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DESIGN OF A WEB-BASED ATTENDANCE AND PAYROLL INFORMATION SYSTEM FOR NON-CIVIL SERVANT GOVERNMENT EMPLOYEES

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Abstract— *The attendance and payroll process for Non-Civil Servant Government Employees (PPNPN) at the Barito Utara District Attorney Office is still conducted manually using attendance sheets and Microsoft Excel. This approach frequently results in recording errors, payroll calculation inaccuracies, reporting delays, and inefficient administrative processes. This study aims to develop a web-based attendance and payroll information system to improve the effectiveness and efficiency of employee administration. The research employed a Research and Development (R&D) approach, with the Waterfall model used for software development through requirements analysis, system design, implementation, testing, and maintenance. Data were collected through observation, interviews, literature studies, and questionnaires involving administrators and PPNPN employees. The developed system provides attendance management, employee data management, payroll processing, attendance reports, salary reports, and salary slip generation within an integrated platform. The implementation results indicate that the proposed system simplifies attendance recording, accelerates payroll processing, minimizes human errors, and improves reporting accuracy. Consequently, the system supports better employee management and enhances administrative services at the Barito Utara District Attorney Office.*

Keywords: *Attendance, Information System, Payroll, PPNPN, Website.*

Intisari— *Pengelolaan absensi dan penggajian Pegawai Pemerintah Non Pegawai Negeri (PPNPN) di Kejaksaan Negeri Barito Utara masih dilakukan secara manual menggunakan daftar hadir dan Microsoft Excel. Kondisi tersebut menyebabkan tingginya potensi kesalahan pencatatan, ketidaksesuaian perhitungan gaji, keterlambatan penyusunan laporan, serta rendahnya efisiensi proses administrasi. Penelitian ini bertujuan membangun sistem informasi absensi dan penggajian berbasis website untuk meningkatkan efektivitas dan efisiensi pengelolaan administrasi pegawai. Penelitian menggunakan pendekatan manajemen proyek yang terdiri atas tahapan inisiasi, perencanaan, pelaksanaan, pemantauan, dan penutupan. Pengumpulan data dilakukan melalui observasi, wawancara, studi literatur, dan penyebaran kuesioner kepada administrator dan PPNPN. Sistem yang dikembangkan menyediakan fitur pengelolaan data pegawai, absensi, penggajian, laporan kehadiran, laporan penggajian, serta pencetakan slip gaji secara terintegrasi. Hasil implementasi menunjukkan bahwa sistem mampu meningkatkan akurasi pencatatan absensi, mempercepat proses perhitungan gaji, mengurangi kesalahan akibat proses manual, serta mempermudah penyusunan laporan. Dengan demikian, sistem yang dibangun mampu mendukung pengelolaan administrasi kepegawaian secara lebih efektif dan efisien di Kejaksaan Negeri Barito Utara.*

Kata Kunci: *Kehadiran, Sistem Informasi, Penggajian, PPNPN, Website.*

INTRODUCTION

The rapid advancement of information technology has accelerated digital transformation across various sectors, including government institutions, to improve public service quality and administrative efficiency. The implementation of information systems enables organizations to automate business processes, resulting in faster, more accurate, and more transparent administrative activities. Furthermore, administrative digitalization contributes to

minimizing human errors, enhancing data security, and supporting evidence-based decision-making through accurate and timely information (Gani et al., 2024), (Milhem et al., 2025), (Firmansyah & Herman, 2023). In the context of human resource management, information systems play a crucial role in improving the efficiency of employee data management, including attendance recording, personnel administration, and payroll processing. Moreover, integrated information systems facilitate real-time access to organizational data, enabling administrative processes to be performed more effectively than conventional manual procedures (Noviana, 2022), (Pertiwi et al., 2023).

Government Non-Civil Servant Employees (Pegawai Pemerintah Non Pegawai Negeri/PPNPN) are personnel employed by government institutions to perform specific duties, with their remuneration financed through the State Budget (Direktorat Jenderal Perbendaharaan, 2016). As an integral part of the government workforce, PPNPN plays a vital role in supporting the delivery of public services; therefore, personnel administration should be managed accurately, efficiently, and accountably [Desfi et al., 2023). Furthermore, Law Number 20 of 2023 concerning the State Civil Apparatus (ASN) provides the legal framework for establishing a professional, performance-oriented, and adaptive civil service management system (Republik Indonesia, 2023). In line with this policy, the adoption of information technology in personnel administration has become an essential strategy for improving data management efficiency, supporting decision-making processes, and enhancing the quality of public services (Gani et al., 2024).

The North Barito District Attorney's Office is one of the government institutions that employs Government Non-Civil Servant Employees (PPNPN) to support its operational activities. Based on field observations, PPNPN attendance is still recorded manually using attendance sheets, while payroll administration is managed using Microsoft Excel based on attendance recapitulation. This practice increases the risk of recording errors, delays in report preparation, and inaccuracies in payroll calculations. Similar issues have been reported in previous studies, which indicate that manual attendance management is inefficient and may negatively affect the accuracy of personnel administration and payroll processes (Syafi'i et al., 2021). Furthermore, the implementation of a Human Resource Information System (HRIS) has been shown to improve the efficiency of employee data management and simplify administrative processes (Suwarno & Jesselyn, 2024). Likewise, web-based attendance and payroll information systems have been reported to improve data accuracy, automate payroll processing, and facilitate integrated administrative reporting (Ghufron et al., 2024; Al Imron et al., 2023). Furthermore, (Tauzy and Asri, 2026) evaluated an integrated attendance and payroll information system using the DeLone and McLean model, providing an additional perspective on the evaluation of integrated information systems. Therefore, the development of a web-based attendance and payroll information system is considered an appropriate solution to improve the effectiveness of PPNPN administrative management at the North Barito District Attorney's Office.

Numerous studies have developed web-based attendance and payroll information systems using various approaches. (Syafi'i et al., 2021), (Batubara et al., 2024) anzdiscussed web-based attendance systems aimed at improving attendance recording and administrative efficiency. Meanwhile, (Azis and Kartini, 2024) and examined the integration of attendance and payroll functions to supposrt automated payroll processing and administrative reporting. (Suwarno and Jesselyn, 2024) highlighted the role of an integrated Human Resource Information System (HRIS) in centralizing personnel data and administrative processes. These studies provide a foundation for developing digital solutions for attendance, payroll, and personnel administration.

Despite these contributions, the present study focuses on the administrative requirements of Government Non-Civil Servant Employees (PPNPN) at the North Barito District Attorney's Office, where attendance was previously recorded manually and payroll was processed using Microsoft Excel. The proposed system brings employee data management, attendance recording, payroll processing, attendance reporting, and salary slip generation together in a single web-based platform. Its contribution lies in implementing these integrated functions within the operational context of a government institution that employs PPNPN. This focus distinguishes the study from the broader attendance, payroll, and HRIS implementations discussed in the cited literature. Nevertheless, the study does not claim that these functions are entirely absent from all previous systems; rather, it addresses their integration in the specific administrative context examined in this research.

Based on the identified research gap, this study aims to design and develop an integrated web-based attendance and payroll information system for Government Non-Civil Servant Employees (PPNPN) at the North Barito District Attorney's Office. The system integrates employee data management, attendance recording, payroll processing, attendance and payroll reporting, and

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salary slip generation into a single platform. Unlike the previous manual process, which relied on attendance sheets and Microsoft Excel, the proposed system is designed to streamline administrative procedures and reduce the risk of data processing errors. Thus, this study focuses on implementing integrated attendance and payroll functions tailored to the administrative needs of PPNPN at the selected government institution.

MATERIALS AND METHODS

This study employed a Research and Development (R&D) approach to develop a web-based attendance and payroll information system for Government Non-Civil Servant Employees (PPNPN) at the North Barito District Attorney's Office. The research process began with problem identification, followed by data collection, system requirements analysis, system design, implementation, and system testing prior to deployment in the operational environment. The software was developed using the Waterfall model because it provides a systematic and structured development process consisting of requirements analysis, system design, implementation, testing, and maintenance, allowing each phase to be completed sequentially according to user requirements.

The details of the research method can be seen in Figure 1.

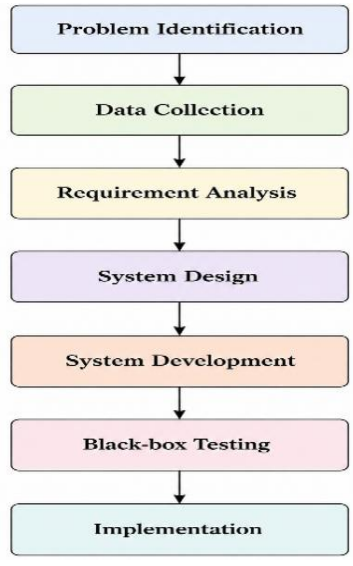


Figure 1. Research Stage
Source: (Research Results, 2025)

The research data consisted of primary and secondary data. Primary data were collected through observations of the existing attendance and payroll processes, interviews with system administrators, management, and Government Non-Civil Servant Employees (PPNPN), and questionnaires used to evaluate the developed system. The research sample consisted of 21 PPNPN employees, two system administrators, and one Head of the District Attorney's Office, totaling 24 participants. Secondary data were obtained from administrative documents, government regulations, and relevant scientific literature related to attendance information systems, payroll systems, and Human Resource Information Systems (HRIS). The collected data were analyzed to identify functional and non-functional requirements that served as the basis for system development.

Requirements analysis was conducted based on the results of observations and interviews to identify user requirements and existing system limitations. Subsequently, the system was modeled using the Unified Modeling Language (UML), including use case diagrams, activity diagrams, class diagrams, and an Entity Relationship Diagram (ERD) to design the database structure. The application was developed using the Laravel framework with PHP, HTML, CSS, and JavaScript, while MySQL was employed as the database management system. Functional testing was performed using the Black-box Testing method to verify that all system features operated according to the specified requirements before the system was deployed in the operational environment of the North Barito District Attorney's Office.

RESULTS AND DISCUSSION

System Analysis and Design

Based on the observations and interviews conducted at the North Barito District Attorney's Office, the existing attendance and payroll administration processes were still performed manually using attendance sheets and Microsoft Excel. This manual process resulted in several problems, including recording errors, payroll calculation inaccuracies, lengthy report preparation, and difficulties in managing employee data. Therefore, a web-based attendance and payroll information system was designed to integrate attendance management, employee records, payroll processing, and reporting into a single platform.

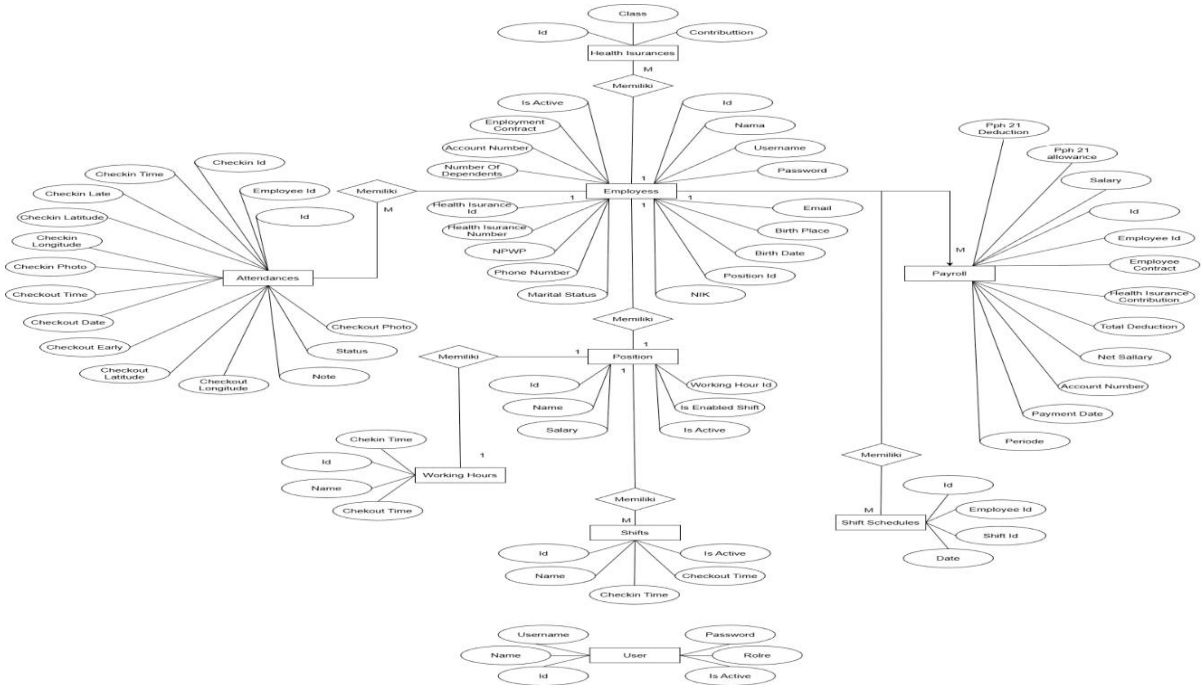
The functional requirements analysis identified two primary user roles, namely Administrator and Government Non-Civil Servant Employee (PPNPN). Each user role was assigned different system functions according to its responsibilities within the attendance and payroll administration process. The functional requirements identified during the analysis phase are summarized in Table 1 and subsequently represented in the Use Case Diagram.

Table 1. Functional Requirements of the Proposed System

User Role	Functional Requirements
Administrator	Login to the system
	Manage employee data (add, edit, delete, and view employee information)
	Manage attendance records
	Manage payroll data
	Manage work schedules
	Manage holiday data
	Generate attendance reports
	Generate payroll reports
	Generate employee salary slips
	Manage user accounts
	Change password
	Logout
PPNPN Employee	Login to the system
	Record attendance (check-in/check-out)
	View attendance history
	View payroll information
	View and print salary slips
	Manage personal profile
	Change password
	Logout

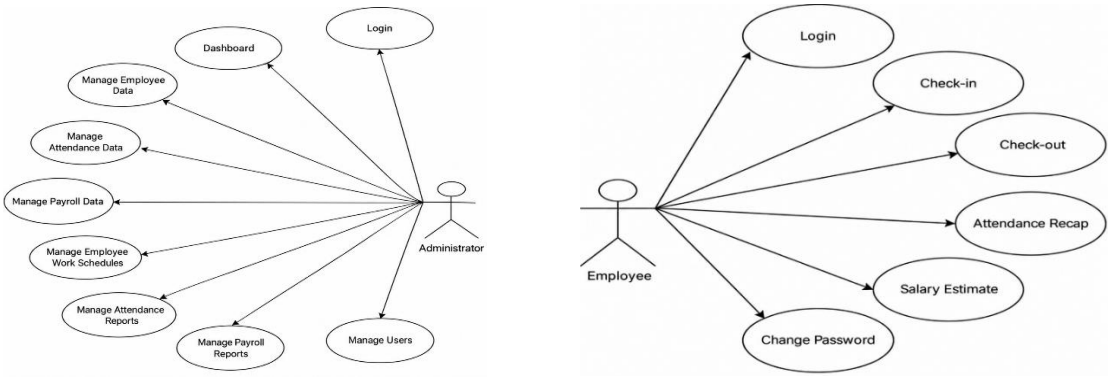
Source: Research Results (2025)

Based on the functional requirements presented in Table 1, the interaction between users and the proposed system was modeled using a Use Case Diagram to illustrate the functionalities available to each user role. The interaction between users and the proposed system is illustrated in the Use Case Diagram, which describes the functions available to each user according to their respective access rights.



Source: (Research Results, 2025)

Figure 3. Entity Relationship Diagram



(a)Admin (b) Employee

Source: (Research Results, 2025)

Figure 2. Use Case Diagram of the Proposed System (a)(b)

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Furthermore, the database structure was designed using an Entity Relationship Diagram (ERD) to establish the relationships among entities involved in attendance management, employee records, payroll, work schedules, and user authentication. The ERD serves as the foundation for database implementation and ensures data consistency throughout the application.

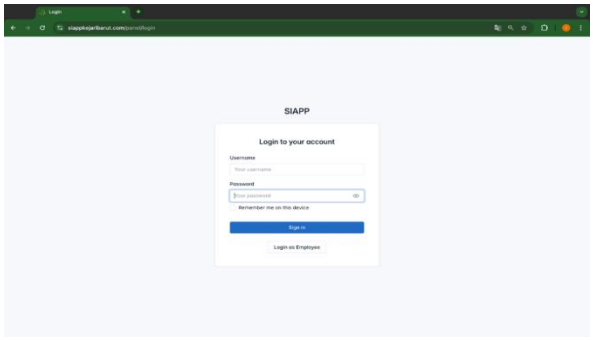
The designed database consists of several interrelated entities representing employee information, attendance records, payroll data, work schedules, holidays, and user accounts. The relationships among these entities enable data integration across system modules, thereby ensuring data consistency and supporting efficient attendance and payroll management.

System Implementation

The developed application consists of several integrated modules that support attendance and payroll administration for PPNPN employees, including:

Login

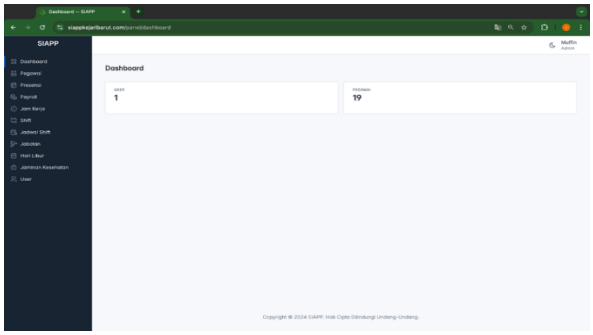
The login page provides authentication for both administrators and PPNPN employees using registered usernames and passwords. After successful authentication, users are redirected to their respective dashboards according to their access privileges.



Source: (Research Results, 2025)

Figure 4. Login Page

Dashboard



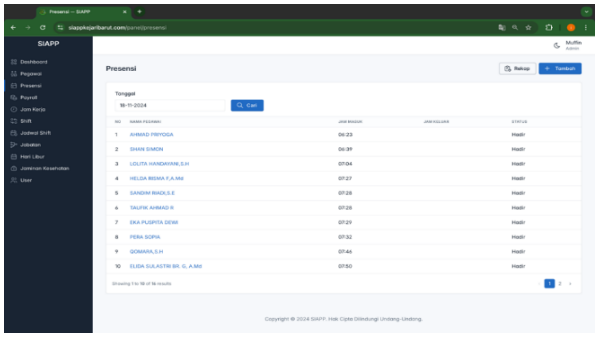
Source: (Research Results, 2025)

Figure 5. Administrator Dashboard

The dashboard presents summarized information regarding attendance statistics, employee data, payroll information, and other operational indicators. This interface enables administrators to monitor attendance and payroll activities efficiently through a centralized dashboard.

Attendance

The attendance module enables employees to record check-in and check-out activities online while allowing administrators to monitor attendance records in real time. The module simplifies attendance management and minimizes manual recording errors.

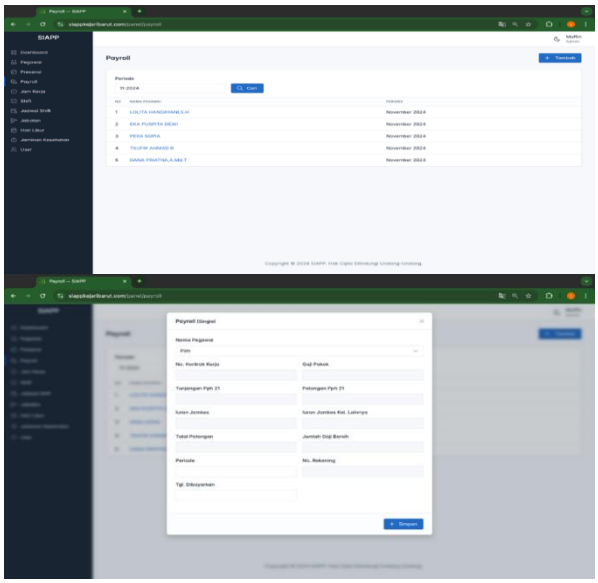


Source: (Research Results, 2025)

Figure 6. Attendance Module

Payroll

The payroll module automatically calculates employee salaries based on attendance records and predefined payroll components. The integration between attendance and payroll minimizes calculation errors while accelerating salary administration.



Source: (Research Results, 2025)

Figure 7. Payroll Module

In addition to calculating employee salaries based on attendance records and predefined payroll components, the payroll module incorporates deductions for Income Tax Article 21 (PPh 21) and BPJS contributions. These deductions are processed by the system as part of the payroll calculation to determine the net salary received by each employee. The calculation of these components should follow the applicable government regulations and the contribution or deduction parameters configured in the system. The integration of these calculations helps centralize payroll processing and reduces the need for separate manual calculations. However, the accuracy of the deductions depends on the correctness of the configured parameters and their compliance with the applicable regulations.

Reports

The reporting module automatically generates attendance reports, payroll reports, and salary slips that can be viewed or printed whenever required.

System Testing and Discussion

Functional testing was conducted using the Black-box Testing method to verify that all system functions operated according to the specified functional requirements. The testing focused on validating the functionality of each module by comparing the expected outputs with the actual system responses without examining the internal source code. The tested modules included user authentication, attendance management, employee data management, payroll processing, attendance reporting, and salary slip generation. The testing results are presented in Table 2.

Table 2. Black-box Testing Results of the Proposed System

No	Module	Test Scenario	Expected Result	Result
1	Login	User enters a valid username and password	User successfully accesses the system dashboard according to the assigned role	Passed
2	Attendance	Employee performs check-in and check-out	Attendance data are successfully recorded in the database	Passed
3	Employee Management	Administrator adds, edits, and deletes employee data	Employee data are processed correctly	Passed
4	Payroll	Administrator generates payroll	Payroll is automatically calculated based on attendance records	Passed
5	Attendance Report	Administrator generates attendance reports	Attendance reports are successfully displayed and printed	Passed
6	Salary Slip	Employee accesses salary slip	Salary slip is successfully displayed according to the selected payroll period	Passed

Source: (Research Results, 2025)

The black-box testing results presented in Table 2 show that all six documented test scenarios passed, covering login, attendance, employee management, payroll processing, attendance reporting, and salary slip generation. Thus, the functional test success rate was 100% (6 out of 6 documented scenarios). This percentage refers only to the scenarios listed in Table 2 and does not represent complete system test coverage. The test results indicate that the tested modules operated according to their expected functional requirements. The login module verified access based on assigned user roles, while the attendance module recorded employee check-in and check-out data in the database. The payroll module automatically calculated salary based on attendance records, helping reduce manual calculations and the potential for human error. In addition, the attendance reporting and salary slip modules enabled users to view and print the corresponding documents through the system.

Beyond these tested functions, the proposed system integrates attendance recording, employee data management, payroll processing, and reporting within a single web-based application. Previously, attendance records were manually recapitulated before being processed for payroll calculation using Microsoft Excel. The integration of these administrative processes is intended to improve workflow efficiency, data consistency, and the accessibility of personnel information. The system also implements role-based access control to distinguish the responsibilities of administrators and PPNPN employees. Administrators are authorized to manage employee records, payroll, attendance, and reports, whereas PPNPN employees can access their attendance records, payroll information, and personal profiles. This access arrangement is designed to support more organized personnel administration and restrict

access according to user roles. However, the black-box test results reported in Table 2 do not independently establish the system's security effectiveness, performance, or reliability under heavy workloads.

These findings are consistent with previous studies. (Ghufron et al., 2024) reported that integrating attendance and payroll modules into a web-based information system improves payroll accuracy while reducing administrative processing time. Similarly, (Azis and Kartini, 2024) demonstrated that web-based payroll systems can improve administrative efficiency by automating salary calculations and report generation. Furthermore, (Suwarno and Jesselyn, 2024) emphasized that implementing an integrated Human Resource Information System (HRIS) can enhance personnel administration by centralizing employee information and supporting more effective decision-making. Therefore, the developed system addresses the functional requirements of attendance and payroll management and is intended to support administrative efficiency, data accuracy, transparency, and accountability in managing Government Non-Civil Servant Employees (PPNPN) at the North Barito District Attorney's Office. The integration of attendance, employee management, payroll processing, and reporting within a single web-based platform demonstrates the practical contribution of this study to personnel administration in government institutions.

User Evaluation Results

In addition to functional testing using the black-box method, a user evaluation questionnaire was conducted to assess the usability and perceived benefits of the developed system. The questionnaire received responses from 16 participants. The results showed that 50% of respondents considered the application very easy to use, while 43.8% considered it easy to use. Regarding access speed, 43.8% rated the application as very fast and 50% as fast. In terms of feature suitability, 50% of respondents considered the features very adequate and 50% considered them adequate. Regarding data accuracy, 60% of respondents rated the attendance and payroll data as very accurate, while 33.3% rated them as accurate. For the user interface, 50% considered it very attractive and 43.8% considered it attractive. Furthermore, 56.3% of respondents stated that the application was very helpful in saving time, while 43.8% stated that it was helpful. Regarding transparency and accountability, 50% perceived a very significant improvement and 43.8% perceived an improvement. Overall, these responses indicate positive user perceptions of the system's usability, feature suitability, and administrative benefits. However, the results represent user perceptions and should not be interpreted as a direct measurement of system performance or objective accuracy.

Website Performance Evaluation

The performance of the developed website was evaluated using GTmetrix. Based on the results documented in the project report, the website obtained a performance score of 85% (Grade B) and a structure score of 90%. The Largest Contentful Paint (LCP) was recorded at 1.7 seconds. The project report associated the page-loading process with relatively large image assets. These results provide an initial assessment of the website's loading performance under the tested conditions. However, the evaluation did not include load testing with multiple concurrent users or measurements of database efficiency. Therefore, further testing is required to assess the system's scalability and performance under varying workloads.

Security Considerations

The developed system implements role-based access control by distinguishing between administrators and PPNPN employees. Administrators are authorized to manage employee records, attendance, payroll, and reports, while PPNPN employees can access their attendance history, payroll information, and personal profiles. The system also provides a password-change function for users. These features are intended to limit access to information and administrative functions according to user roles. However, the project evaluation did not document dedicated security testing, such as unauthorized-access testing, vulnerability assessment, or data-protection verification. Therefore, the effectiveness of these security mechanisms has not been independently established. Further security testing is necessary to assess the protection of sensitive employee and payroll data.

CONCLUSION

This study successfully developed a web-based attendance and payroll information system for Government Non-Civil Servant Employees (PPNPN) at the North Barito District Attorney's Office. The proposed system integrates attendance management, employee records, payroll processing, attendance reporting, and salary slip generation into a single platform, thereby improving the efficiency, accuracy, and transparency of personnel administration. The Black-box Testing results confirmed that all system functions operated according to the specified functional requirements, indicating that the system is capable of supporting

attendance recording, payroll calculation, and administrative reporting effectively. Compared with the previous manual process, the developed system reduces redundant administrative tasks, minimizes the potential for human error, and improves data consistency through an integrated database. Furthermore, the implementation of role-based access control is intended to restrict access to system functions and information according to user responsibilities. Therefore, the proposed system provides a practical solution for improving PPNPN administration and may serve as a reference for developing integrated personnel information systems in other government institutions. Future research may enhance the proposed system by incorporating mobile-based attendance, biometric authentication, or real-time notification features to further improve personnel administration services.

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