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WEB-BASED LEAVE APPLICATION INFORMATION SYSTEM AT ANUGRAH FURNITURE STORE DAYA MAKASSAR

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Abstract

Employee leave management is a fundamental aspect of human resource management with significant impacts on productivity and employee welfare. This study presents the design and development of a web-based leave application information system for Toko Anugrah Meubel Daya Makassar. The system aims to automate the leave request and approval process, replacing the manual paper-based system that proved inefficient and time-consuming. Using the Waterfall methodology, the system was developed with PHP programming language, MySQL database, and implements UML modeling for system design. The system features three user roles: employees (leave applicants), supervisors (approvers), and administrators (data managers). Testing was conducted using Black Box Testing method to ensure system functionality. The results demonstrate that the web-based system successfully streamlines the leave application process, provides real-time access to leave information, and improves administrative efficiency in managing employee leave data.

Keywords: Leave Management System, Web-Based Application, Information System, Waterfall Method, Human Resource Management

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INTRODUCTION

The rapid development of technology has made web-based information systems valuable tools for improving organizational efficiency. These systems facilitate faster data processing, better decision-making, and significant time and cost savings. In the context of human resource management, leave management represents a critical function affecting both employee welfare and operational productivity.(Wahyudin & Rahayu, 2020)

According to Law Number 6 of 2023 concerning Job Creation, every employee is entitled to a minimum of 12 days annual leave after working for one full year.(Husna et al., 2025) For medium-sized businesses like Toko Anugrah Meubel Daya Makassar, effective leave program management is essential for maintaining balance between operational needs and employee rights.(Lutviana et al., 2023)

Current challenges in leave management at medium-sized enterprises include manual paper-based processes that are time-consuming, lack of transparency in approval workflows, difficulty in tracking leave balances, and delays in processing leave requests.(Informasi & Makassar, n.d.) These inefficiencies necessitate a digital solution that can automate processes while ensuring compliance with labor regulations.(Ikhwan, Wiranata, et al., 2024)

Previous studies have demonstrated the effectiveness of web-based leave management systems.(Fatoni et al., 2020) Research published in the Journal of Computer Science on leave information system design using the Waterfall method showed that web-based systems provide structured and systematic solutions for employee leave management. Similarly, (Ikhwan, Nasution, et al., 2024)

This research aims to design and develop a web-based leave application information system for Toko Anugrah Meubel Daya Makassar that can: Automate the leave request and approval process, Provide real-time access to leave information, Improve administrative efficiency and Maintain accurate leave records and reporting.(Laudon & Laudon, 2022)

Information systems are organized combinations of hardware, software, communication networks, and data resources collected, processed, and distributed by organizations to support decision-making and control Modern information systems comprise five key components: hardware,

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software, data, procedures, and people (peopleware). (Anwar et al., 2022) The effective integration of these components is crucial for ensuring optimal system functionality and supporting business processes.(Aldiansyah et al., 2025)

Leave refers to the right granted to employees to not attend work for a certain period with valid reasons.(Samsudin & Mangunsong, 2024) Leave can be paid or unpaid, depending on company policy and applicable labor regulations.(Nasution et al., 2024) Types of leave include annual leave, sick leave, maternity leave, and leave for important reasons. Based on Law Number 13 of 2003 on Labor, leave is the right of workers to not work for a certain period while still receiving wages.(Setyawan & Nugraha, 2025)

METHODE

1. **research Approach**
   This study adopts a Software Development Life Cycle (SDLC) approach using the Waterfall Model.
   The stages include: (1) Requirement Analysis, (2) System Design, (3) Implementation, (4) Testing,
   and (5) Deployment & Maintenance. This model ensures a structured and well-documented
   development process suitable for business-critical systems.

2. **Data Collection Techniques**
   Data were obtained through observation, interview, and document analysis at Toko Anugrah Meubel Daya Makassar.
   Observation focused on current workflows, interviews were conducted with HR staff,
   and document analysis included existing paper forms and leave records.

3. **System Testing Methodology**
   System functionality was tested using the Black Box Testing technique, focusing on functional validation.
   The percentage of test success (P) was calculated as:

$$\mathbf{P = (Nt / N) \times 100\%}$$

   where Nt = number of successfully passed test cases, and N = total number of test cases. A system is valid if $P \geq 95\%$.

4. Evaluation of System Performance

The time efficiency gain (E) of the new system compared to the manual method was calculated as:

E = ((Tmanual - Tsystem) / Tmanual) × 100%

where Tmanual = average processing time using manual method, and Tsystem = processing time using the web-based system.

5. Software and Tools

The tools used were: PHP (Laravel), MySQL, Visual Studio Code, XAMPP, StarUML, Google Chrome, and Black Box Testing framework.

Table 2.1 Software and Tools

Tool	Function
PHP (Laravel)	Backend programming for logic and routing
MySQL	Database management
Visual Studio Code	Source code editor
XAMPP	Local server environment
StarUML	UML diagram design
Google Chrome	Testing and system access
Black Box Testing	Functional validation method

6. Research Output Validation

Functional validation and user satisfaction tests were conducted. The satisfaction score (S) was calculated as:

$$S = \Sigma(xi) / n$$

where xi = respondent score (1–5 scale), and n = number of respondents. Interpretation: 1.00–1.79 (Very Poor), 1.80–2.59 (Poor), 2.60–3.39 (Fair), 3.40–4.19 (Good), 4.20–5.00 (Very Good).

Table 2.6 Research Output Validation

Range	**Interpretation**
1.00 – 1.79	Very Poor
1.80 – 2.59	Poor

P-ISSN: XXXX-XXXX, E-ISSN: XXXX-XXXX

2.60 – 3.39	Fair
3.40 – 4.19	Good
4.20 – 5.00	Very Good

RESULT AND DISCUSSION

1. System Implementation and Functional Overview

The implementation of the Web-Based Leave Application Information System was successfully completed using PHP (Laravel Framework) and MySQL database. The system operates on a modular architecture, providing three primary user roles: employee, supervisor, and administrator.

Each role interacts through a secure Role-Based Access Control (RBAC) mechanism that ensures data confidentiality and integrity. The main modules include:

1. **User Authentication and Authorization:** Implements encrypted login credentials using SHA-256 hashing.
2. **Leave Application Form:** Automatically calculates leave duration based on start and end dates while cross-validating remaining leave balance.
3. **Approval Workflow:** Supervisors review pending applications in real-time using a dynamic dashboard integrated with the team calendar.
4. **Reporting and Analytics Module:** Generates tabular and graphical leave statistics by department, leave type, and approval rate.

The modular implementation ensures scalability and maintainability, aligning with **ISO/IEC 25010** software quality characteristics specifically functionality, usability, reliability, and efficiency.

2. Functional Testing and Validation

Functional validation was conducted using the Black Box Testing approach to verify that all modules perform according to specifications. Testing scenarios were categorized into authentication, leave submission, approval workflow, and reporting.

The test success rate (PPP) was calculated using the formula:

$$\mathrm{P} = \frac{Nt}{N}\ x\ 100\%$$

where Nt = number of successful test cases, and N = total test cases executed.

Table 2.1 Functional Testing and Validation

Module	**Test Cases**	**Passed**	**(P (%))**
Login & Authentication	10	10	100
Leave Application	15	15	100
Approval Workflow	12	11	91.6
Reporting Module	8	8	100
Total Average	**45**	**44**	**97.7**

The overall success rate of 97.7% indicates that the system meets all functional requirements and achieves a high level of reliability. The one minor defect found during testing was related to the edge case of overlapping leave dates, which was later resolved through input validation.

3. Efficiency Evaluation

To evaluate performance improvement, the time efficiency gain (E) was computed by comparing the manual paper-based workflow with the web-based system:

$$\mathrm{E} = \frac{TManual \; - \; Tsyste,}{TManual} \; x \; 100\%$$

Table 2.3 Efficiency Evaluation

Process Type	Average Processing Time (hours)	Efficiency Gain (%)
Manual Leave Processing	24	—
Web-Based System	3	87.5% faster

The results demonstrate that the web-based system reduces the total processing time for leave approvals from an average of 24 hours to only 3 hours, leading to an 87.5% improvement in operational efficiency.

4. Usability and User Satisfaction

Usability evaluation was conducted using a Likert-scale questionnaire distributed to 10 users, consisting of employees, supervisors, and HR administrators. The satisfaction score (SSS) was calculated as:

$$S = \frac{\sum_{i=1}^{n} x_i}{n}$$

Table 2.4 Usability and User Satisfaction

Evaluation Aspect	Mean Score	Interpretation
Ease of Use	4.6	Very Good
Interface Design	4.5	Very Good
Response Speed	4.4	Good
Accuracy of Information	4.7	Very Good
System Reliability	4.5	Very Good
Average Score	4.54	Very Good

5. Discussion Summary

From the overall analysis, it can be concluded that the developed system:

1. Achieved 97.7% functional accuracy during testing.
2. Improved leave processing efficiency by 87.5%.
3. Obtained a user satisfaction rating of 4.54/5 (Very Good).
4. Aligned with international software engineering standards (ISO/IEC 25010 and SDLC Waterfall Model).

These results confirm that the proposed system is technically robust, user-oriented, and adaptable for enterprise-level deployment, providing tangible benefits in human resource management digitization.

CONCLUSION

This research successfully designed and implemented a web-based leave application information system for Toko Anugrah Meubel Daya Makassar. The system effectively addresses limitations of manual leave management by automating workflows, improving accessibility, and enhancing administrative efficiency.

Key achievements include:

1. Development of a functional web-based system using PHP and MySQL

2. Implementation of role-based access for administrators, employees, and supervisors
3. Creation of intuitive interfaces for leave application and approval
4. Successful validation through Black Box Testing
5. Significant improvement in leave processing efficiency

The system demonstrates that web-based information systems can successfully modernize traditional HR processes in medium-sized enterprises, providing benefits for both employees and management.

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