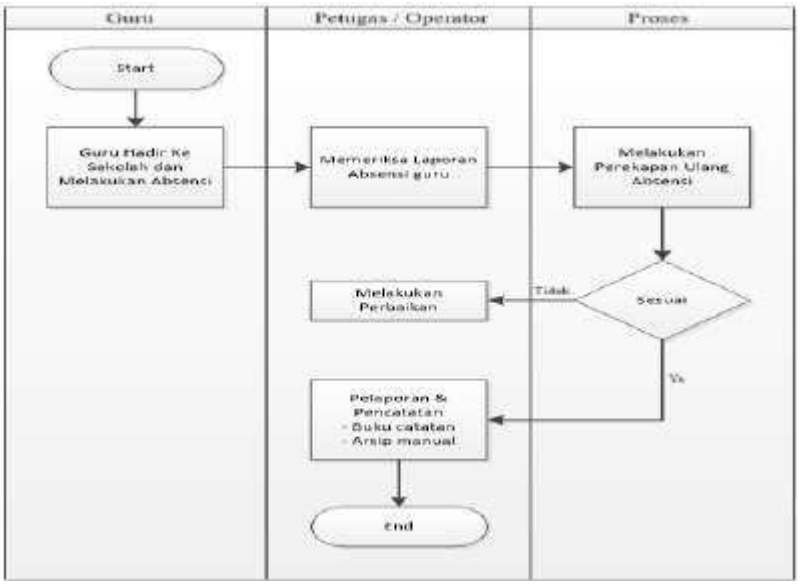

Figure 1. Old Breast Milk

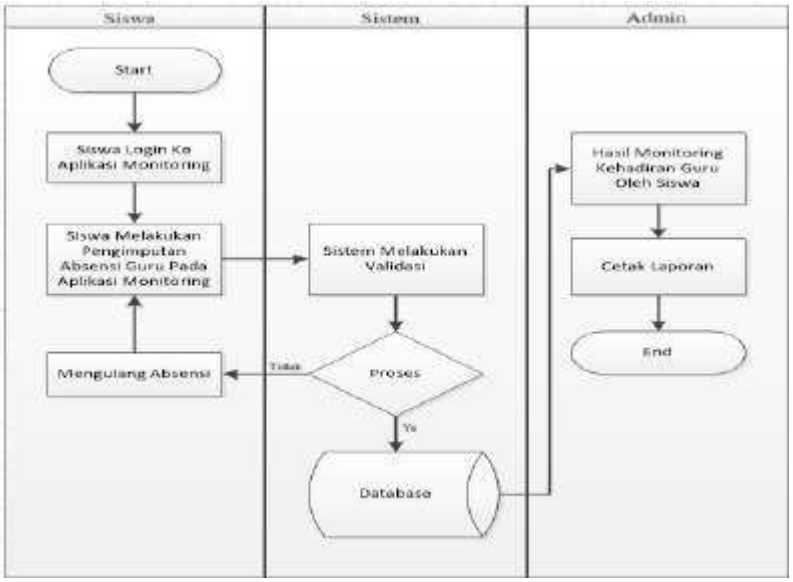

Figure 2. Old Breast Milk

The previously explained new system flow describes the functional requirements for this monitoring application as follows: Students' login to the monitoring application - Students must be able to log into the monitoring application using valid credentials (e.g., username and password), Functional details (Log into and exit the system, The system verifies the student's credentials, The application's home page redirects the student if the credentials are valid and If the credentials are invalid, the system displays an error message and asks the student to try again), students enter teacher attendance information into the monitoring application (Students can enter teacher attendance data into the monitoring application). Functional details (The application must provide an attendance data input interface, Students must select an attendance schedule in accordance with the available schedules, Students must be able to select attendance hours and Students must input attendance data into the system).

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Admin displays the results of monitoring teacher attendance by students. The administrator can view the results of student-inputted teacher attendance monitoring. The application provides an interface for admins that displays teacher attendance data. Admins should be able to view summary and detailed attendance reports. The system allows admins to export attendance data in easy-to-read CSV or PDF formats.

Modeling in computer science is an important method for understanding and representing real-world systems, organizations, and areas of interest. Models not only save time for non-programmers by eliminating the need to learn programming languages, but also enhance their understanding of system requirements and functionality. During this stage, the author creates the application design for the system, taking into account the functional requirements. We will explain the stages of this procedure's design using UML (Unified Modeling Language) models. A use-case diagram is a visual depiction of the interaction between a system and its users. This diagram illustrates the primary functions of the system and demonstrates how users or external entities engage with the application under development. This image depicts the process of creating the use case diagram for the system.

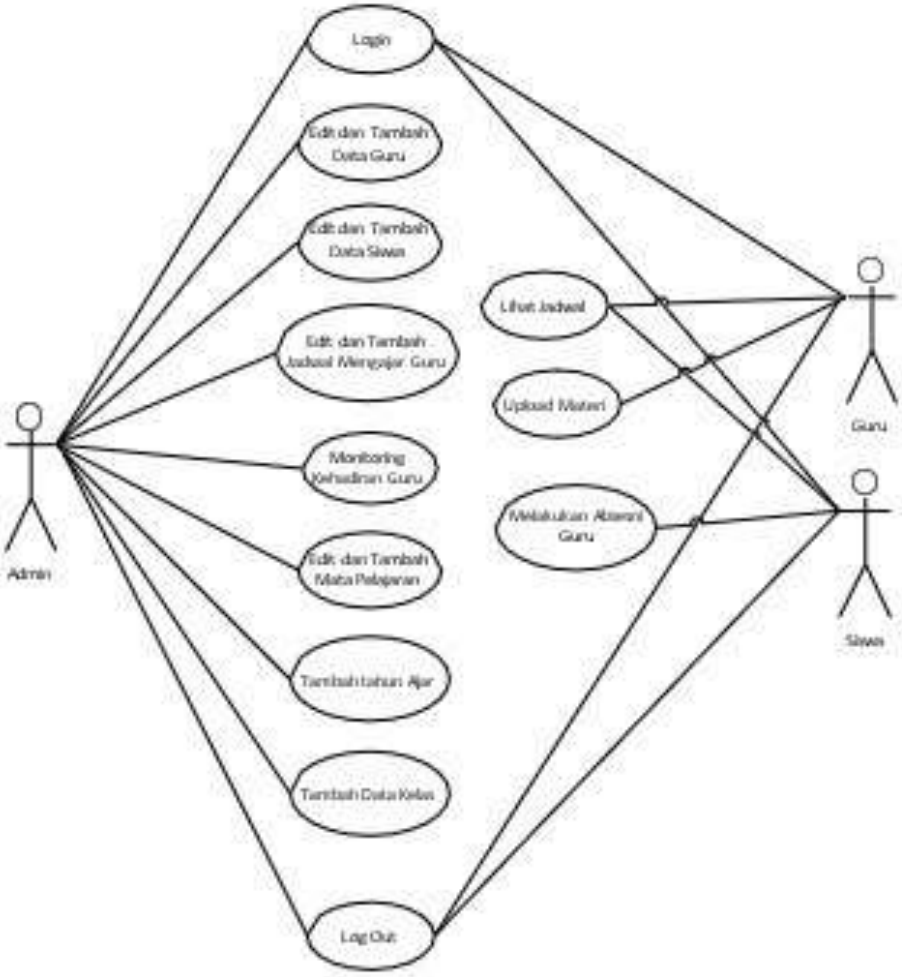

Figure 3. Use Case Diagram of Monitoring Application

We use an activity diagram to describe various activities in a system. We recommend creating an activity diagram to better understand the system under construction. Here is the activity diagram:

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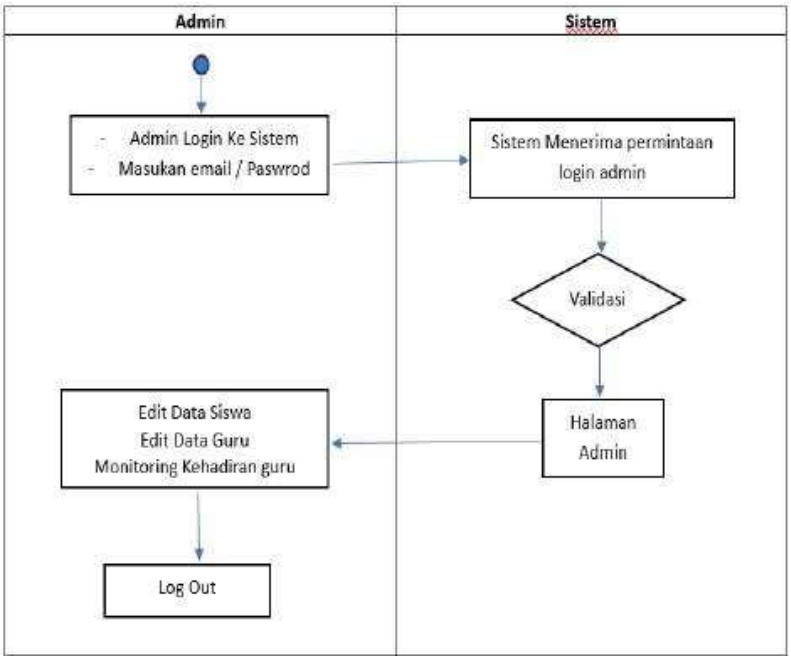

Figure 4. Admin Activity Diagram

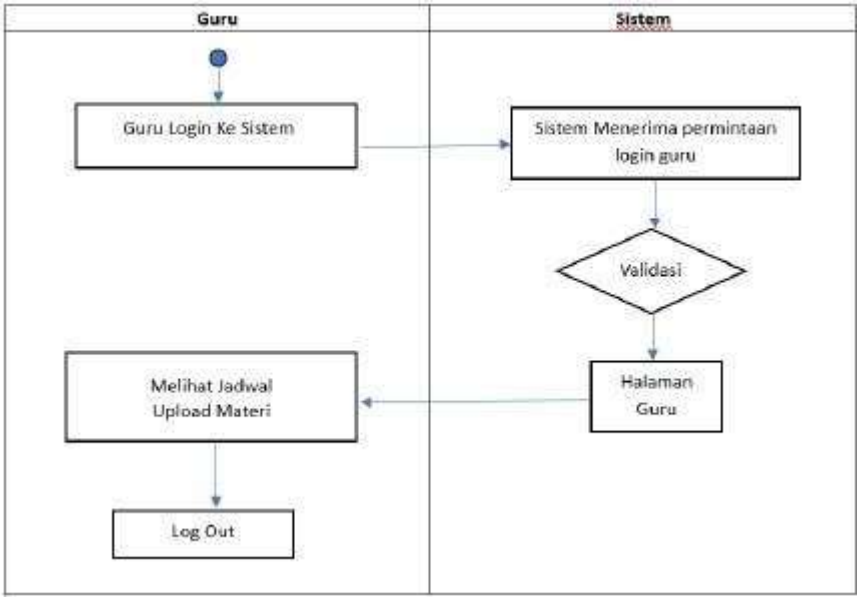

Figure 5. Teacher Activity Diagram

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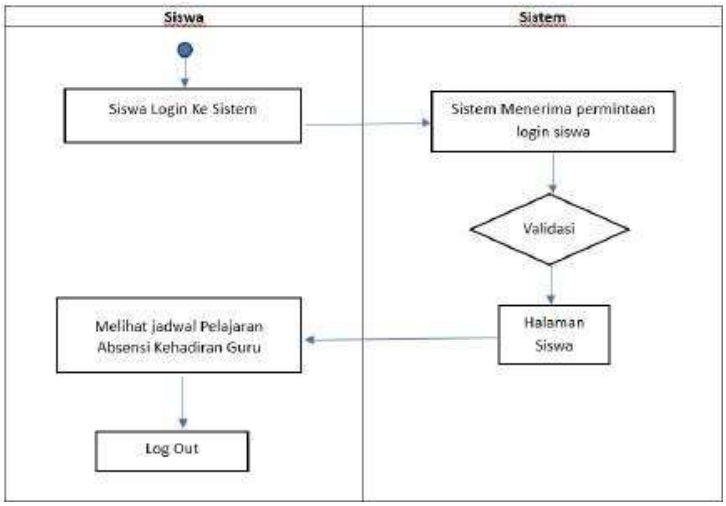

Figure 6. Student Activity Diagram

Sequence diagrams depict the activities in a scenario, showing the various objects and messages exchanged between them in a use case. This diagram shows the interactions between objects chronologically. Here is a sequence diagram:

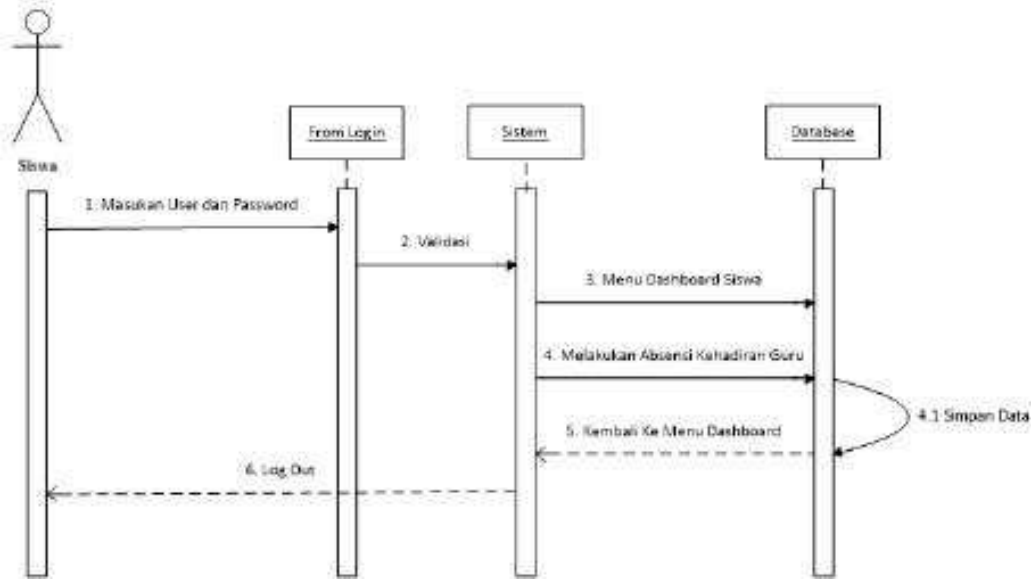

Figure 7. Teacher Absence Sequence Diagram

RESULT AND DISCUSSION

Program Implementation

In an attempt to enhance the quality of education at SMK Ibnu Sina Batam, the program incorporates several features, one of which is the display of the program on the teacher attendance monitoring application.

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1. Admin login page

Figure 8. Admin Login

2. Admin dashboard page

Figure 9. Admin Dashboard

3. Teacher data editing page

Figure 10. Edit Teacher Data

4. Student data editing page

Figure 11. Edit Student Data

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5. Edit page add course

Figure 12. Add Course

6. Add academic year data page

Figure 13. Academic Year Data

7. Add class data page

Figure 14. Class data

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8. Teacher login page

Figure 15. Teacher Login

9. Teacher dashboard page

Figure 16. Teacher Dashboard

10. Teacher material update page

Figure 17. Upload Material

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11. Student login page

Figure 18. Student Login

12. Student dashboard page

Figure 19. Student Dashboard

13. The teacher's attendance data page is filled in directly by students

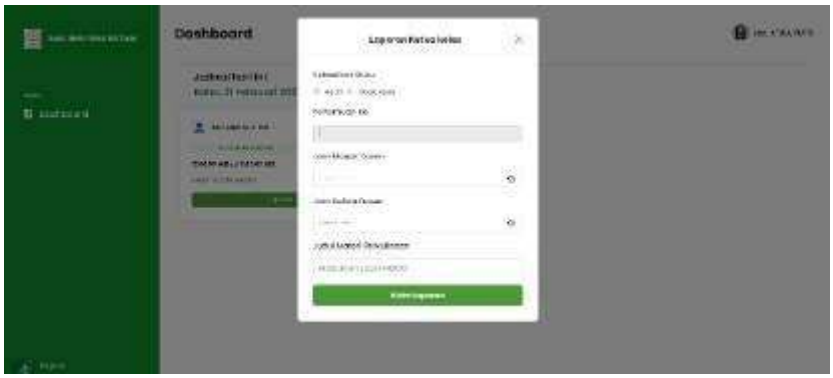

Figure 20. Filling in Attendance Data

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14. Teacher attendance monitoring page

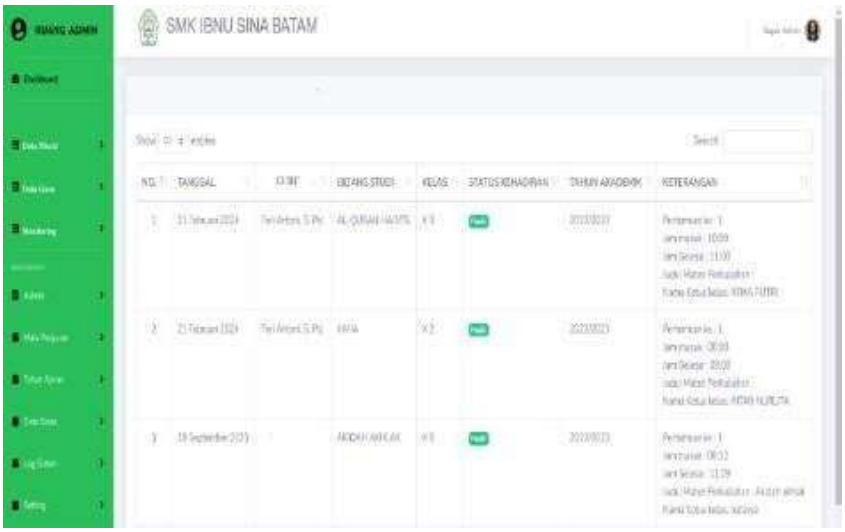

Figure 21. Monitoring Teacher Attendance

15. Teacher attendance report print page

Figure 22. Print Teacher Attendance Report

16. Print Report Results

Figure 23. Printed Report Results

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Testing

At this stage, the author performs testing on the program. In this study, the author uses the external testing method (black box). External testing (black box) evaluates the application by checking each link with a test table to ensure that it functions as expected.

Table 1. Black Box Testing

No	Admin Menu	Expected results	Test Results
1	Login	Display login page	OK Success
2	Dashboard	Display dashboard page	OK Success
3	Teacher Data	Display teacher data page	OK Success
4	Student Data	Display student data page	OK Success
5	Subject	Display subject page	OK Success
6	Academic Year	Display academic year page	OK Success
7	Class Data	Display class data page	OK Success
8	Teacher Attendance Monitoring	Display monitoring page	OK Success

CONCLUSION

The implementation of the teacher attendance monitoring application has significantly improved the quality of education at SMK Ibnu Sina Batam, according to the study's results. This application is effective in monitoring and tracking teacher attendance in real-time, allowing school management to take corrective action if necessary. In addition, this application has encouraged increased teacher discipline, making them more aware of the importance of punctual attendance and adhering to the set schedule, which has a positive impact on the learning process. Additionally, digital attendance monitoring optimizes time by cutting down on manual checks, allowing for more efficient allocation of school resources. In addition, this application increases transparency and accountability in school management with well-documented attendance data, facilitating verification and checking of attendance records. All of this shows that the teacher attendance monitoring application is very useful in efforts to improve the quality of education.

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