



College of Computer Studies

Labadero Laundry Management Information System

A Senior Systems Project Presented

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Carlos Hilado Memorial State University

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ABSTRACT

The Labadero Laundry Management Information System (LLMIS) was developed to enhance operational efficiency and user experience in managing laundry services. This web-based system aims to address critical business requirements, including transaction processing, inventory management, delivery tracking, and feedback collection. The study's objectives focused on creating a system with intuitive user interfaces, robust data management, real-time monitoring, and report generation capabilities.

The system's usability was evaluated using the Post-Study System Usability Questionnaire (PSSUQ), which assessed System Usefulness, Information Quality, and Interface Quality. The evaluation involved a mix of online and face-to-face sessions, targeting clients, staff, and IT professionals. Results revealed high levels of user satisfaction, with an overall mean score of 1.51, interpreted as "Very Usable." Subscale results included System Usefulness (1.42), Information Quality (1.63), and Interface Quality (1.49), all significantly exceeding the acceptable usability thresholds.

Findings suggest that the system provides a user-friendly and efficient platform for managing laundry operations. It supports smooth task completion, effective information delivery, and a visually appealing interface, contributing to its successful implementation. Minor areas for improvement, such as error messaging and troubleshooting support, were identified, ensuring the system's continuous refinement.

This study concludes that the system meets the usability standards required for effective adoption, positioning it as a valuable tool for streamlining operations at Labadero Laundry Shop. These findings underscore the importance of user-centered design in delivering software solutions tailored to business needs.



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Chapter 1

INTRODUCTION

The way websites are developed has evolved drastically as a result of the various new trends in web development that emerged recently. In order to fulfill the objectives of a business, organization, or individual, web development strives to develop a visually appealing and user-friendly website.

Using website design, businesses such as our beneficiary, Labadero Laundry, can create an online space where the business can digitalize various business processes such as taking orders, maintaining records, scheduling delivery and pickup, and managing payment. Their laundry business may benefit from outsourcing web development in a number of ways, including cost-effectiveness, time-value, and enhanced productivity.

Labadero Laundry is a laundromat located in Barangay 33 Rosea St., offering services such as drying, washing, ironing, and folding the clothes, providing convenient and high-quality cleaning for clothing and textiles. The customer has options to drop off or do self-service, and prices may vary depending on the weight of the laundry and the services they would take. As a brick-and-mortar

establishment, Labadero Laundry manages its accounts and daily operations largely through manual means, which ultimately leads to inconsistency, delayed deliveries, customer dissatisfaction, and improper data management. This poses core challenges such as lost clothes and wrong deliveries, inefficient order assortment, untimely clients due to lack of notification methods, and unorganized queuing.

The aforementioned proposed system urged the researchers to develop the Labadero Laundry Management Information System (LLMIS) to replace the existing manual, paper-based system. By creating an automated environment for laundry operations, the proposed system seeks to address the challenges faced by Labadero Laundry. This includes order taking, record keeping, delivery scheduling, and payment management. The fundamental objectives of the system are to boost production, reduce costs, promote operational efficiency, and handle data efficiently throughout the system.

Objectives of the Study

The general objective of this study is to develop a web application for Labadero Laundry, entitled Labadero Laundry Management Information System.

Specifically, this study aims to:

1. Develop a laundry information management system with the following technical features:

1.1. Present an intuitive and easy to use UI;

1.2. Record and provide complete details of transactions;

1.3. Allow admin roles to control access and values, as well as monitor changes in the system;

1.4. Allow staff roles to process transactions;

1.5. Store information for deliveries through registered client accounts.

1.6 Allows admin to generate reports

1.7 Allows users to provide feedback

2. Assess the system's technical functionalities with the Post-Study System Usability Questionnaire (PSSUQ) in terms of:

- a. System Usefulness
- b. Information Quality
- c. Interface Quality
- d. Overall Satisfaction

Significance of the Study

The results of this study will benefit the following:

Owner of Laundry Shop. Using digital solutions, the laundromat's owner can streamline operations, increase output, save operating expenses, and establish a reputation for quality and convenience.

Staff of Laundry Shop. This system will help staff shorten the time spent on crucial tasks like without compromising accuracy in order to increase output and manage their workload a lesser need for extensive manual input. Staff can save time and increase productivity through optimizing the process.

Researchers. The pursuit of this study allows researchers to contribute to knowledge creation. It allows them to learn to adopt innovative research techniques as practiced by the international community. In order to maximize their full potential and make use of their skills as future IT professionals, researchers can cultivate and improve their web development expertise by creating a web-based management system.

Future Researchers. Future researchers who seek to further develop the system will benefit from this study as the system is already established and they won't have to spend as much time creating another from scratch. In order to maximize the system's usability, all that needs to be done is identify areas for development and keep it updated with new features and functionalities.

Scope and Limitation of the Study

The Labadero Laundry Management Information System focuses on shop transactions to eliminate and replace their existing manual paper-based works. The new system, which takes the form of an e-registration system, manages transactions, items, services, and customer information. This system aims to provide in an efficient, cost-effective

manner, with the goal of eliminating the usage of paper and resources currently required for such tasks that are bound to a particular customer. This new system is efficient for the management to check and validate the recent and oldest transactions and shows the trends of services for a specific date.

As the system includes client accounts, it must remain online in order to be able to perform tasks pertaining to outside of its local network, specifically regarding delivery and pickup.

Definition of Terms

Drop off

Drop off refers to the act of leaving items or goods at a designated location for further processing or handling by a service provider.

In the context of this study, drop off involves customers bringing their dirty laundry to the laundromat and leaving it with the staff for cleaning and processing.

Laundry

Laundry refers to the process of washing, drying, ironing, and folding clothes and textiles to maintain cleanliness and hygiene.

Laundry in the context of the Labadero Laundry Management Information System (LLMIS) refers to all activities associated with washing, drying, ironing, folding, and organizing customer orders and preferences, among other chores connected to cleaning and maintaining textiles and apparel.

Management

Management involves the process of planning, and organizing, and regulating resources to achieve organizational goals and objectives effectively and efficiently.

In the context of Labadero Laundry Management Information System (LLMIS), management refers to the coordination and oversight of various activities and operations within the laundromat, including but not limited to order processing, scheduling, inventory management, staff supervision, and customer service.

Paper-based

Paper-based refers to any system, process, or documentation that relies primarily on physical paper documents for record-keeping, communication, or data management.

In the context of Labadero Laundry Management Information System (LLMIS), paper-based refers to the traditional method of managing transactions, customer records, and operational tasks using physical paper documents, such as order forms, receipts, and manual logs.

Self-service

Self-service refers to a mode of operation where customers independently perform tasks or transactions without the direct assistance of staff or service providers.

In the context of Labadero Laundry, self-service allows customers to utilize laundry facilities and equipment on their own without the need for staff assistance. This may include activities such as using self-service washing machines and dryers, selecting laundry options, and completing transactions without direct interaction with employees.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This section presents a comprehensive overview of relevant research and concepts that form the foundation for the development of the Labadero Laundry Management System. It includes operational and technical terms, studies, and articles pertinent to this study.

Foreign Literature

Pickup and Delivery Laundry Service Applications: A Review Paper

Every day, more and more people are using laundry services. In addition to enjoying self-service washing and drying at the new laundry business, customers also need to use the laundry service. The self-service laundry dilemma is brought on by an excess of patrons and a shortage of washing machines, which forces customers to wait longer for a suitable machine. Furthermore, there isn't a unique laundry service company that provides laundry services at home. An overview of the methods and applications utilized for laundry collection and delivery is provided in this article. Its objectives are to list the programs that are

currently in use for this purpose and to suggest the top apps so that users can save time.

LaundryMama: Humanising Laundry Tasks using Laundry Management System and Laundry-On-Demand Mobile Applications

The laundry-on-demand mobile applications and the laundry management system are presented in this article. The laundry order paper forms are commonly misplaced during transit between the customer and the administration, and the customer is not notified about the laundry process stage in the traditional laundry service method. Additionally, the customer is not given the option to schedule a preferred laundry pick-up time for the delivery man to retrieve the unwashed laundry from the specified address. Consequently, in order to solve these problems, there is a need for laundry management system software and a laundry-on-demand smartphone application. The open-source Android Studio IDE platform with Firebase Real-time Database, Authentication, Cloud Messaging, and Cloud Storage are used in the software development process. The waterfall methodology of software development is used, and there are two separate user roles: admin and customer.

There are two separate applications for the two vacancies. A Laundry-On-Demand mobile application is

designed for customers to place orders and keep track of them, while a laundry management system software is made for the administrator to oversee, place orders, and keep an eye on the business. Notifications from both programs can be received by each other. Firebase Authentication, Firebase Real-time Database, and Firebase Cloud Storage all allow for correct writing and reading of data. The functionality of the created software and mobile application is assessed.

A Smart Tool for Laundry Management System: An Integrated Way for Next Gen. Society 4.0

This research introduces an online laundry website with a comprehensive management system and integrated payment gateway. Many laundry firms lack a proper management system to store records, resulting in issues such as mixing up customers' clothes or occasionally losing the record register. This system enables users to track their requests/orders and set drop-off times at their convenience. There will be two login portals: one for admin and one for users. The user portal allows customers to place orders, while the admin portal enables the admin to access all user information and monitor order status.

The admin can adjust laundry rates from the admin portal according to market prices, and occasional discounts/offers can also be provided. With the payment gateway included on the website, customers can conveniently make payments. Each customer is assigned a unique ID upon registration to prevent conflicting information, and their remaining information is securely stored. The technical skills involved encompass PHP/nodeJS, mongoDB/MySQL, Python, HTML, CSS, and JavaScript.

This solution resolves numerous problems and streamlines business operations. All customer information, service requests/orders, and order records are managed effectively, ensuring nothing is lost. Additionally, the website's design is unique and features a user-friendly interface, making it enjoyable for users to interact with. As a result, service providers have the opportunity to run their business smoothly.

Local Literature

Specialized Laundry Management System Software

Every day, laundry services undergo transformations. The customer may enhance its own company and beat out the competition by using the robust laundry management software that Focus Softnet offers (Focus Softnet, 2023). The custom laundry management ERP software will help customers efficiently manage daily operations and meet all of its demands, regardless of the size of the company. The suggested ERP laundry management system takes care of every step of the process, beginning with order receipt, clothing tagging, pricing and discount computation, washing, packing, billing, and payments. The customer may get more control over business processes, save time, and gather information more precisely by utilizing the automated system.

Lavandera.ph: First online laundry management system in the Philippines

Launched in 2023, Lavandera.ph essentially uses the user's geolocation to find the closest laundry shops in the area. It also incorporates a feature that lets users note the items of clothing they've left at a particular shop, giving customers and shop owners a breakdown of what was

accepted and what needs to be claimed. Lavandera is a web app that helps you locate the closest laundry shops. It also lets you manage the laundry you've sent, view the status of each laundry, from pick-up to delivery. According to Rom (2013), it is explicitly stated on Lavandera.ph that they are not laundry providers and do not support any businesses; rather, they are only a platform that makes it simple for clients and store owners to find, administer, and provide services. Initially offered as an online service, Lavandera.ph will soon have iOS, Android, and Windows Phone app versions accessible for mobile devices.

Laundry Management System by Internet of Things Philippines Inc.

A laundry management system is a creative way for businesses to better understand what's going on in their establishment. By automating the entire process, it may assist business owners in lowering expenses, raising income, and streamlining their operations. It also gives managers a simple method to plan pickups, manage returns and exchanges, and keep track of inventories. At Internet of Things Philippines Inc., the goal is to give customers affordable management systems so they may enhance their business operations (IOT, 2023). The team of experts can

evaluate the present situation and design a framework that best complements the customer's established protocols.

Foreign Studies

LAUNDRY MANAGEMENT SYSTEM: DESIGN AND IMPLEMENTATION

This software is designed to oversee the laundry service and offer automatic backup and recovery for the purpose of managing information security in the laundry (Lawal, 2020). The database administrator, manager, and staff are the only three (3) primary users who have access to the client-server system. Logging onto the system and seeing the LMS application is restricted to authorized users only. The database administrator is responsible for maintaining the user privilege to see the system as well as backup and recovery procedures. In addition, the clerk is in charge of keeping track of the clients, laundry service, and payment records. The laundry manager may then examine and amend every record in the laundry. The System Development Life Cycle (SDLC), a prototyping model, is the approach used in this system. Based on the present manual system, an analytical study was conducted, and all requirements and problem statements were noted. The Laundry Management System (LMS) will assist in enhancing the

efficiency of the existing circumstance and resolving present-day problems.

Laundry Management System

This software program will be crucial to everyone's life in order to solve these issues (Senthil Murugan et al., 2023). Customers can make orders on this shared platform provided by the laundry management system. The primary goal of this application is to reduce the workload on the client. Basically, this application includes dry cleaning, ironing, and clothing washing. If the client has already made an account, they may log in using their special username and password. If not, they can make an account here by providing their personal information. The customer may make reservations at any laundry store and will learn about all the laundry shops in the vicinity. Upon logging in, users are greeted with a home page that offers several alternatives, each with its own advantages. The program will utilize front-end and back-end development tools such as HTML, CSS, JavaScript, Node.js, MongoDB, and others to provide an intuitive user experience.

Design and Implementation of a Laundry Management System

Shoewu et al. (2016) designed this Laundry Management System for any Laundry firm to replace their existing

manual, paper-based system. An e-registration system is the new system's structure for managing user accounts, carts, receipts, items, services, and customer data.

With the use of the SQL database application and the asp.net computer programming language, the laundry management system aims to give users and staff members in charge of customer registration and laundry management procedures a stress-free, dependable, and speedy computerized process. The front end would be HTML, which would give the user-facing graphical user interface, and the back end would be a SQL database, which would manage the data storage process.

Local Studies

Laundry Identification Using NFC and Recording Management System for Speedwash Laundry

The NFC Laundry Identification and Recording Management System for Speedwash Laundry was developed to provide the owner with an alternative to the current identification process. It manages all transaction procedures for the laundry shop's customers, offering a more reliable process for both employees and customers by utilizing RFID tags for laundry identification. The system streamlines transactions, starting with the customer

dropping off their laundry, the employee entering necessary transaction information, and writing the transaction code onto RFID tags applied to the customer's laundry. Once washed, the laundry is scanned to identify and segregate it for the corresponding owner. Customers can then claim their laundry, and the system is used by employees to calculate the transaction.

Development and Validation of Flora Inventory Management System

The aim of this project was to create and verify an information management system for Manuel S. Enverga University Foundation's Lucena City flora inventory (Bermudez & Cantos, 2012). Rapid Application Development (RAD) stages were followed in the development of the system. The steps in this process are as follows: requirements planning through interviews with experts in the field who support the flora inventory study; user design for the creation of system models that depict all inputs, outputs, system processes, features, and database design; and construction, which is centered on application development and involves the use of PHP, JavaScript, CSS, Adobe Dreamweaver, Apache server, and MySQL database in the system's coding. System testing was done to confirm the

functionality of the system following the iterative phases of user design and development. Both the project developers and the proponents of the flora inventory research participated in the system testing. It was determined from the validation findings that the constructed system had effectively achieved the desired characteristics.

Laundry Management System

Any laundry business looking to replace its old manual, paper-based system can use the Laundry Management System. With the intention of cutting down on the time and resources now needed for activities like compiling clothing data based on customer names, these services are designed to be both efficient and economical. It's difficult to get complete information from busy clients because the current system requires time-consuming administrative work, a ton of paperwork, and boring administrative activities.

The graphical user interface (GUI) that interacts with the user will be provided by PHP at the front end, and the data storage process will be managed by the SQL database at the back end. The administrative side, adding new laundry types, adding, editing, viewing, and deleting laundry, claiming laundry, changing passwords, and generating reports are among the features.

Synthesis

Table 1

Summary of related systems in comparison to the mentioned functionalities of Labadero Laundry Management Information System

System/Study Name	Notification System	Sales Processing	Inventory Management	Account Management	Delivery	Service Management
1. Laundry Management System: Design and Implementation	✓	✓	✗	✓	✗	✗
2. Laundry Management System	✓	✗	✗	✓	✗	✗
3. Design and Implementation of a Laundry Management System	✓	✓	✓	✓	✗	✓
4. Laundry Identification Using NFC and Recording Management System for Speedwash Laundry	✓	✓	✗	✓	✗	✗
5. Development and Validation of Flora Inventory Management System	✗	✗	✓	✗	✗	✗
6. Laundry Management System	✗	✗	✗	✓	✗	✓
7. Pickup and Service Applications: A Review Paper	✓	✗	✗	✗	✓	✗
8. LaundryMama: Humanising Laundry Tasks using Laundry Management System and Laundry-On Demand Mobile Applications	✓	✗	✗	✗	✓	✓

System/Study Name	Notification System	Sales Processing	Inventory Management	Account Management	Delivery	Service Management
9. A Smart Tool for Laundry Management System: An Integrated Way for Next Gen. Society	✓	✓	✗	✓	✗	✗
10. Specialized Laundry Management System Software	✓	✗	✗	✓	✗	✗
11. Lavandera.ph: First online laundry management system in the Philippines	✓	✓	✓	✓	✗	✓
12. Laundry Management System by Internet of Things Philippines Inc.	✓	✓	✗	✓	✗	✗

Chapter 3

DESIGN AND METHODOLOGY

Research Design

This study employed both developmental and descriptive research designs to systematically study the designing, development, and evaluation of the Labadero Laundry Management Information System (LLMIS) to meet criteria for internal consistency and effectiveness. The descriptive research design aimed to systematically obtain information to describe a phenomenon, situation, or population.

Research Respondents

Table 2

Respondents	Frequency	Percent
IT Professionals	10	40%
Management personnel	4	16%
Clients	11	44%
Total	25	100%

The research respondents included the administrator, staff, IT professionals, and potential users of Labadero Laundry located at Rosea St., Barangay 33. A total of

twenty-five (25) respondents were involved: one (1) administrator, two (2) staff members, one (1) rider, eleven (11) customers, and ten (10) IT professionals in the field. The system was rated using the Post-Study System Usability Questionnaire (PSSUQ).

Sampling Technique

The study utilized purposive sampling to identify individuals who were deemed relevant to the aims of the research, thus guaranteeing participation from all relevant groups. In order to collect data, questionnaires were then distributed. After the data had been collected, it was analyzed using the average mean.

Data Gathering Instrument

The proponents used the Post-Study System Usability Questionnaire (PSSUQ) as an evaluation tool to assess the perceived usability of the system. The PSSUQ is a standardized questionnaire designed to evaluate a system's usability based on user feedback across three primary subscales: System Usefulness, Information Quality, and Interface Quality. The instrument consists of multiple

items that measure the ease of use, efficiency, and satisfaction users experience when interacting with the system. Each item is rated on a 7-point Likert scale, with lower scores indicating higher usability and satisfaction. The questionnaire is designed to capture both quantitative and qualitative data, offering insights into specific strengths and potential areas for improvement.

In this study, the PSSUQ was administered to a selected group of participants, including clients, staff, and administrators, who interacted with the system. Their responses were then analyzed to generate mean scores for each subscale and item, providing a comprehensive evaluation of the system's overall usability. Its application ensured an objective and structured approach to evaluating the system's design and functionality, thereby supporting the study's conclusions regarding the system's effectiveness and user satisfaction.

Data Gathering Procedures

The proponents administered the Post-Study System Usability Questionnaire (PSSUQ) to the research respondents of the Labadero Laundry Management Information System. A total of 25 respondents completed the questionnaires, and

the responses were analyzed using the average mean as the statistical tool. The proponents conducted a comprehensive system evaluation using a combination of online and face-to-face methods to ensure a diverse range of feedback from various user groups. This dual approach allowed the researchers to gather in-depth insights and ensure a thorough assessment of the system. Face-to-face evaluations were administered to the clients and staff of the beneficiary, Labadero Laundry Shop. This method provided an opportunity for direct observation of user interactions with the system, enabling the proponents to identify any usability challenges or concerns in real time.

The clients and staff were guided through the system's features and functionalities, such as transaction management, delivery requests, and report generation. After using the system, participants completed the Post-Study System Usability Questionnaire (PSSUQ) to provide structured feedback. The in-person setting also facilitated additional qualitative feedback through informal discussions, allowing participants to elaborate on their experiences and offer suggestions for improvement.

Online evaluations were administered to IT professionals to gain expert insights into the system's

technical and usability aspects. Participants were provided with a link to access the system and instructions on how to navigate its features. After exploring the system, they completed the PSSUQ via an online platform, enabling remote data collection. The online approach was particularly effective in reaching professionals who could provide objective and critical evaluations based on their expertise in software development and usability standards. By employing both online and face-to-face evaluation methods, the proponents ensured that feedback was comprehensive and reflective of diverse perspectives. This mixed-method approach also increased the reliability and validity of the evaluation findings, as it captured real-world user experiences alongside expert opinions.

Validity of Research Instrument

In this study, there was no need to establish the validity of the research instrument because the Post-Study System Usability Questionnaire (PSSUQ) was already a standardized tool. The PSSUQ had been extensively validated through previous research, ensuring its reliability and accuracy in measuring system usability across various contexts. Standardized instruments like the PSSUQ undergo

rigorous testing and refinement to ensure they accurately capture the constructs they are intended to measure. Therefore, using a standardized tool like the PSSUQ allowed the researchers to confidently rely on its established validity without the need for further validation in this specific study.

Reliability of Research Instrument

There was no need to establish the reliability of the research instrument because the Post-Study System Usability Questionnaire (PSSUQ) was already a standardized tool. The PSSUQ had been extensively tested for reliability in various studies, ensuring its consistency and stability in measuring system usability. Standardized instruments like the PSSUQ undergo rigorous testing procedures to confirm that they produce consistent results across different samples and contexts. Therefore, by using the PSSUQ, the researchers confidently relied on its established reliability, eliminating the need for further reliability testing in this specific study.

Analysis and Statistical Treatment of Data

The proponents used the average mean as a statistical tool. The system's technical functionalities were assessed using the Post-Study System Usability Questionnaire (PSSUQ), focusing on four key evaluation areas: System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction. Data were gathered from 25 respondents using a 7-point Likert scale with 1 denoting "strongly agree" and 7 denoting "strongly disagree," was used to collect respondents' responses. The lower the score, the better the performance and satisfaction result, in accordance with the PSSUQ score interpretation. For each item on the PSSUQ, the mean score was calculated to determine the average level of user satisfaction with different aspects of the current system. The mean score provided a clear indication of areas that required improvement and those that were already satisfactory.

The average mean was calculated by summing the scores for each response and dividing by the number of respondents. This provided an average measure of user satisfaction for each aspect of the system.

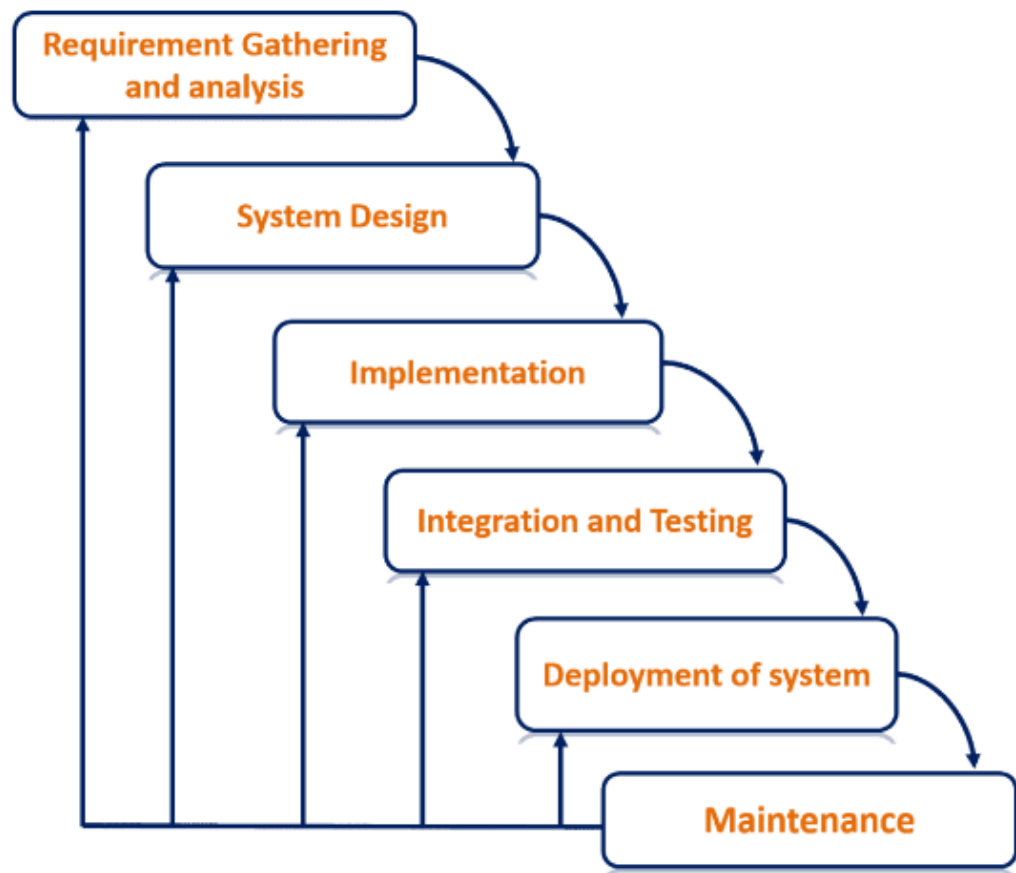
System Development Life Cycle

In the Software Development Life Cycle, the study used the modified waterfall method. The modified waterfall model was a common paradigm used in the system development life cycle to build systems in an orderly sequence approach. The adapted waterfall methodology offered a systematic flow of development stages, incorporating adaptable iterative phases to enhance the quality, dependability, and maintainability of the customized software by ensuring sufficient documentation and design reviews.

The modified waterfall model guided the project through sequential phases to complete it. The proponents used this method to ensure all processes and functionalities underwent testing and documentation, allowing the proponents to return to previous phases if any errors occurred.

Figure 1

Modified Waterfall Model



Requirement Gathering and Analysis

In this phase, the proponents analyzed and gathered information necessary to build the system by meeting with the client, conducting naturalistic observation, and noting the data flow of the old physical system. The data collected served as the basis for developing this system.

System Design

In this phase, the proponents created an app layout draft for the visuals of the app based on the information gathered in the previous phase. The proponents created an app wireframe for the system, and the data flow was also established in this phase.

Implementation

After the initial design phase, the proponents developed the functional requirements. This began with account creation, account management, sales processing, inventory, and laundry categorization, which only users assigned the role of Admin could access. The establishment of a database connection preceded the development of the remaining transaction processing system. Admin users were able to manage inventory of supplies, generate reports, change account status, edit and update service types, and perform account management. Staff users oversaw sales processing, taking and managing delivery orders of laundry. The client could also input the address for delivery.

Integration and Testing

In this phase, the proponents integrated all functions and processes and tested the system. The proponents tested the system for dead ends and incorrect functions.

Deployment

The system will be endorsed to the Labadero laundry shop at this phase, signaling the change from development to operational usage. To make sure that all features will satisfy the needs and expectations of the stakeholders, a final system optimization will be carried out prior to complete deployment. This included verifying user accounts, permissions, data connections, and system configurations. The proponents will facilitate the installation of the Labadero Laundry Management Information System (LLMIS) onto the shop's designated devices, ensuring compatibility and security of the software in the new environment.

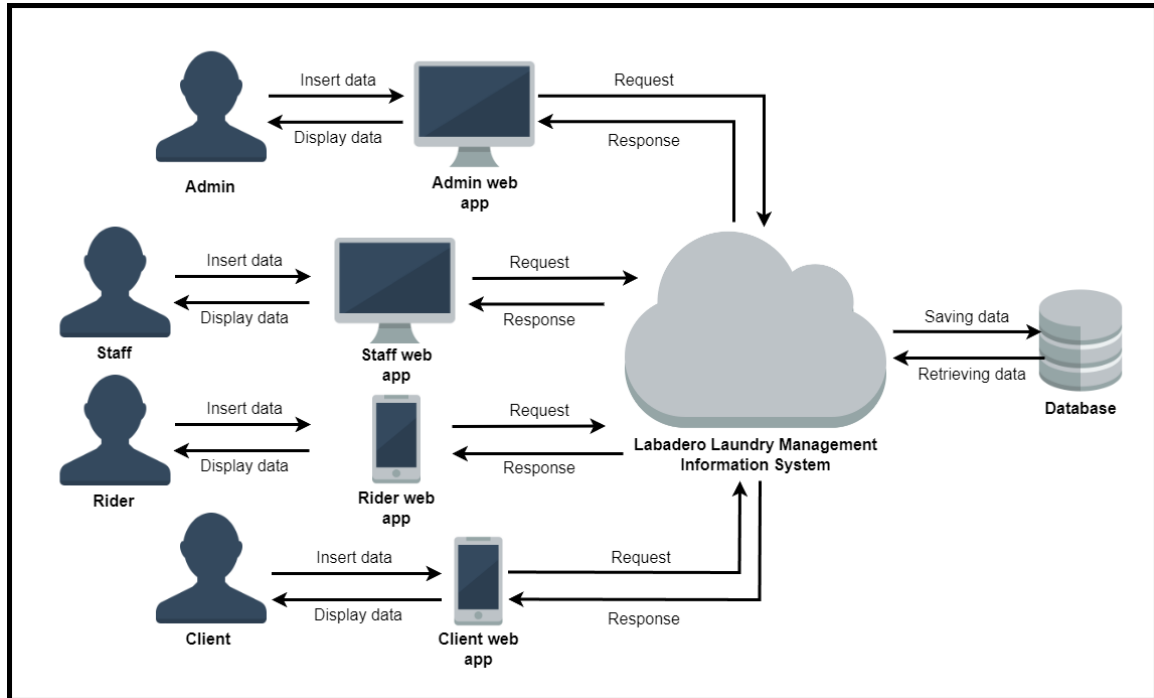
Maintenance

In this phase, regular maintenance procedures will be established by the proponents to ensure system performance will remain optimal and responsive to the shop's evolving needs. This phase involved scheduled updates to address potential system bugs, improve functionalities, and enhance security features as necessary.

Framework of the Study

Figure 2

Operational Framework

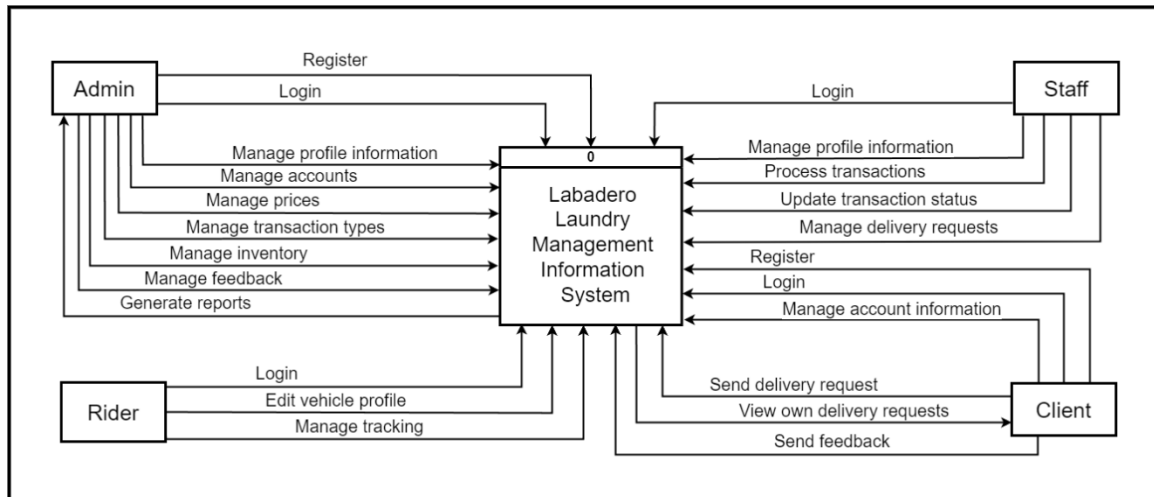


The operational framework is the graphical representation of how the Labadero Laundry Management Information System operates. With the help of an internet connection, all data from client, admin, rider, and staff accounts can be stored and retrieved in the database.

Context Diagram

Figure 3

Context Diagram

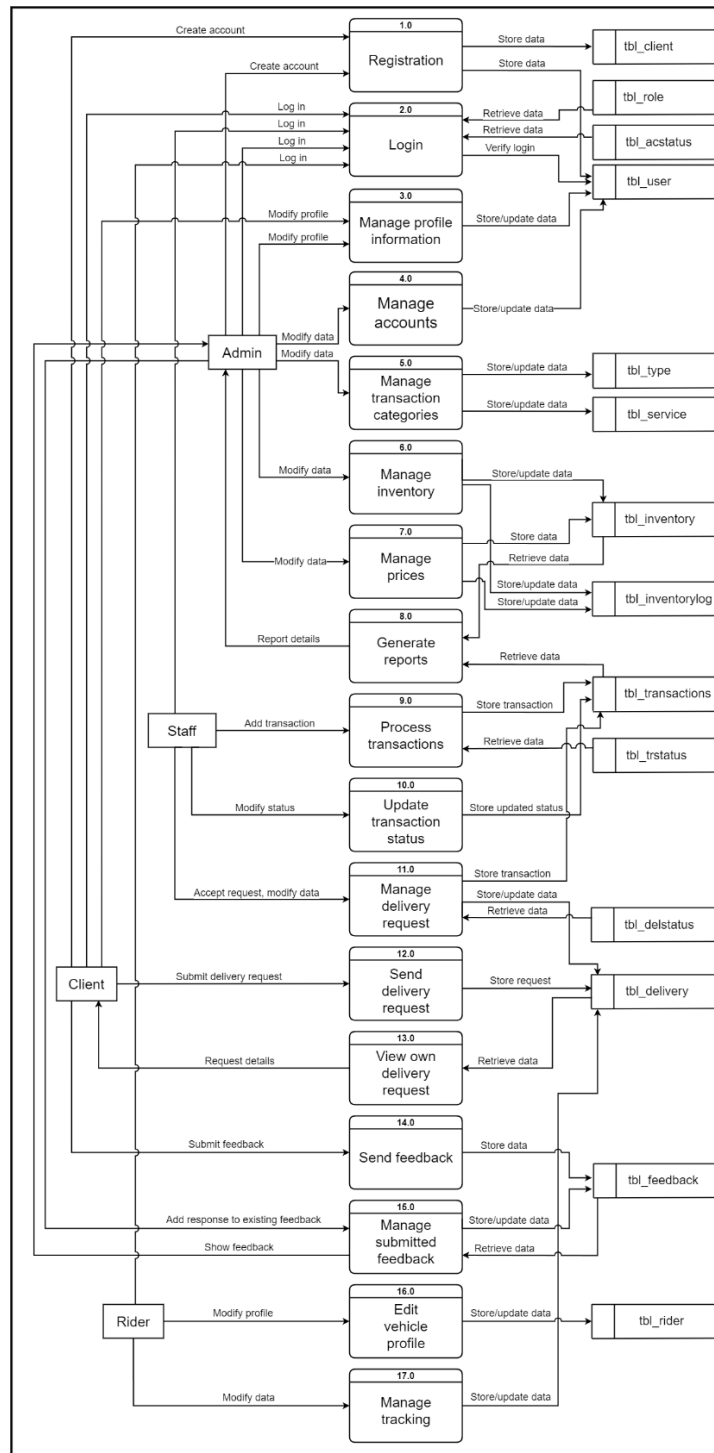


In the diagram above, the Labadero Laundry Management Information System is represented as the middle box. This represents the functionalities of system. It has 4 users which include Admin, Staff, Rider, and Client.

Data Flow Diagram

Figure 4

Data Flow Diagram

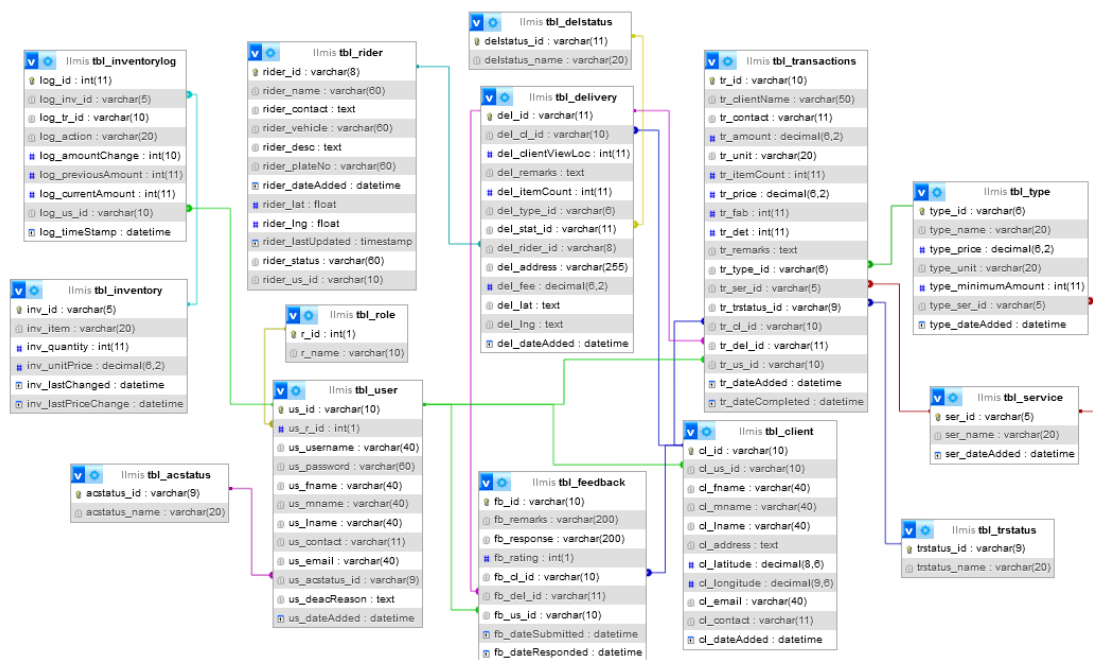


The diagram above depicts how information moves through every process. It starts with the registration of the account, logging in, managing accounts, inventory, updating status, and managing deliveries.

Entity Relationship Diagram

Figure 5

Entity Relationship Diagram

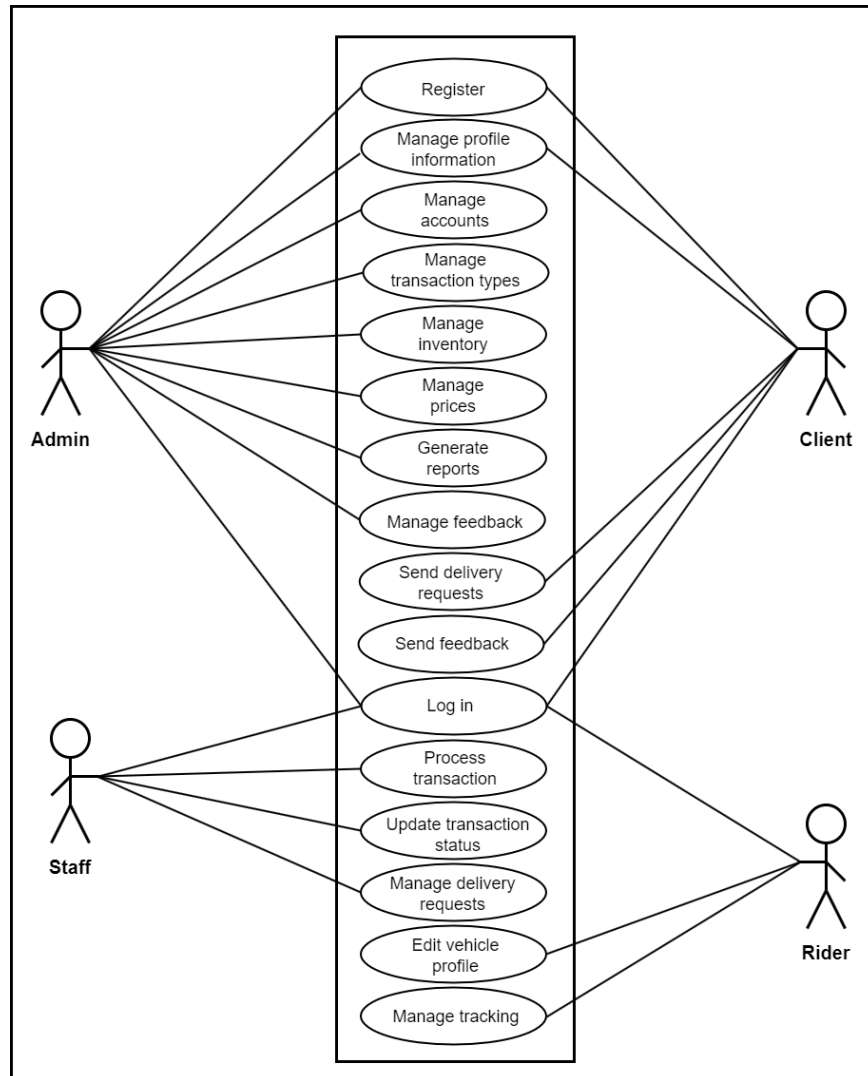


In the diagram above, it shows how each table, people, objects and concepts relate to each other within a process or system. It represents the connection of each functionality.

Use Case Diagram

Figure 6

Use case diagram



The use case diagram above illustrates the processes and functionalities available to different user roles within the system. At the basic user level, all clients can register and log in to access the system. Clients are able to manage their profile information, keeping their personal

details up to date for accurate record-keeping. Clients can also send delivery requests when they require pickup or drop-off services for their laundry. Furthermore, clients are given the option to send feedback about their experience, which provides valuable insights to the business and contributes to service improvements.

Staff users handle functionalities that are primarily centered on processing and updating customer transactions. The staff can log in to access their account and handle the processing of transactions, which involves managing customer orders, payments, and the flow of services. They are responsible for updating transaction statuses as orders progress through the laundry process. Additionally, staff members manage delivery requests, ensuring that laundry items are properly scheduled for delivery and coordinating with riders if needed.

Rider users, a new role in the system, facilitate the delivery process. Riders can log in to access the system and perform necessary tasks. They have the ability to edit their vehicle profile, ensuring that accurate information is available regarding their delivery vehicle. Additionally, riders manage tracking, allowing clients and staff to monitor the delivery status of laundry orders in

real time. This tracking feature enhances transparency and communication within the delivery process.

Admin users hold the highest level of access, enabling them to perform a variety of management tasks. The admin can log in and register within the system, as well as manage profile information to keep their records up to date. They have the authority to manage accounts, which includes overseeing user access and permissions. Additionally, admins manage transaction types, inventory, and prices to ensure accurate service offerings and maintain the integrity of available resources. They are also responsible for generating reports based on system data, which supports business insights and operational decisions. Moreover, admins manage customer feedback, allowing them to address concerns and improve service quality.

Data Dictionary

A data dictionary is a catalog that contains definitions for data elements, data types, data flows, and other conventions used in an information system. Data dictionaries are commonly used in two domains: (i) the database community, where they are used to describe

database entities, schemas, permissions, etc.; and (ii) the software development community, where they are used to describe information flows through the system. Essentially, a data dictionary is a virtual database that contains metadata about an information system.

Table 3

tbl_role

Field Name	Field Type	Length	Description
r_id	int	1	Primary key
r_name	varchar	20	Role of account

Table 3 is used to record the user's role and determine if it is admin, staff or the client.

Table 4

tbl_actstatus

Field Name	Field Type	Length	Description
actstatus_id	varchar	9	Primary key
actstatus_name	varchar	20	Status of account

Table 4 will determine the current status of the account.

Table 5

tbl_user

Field Name	Field Type	Length	Description
us_id	varchar	10	Primary key
us_r_id	int	1	Foreign key
us_username	varchar	600	Username
us_password	varchar	60	User password
us_fname	varchar	40	User first name
us_mname	varchar	40	User middle name
us_lname	varchar	40	User last name
us_contact	varchar	11	User contact number
us_email	varchar	40	User email
us_actstatus_id	varchar	40	Foreign key
us_dateAdded	datetime		Date of the account added

Table 5 is used to record user information and verify login.

Table 6

tbl_inventory

Field Name	Field Type	Length	Description
inv_id	varchar	5	primary key
inv_item	varchar	20	name of inventory item
inv_quantity	int	11	quantity of item
inv_unitSold	varchar	15	number of unit sold
inv_unitPrice	decimal(6,2)		price of item
inv_dateadded	datetime		date of inventory item added/updated
inv_lastChanged	datetime		last update of inventory

Table 6 is to record inventory quantity and price,
accessible only to admins.

Table 7

tbl_client

Field Name	Field Type	Length	Description
cl_id	varchar	10	primary key
cl_us_id	varchar	10	client user ID
cl_fname	varchar	40	first name of client
cl_mname	varchar	40	maiden name of client
cl_lname	varchar	40	last name of client
cl_address	varchar	40	Client address
cl_email	varchar	40	Client email
cl_contact	varchar	11	Client contact number
cl_dateAdded	datetime		Date and time when client added

Table 7 shows records of information of the Client.

Table 8*tbl_delivery*

Field Name	Field Type	Length	Description
del_id	varchar	11	Primary key
del_cl_id	varchar	10	client ID
del_remarks	text		remarks of client
del_stat_id	varchar	10	delivery status ID
del_address	varchar	60	delivery address
del_dateAdded	varchar	60	when delivery added
del_dateAdded	datetime		

Table 8 is used to record delivery information and status.

Table 9*tbl_status*

Field Name	Field Type	Length	Description
del_status_id	varchar	10	Primary key
delstatus_name	varchar	20	Status of transaction

Table 9 is to update the status of the delivery. Only staff will be able to update the status from pending to collected.

Table 10*tbl_transactions*

Field Name	Field Type	Length	Description
tr_id	varchar	10	Primary key
tr_clientName	varchar	50	Foreign Key of client name
tr_contact	varchar	11	foreign key of contact number of client
tr_amount	decimal(6,2)		transaction amount
tr_unit	varchar	20	foreign key of transaction unit
tr_price	decimal(6,2)		transaction price
tr_fab	int	11	Fabric conditioner quantity
tr_det	int	11	detergent quantity
tr_remarks	text		client remarks
tr_type_id	varchar	6	Foreign key of transaction type
tr_ser_id	varchar	5	Foreign key of service ID
tr_trstatus_id	varchar	10	status of transaction
tr_cl_id	varchar	10	foreign key of client ID
tr_del_id	varchar	11	foreign key of delivery ID
tr_us_id	varchar	10	foreign key of username ID
tr_dateAdded	datetime		when the transaction added

Table 10 is to record the transactions entered by staff, including client information and details of transaction such as total amount of transaction, service, status, transaction type, and unique identifier.

Table 11

tbl_trstatus

Field Name	Field Type	Length	Description
trstatus_id	varchar	9	Primary key
trstatus_name	varchar	20	foreign key of Status of transaction

Table 11 is to update the status of the transactions. Only staff will be able to update the status from pending to completed, ready to deliver.

Table 12

tbl_service

Field Name	Field Type	Length	Description
ser_id	varchar	5	Primary key
ser_name	varchar	20	service name
ser_dateAdded	datetime		

Table 12 records the service that client selected.

Table 13

tbl_type

Field Name	Field Type	Length	Description
type_id	varchar	6	Primary key
type_name	varchar	20	type of transaction name
type_price	datetime		
type_unit	varchar	20	foreign key of type of unit
type_ser_id	varchar	5	foreign key of type of service ID
type_dateAdded	datetime		when the type is added

Table 13 records the type of service that client selected.

Table 14*tbl_rider*

Field Name	Field Type	Length	Description
rider_id	varchar	8	Primary key
rider_name	varchar	60	Name of rider
rider_contact	text		Contact number of rider
rider_vehicle	varchar	60	Rider vehicle type
rider_desc	text		Description of rider's vehicle
rider_plateNo	varchar	60	Plate number of rider's vehicle
rider_dateAdded	datetime		when the rider was added
rider_lat	float		Rider latitude
rider_lng	float		Rider longitude
rider_lastUpdated	timestamp		When the rider's coordinates last changed
rider_status	varchar	60	Status of rider
rider_us_id	varchar	10	User ID of rider

Table 14 records the riders in the system, along with relevant details of themselves, their vehicles, and their location.

Table 15*tbl_feedback*

Field Name	Field Type	Length	Description
fb_id	varchar	10	Primary key
fb_remarks	varchar	200	content of feedback
fb_response	varchar	200	content of response
fb_rating	int	1	value of feedback rating
fb_cl_id	varchar	10	foreign key of client
fb_del_id	varchar	11	foreign key of delivery order
fb_us_id	varchar	10	foreign key of admin who responded
fb_dateSubmitted	datetime		when feedback was submitted
fb_dateResponded	datetime		when feedback was responded to

Table 15 records the submitted feedback of registered clients on individual delivery orders, the responses of employees, and the relevant details regarding time.

Hardware and Software Requirements

Table 16

Hardware Requirements			
Operating system	Windows 11	Home Single Language	64-bit(10.0, Build 22621)
Processor	AMD Ryzen 3 7320U with Radeon Graphics (8 CPUs), ~2.4GHz		
Memory	8MB RAM DDR4		

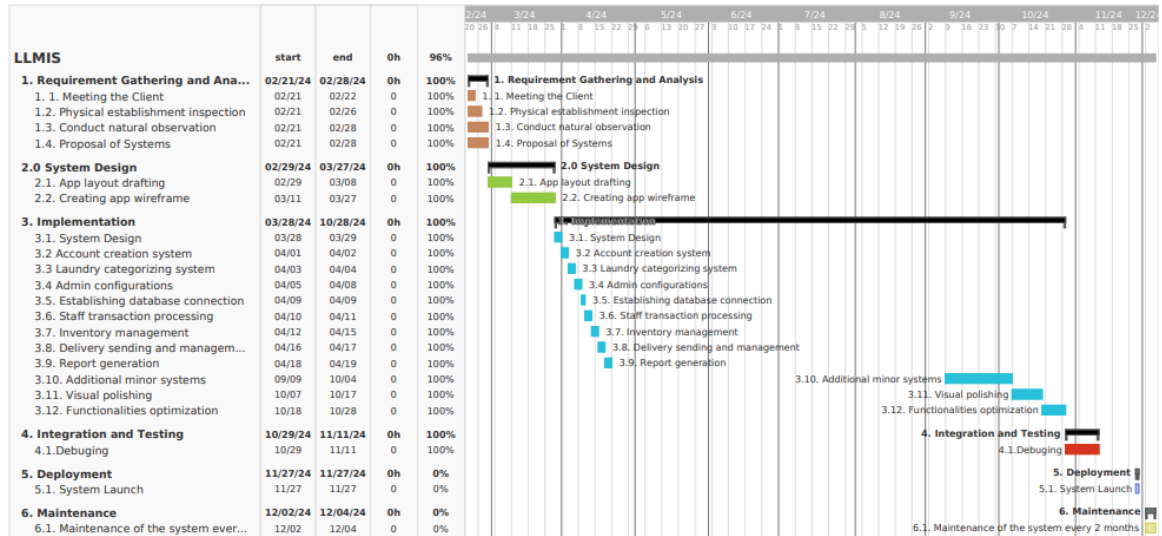
Software Requirements

The recommended network is 20 MBPS data connection and the minimum is 5 Mbps. The proponents suggested to use any compatible operating system, and XAMPP or any compatible web server for recording the data and browser.

Time Table

Figure 7

Gantt Chart



Chapter 4

RESULTS AND DISCUSSION

This chapter presents the results and discussion based on the evaluation of the Labadero Laundry Management Information System (LLMIS), a web application developed to streamline and improve laundry management operations at Labadero Laundry. The system was designed with specific objectives, including providing an intuitive and easy-to-use interface, recording and tracking detailed transaction information, and offering administrative control over system access, roles, and values. The system's technical functionalities were assessed using the Post-Study System Usability Questionnaire (PSSUQ), focusing on four key evaluation areas: System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction. Data were gathered from 25 respondents using a 7-point Likert scale with 1 denoting "strongly agree" and 7 denoting "strongly disagree," was used to collect respondents' responses. The lower the score, the better the performance and satisfaction result, in accordance with the PSSUQ score interpretation. In addition to presenting the results of the system evaluation on usability, quality, and satisfaction, this chapter provides an in-depth analysis of

how well the system achieved the main objectives of the study while also providing insights into the areas where the system performed as expected and those where further improvements could enhance the user experience.

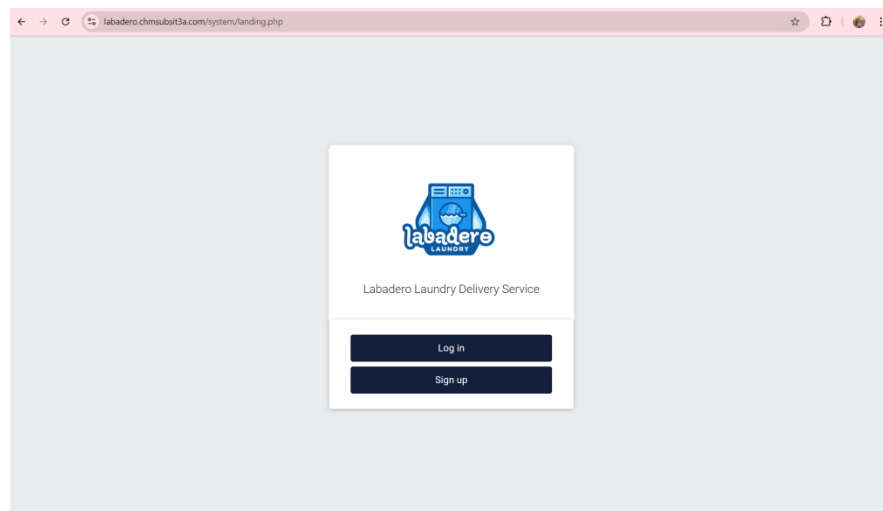
Presentation of Results

1. Develop a laundry information management system with the following technical features:

1.1. Present an intuitive and easy to use UI. The developers have successfully created and developed a laundry management information system with an intuitive and easy to use UI.

Figure 8

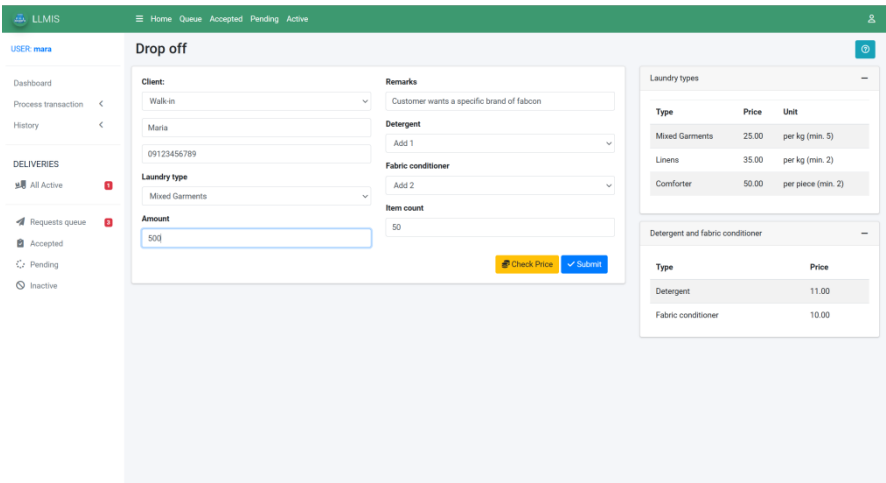
Login page



1.2. Record and provide complete details of transactions. The developers have successfully developed a system that could record and provide complete details of transactions.

Figure 9

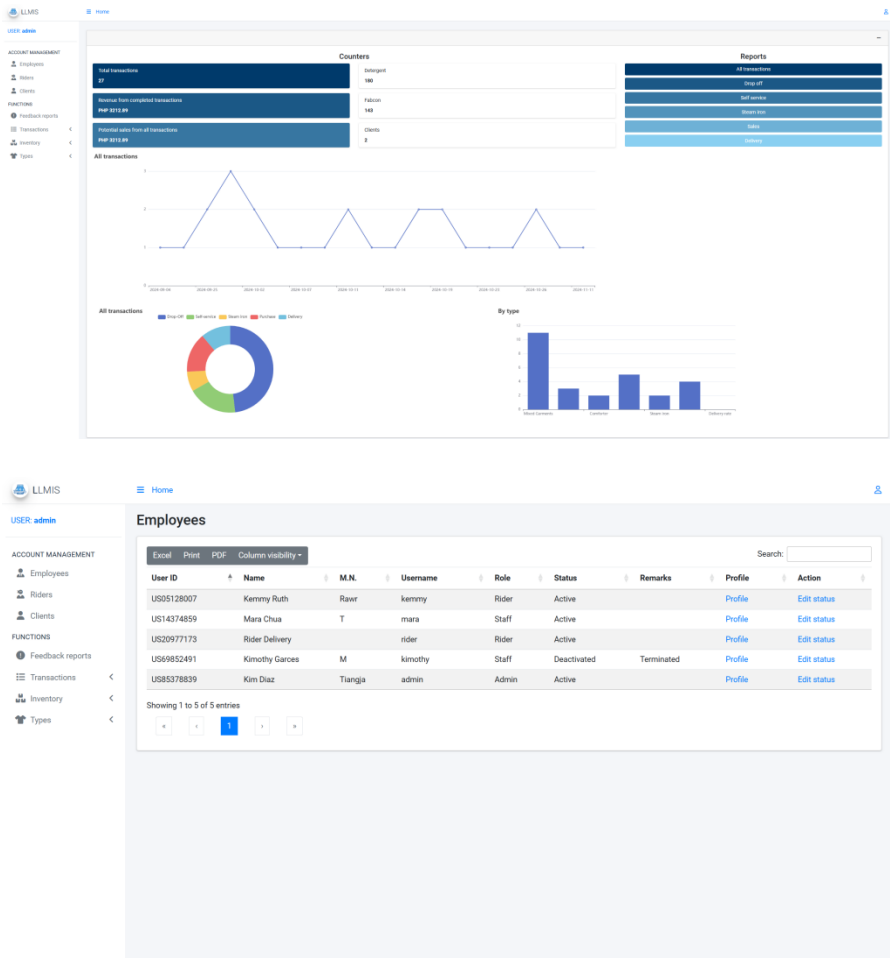
Staff Dashboard



1.3. Allow admin roles to control access and values, as well as monitor changes in the system. The developers have successfully developed a system that allows admin roles to control access and values, as well as monitor changes in the system.

Figure 10

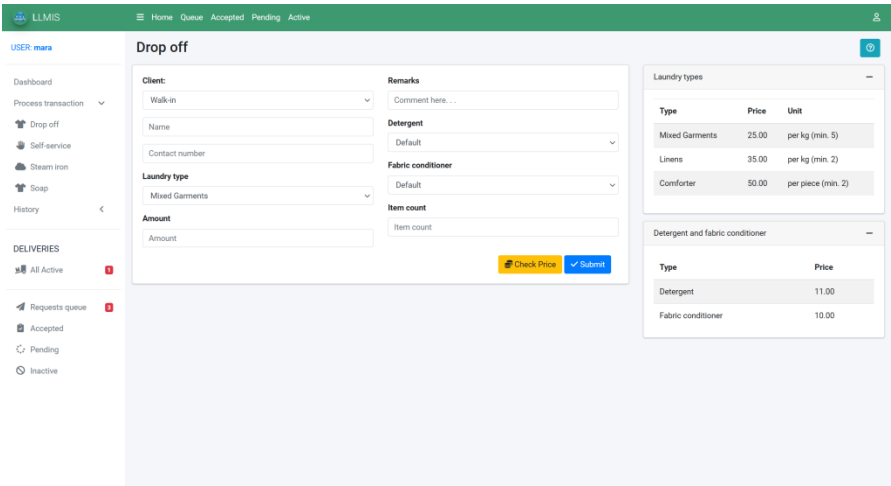
Admin Dashboard



1.4. Allow staff roles to process transactions. The developers have successfully developed a system that allows staff roles to process transactions.

Figure 11

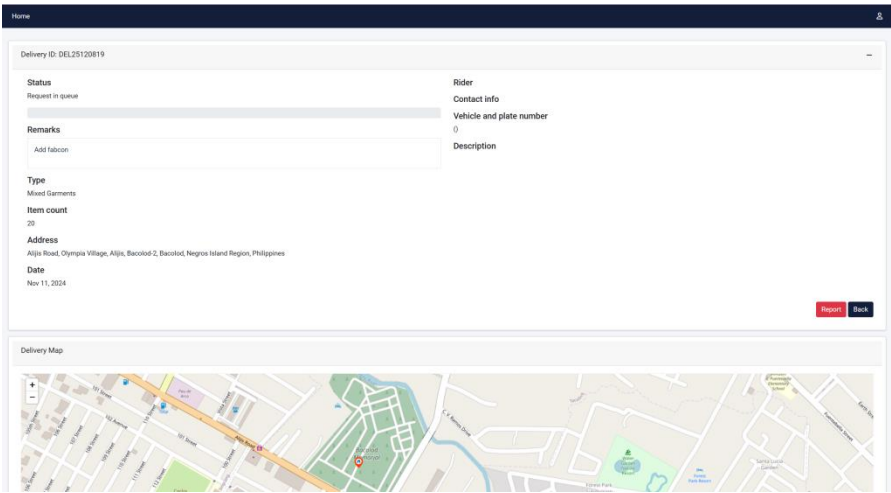
Transaction page



1.5. Store information for deliveries through registered client accounts. The developers have successfully developed a system that stores information for deliveries through registered client accounts.

Figure 12

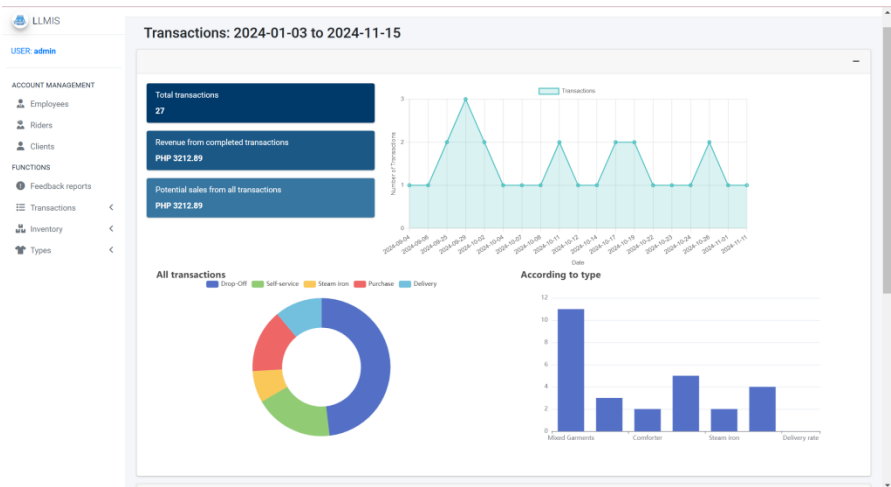
Delivery Page



1.6 Allows admin to generate reports. The developers have successfully developed a system that allows admin to generate reports.

Figure 13

Reports



1.7 Allows users to provide feedback. The developers have successfully developed a system that allows users to provide feedback.

Figure 14

Feedback

The screenshot displays a web application interface for tracking a delivery. A modal window titled "Submit Feedback" is open, allowing a user to provide feedback on a specific delivery. The background page shows details for Delivery ID: DEL25120819, including its status (Request in queue), remarks, type (Mixed Garments), item count (20), address (Aljira Road, Olympia Village, Aljira, Bacolod 2, Bacolod, Negros Island Region, Philippines), and date (Nov 11, 2024). A "Delivery Map" is visible at the bottom. The feedback modal includes a text input field with the placeholder "nice service!", a rating section with five yellow stars, and a blue "Submit" button. At the bottom right of the background page, there are "Report" and "Back" buttons.

Home

Delivery ID: DEL25120819

Status
Request in queue

Remarks
Add remark

Type
Mixed Garments

Item count
20

Address
Aljira Road, Olympia Village, Aljira, Bacolod 2, Bacolod, Negros Island Region, Philippines

Date
Nov 11, 2024

Report Back

Delivery Map

Submit Feedback

Your Feedback
nice service!

Rating ★★★★★

Submit

2. Evaluation of the System

Table 17

Usability result

PSSUQ Sub Scale	Mean	Verbal Interpretation
System Usefulness	1.42	Very Usable
Information Quality	1.63	Very Usable
Interface Quality	1.49	Very Usable
Overall	1.51	Very Usable

The overall usability test results for the Labadero Laundry Management Information System (LLMIS), as shown in Table 17, provide an overall interpretation using the Post-Study System Usability Questionnaire (PSSUQ) standards. Each subscale demonstrates a high level of usability, with all categories receiving a mean rating that falls well below the PSSUQ threshold for acceptable usability scores, indicating that respondents found the system to be very usable across all measured areas.

The System Usefulness subscale achieved a mean rating of 1.42, which is interpreted as "Very Usable." This rating is lower than both the PSSUQ lower limit of 2.57 and upper limit of 3.02, which suggests that the system effectively

met users' needs by offering valuable features and solutions that improve the efficiency of laundry management processes. This aligns with prior findings indicating that user-centered design approaches contribute significantly to user satisfaction and functionality within specialized management systems (Duck Design, 2023).

The Information Quality subscale received a mean rating of 1.63, also classified as "Very Usable." This rating is lower than both the PSSUQ lower limit of 2.79 and upper limit of 3.24. This outcome implies that users perceived the quality of information provided by the system as accurate, timely, and relevant to their operational needs. High information quality ensures users can make well-informed decisions, which is crucial for maintaining effective laundry service workflows.

For Interface Quality, the mean rating was 1.49, interpreted as "Very Usable." This rating is lower than both the PSSUQ lower limit of 2.28 and upper limit of 2.71. This high rating reflects positive user experiences regarding the system's layout, ease of navigation, and interface aesthetics, which contributed to user satisfaction.

The Overall Satisfaction score for this system is 1.41, further confirming the system's high usability rating. This rating is lower than both the PSSUQ lower limit of 2.62 and upper limit of 3.02. This overall assessment indicates that users found the system highly satisfactory, meeting or exceeding expectations in supporting daily operations and improving task efficiency. These high usability scores across subscales reflect a well-implemented system that not only meets functional requirements but also enhances the quality of user interactions.

Table 18

System Usefulness result

System Usefulness	Mean	Verbal Interpretation
1. Overall, I am satisfied with how easy it is to use this system.	1.44	Very Usable
2. It was simple to use this system.	1.32	Very Usable
3. I was able to complete the tasks and scenarios quickly using this system.	1.52	Very Usable
4. I felt comfortable using this system	1.6	Very Usable
5. It was easy to learn to use this system.	1.4	Very Usable
6. I believe I could become productive quickly using this system.	1.24	Very Usable
System Usefulness	1.42	Very Usable

The results in Table 18 summarize the mean scores for the System Usefulness subscale of the Post-Study System Usability Questionnaire (PSSUQ) for the Labadero Laundry Management Information System (LLMIS). The first item achieved a mean score of 1.44, which falls within the "Very Usable" range, indicating high satisfaction with the system's ease of use. The second item scored an average of

1.32, also interpreted as "Very Usable." This finding suggests that users found the system straightforward and easy to navigate, consistent with findings in usability research, such as those by Nielsen (2012), which emphasize simplicity as a critical factor in enhancing user satisfaction.

The third item achieved a mean score of 1.52, interpreted as "Very Usable," suggesting that respondents found the system effective in facilitating timely task completion. Similarly, the fifth item scored 1.4, reinforcing the system's ease of learnability, an important factor in usability studies supported by Shneiderman and Plaisant (2009), who highlight that easy-to-learn interfaces improve user adoption and productivity.

The fourth item had a mean score of 1.6, also falling within the "Very Usable" category, indicating that users found the system to be comfortable to use, likely contributing to a more positive overall experience. Lastly, the sixth item achieved a mean of 1.24, indicating a high level of confidence among users in achieving productivity with the system.

The overall average score for the System Usefulness subscale was 1.42, categorized as "Very Usable." This

result suggests that the Labadero Laundry Management Information System met users' expectations for usability, supporting effective task completion and comfort, which are essential for productivity. This high level of system usefulness indicates that the system functions effectively and supports users in completing tasks efficiently.

Table 19

Information Quality result

Information Quality	Mean	Verbal Interpretation
7. The system gave error messages that clearly told me how to fix problems.	2.04	Very Usable
8. Whenever I made a mistake using the system, I could recover easily and quickly.	1.88	Very Usable
9. The information (such as online help, on-screen messages, and other documentation) provided with this system was clear.	1.56	Very Usable
10. It was easy to find the information I needed.	1.52	Very Usable
11. The information was effective in helping me complete the tasks and scenarios	1.4	Very Usable
12. The organization of information on the system screens was clear.	1.4	Very Usable
Information Quality	1.63	Very Usable

Table 19 shows the summary of mean scores for the Information Quality subscale of the PSSUQ. The first item achieved a mean score of 2.04, interpreted as "Very Usable." This suggests that respondents found the system's error messages highly informative and effective in aiding

troubleshooting. The second item scored a mean of 1.88, indicating that users were able to recover from errors smoothly, thus minimizing interruptions in workflow. The third item achieved a mean score of 1.56, which respondents also interpreted as "Very Usable." This reflects the effectiveness of the system's help and on-screen instructions in guiding users efficiently.

Furthermore, item four received a mean score of 1.52, affirming the ease of navigation and accessibility of critical information within the system. Item five had a mean score of 1.4, suggesting that users were able to complete tasks and scenarios effectively using the information provided. The sixth item achieved the highest usability score in this subscale with a mean of 1.4. This indicates that users found the screen layouts well-structured and easy to interpret, which contributed to their overall positive experience.

The overall Information Quality subscale achieved a mean score of 1.63, classified as "Very Usable." This aligns with studies stating that systems with clear information structure and supportive feedback mechanisms enable users to complete tasks more efficiently and enhance overall satisfaction (MacDonald, 2014). These findings

suggest that the Labadero Laundry Management Information System effectively facilitated information clarity, accessibility, and support, contributing to a seamless user experience.

Table 20

Interface Quality result

Interface Quality	Mean	Verbal Interpretation
13. The interface of this system was pleasant	1.44	Very Usable
14. I liked using the interface of this system.	1.52	Very Usable
15. This system has all the functions and capabilities I expect it to have.	1.6	Very Usable
16. Overall, I am satisfied with this system.	1.4	Very Usable
Interface Quality	1.49	Very Usable

Table 20 presents the summary of mean scores for the Interface Quality subscale of the PSSUQ. The first item achieved a mean score of 1.44, verbally interpreted as "Very Usable." This suggests that users found the interface visually appealing and comfortable to engage with, enhancing their interaction with the system. The second

item received a mean score of 1.52, further confirming that respondents appreciated the design and usability of the interface, which likely contributed to their enjoyment and ease of use. The third item also achieved a mean score of 1.6. This implies that users felt the system met their functional expectations, supporting efficient task completion. The fourth item received the highest score within this subscale with a mean of 1.4, indicating a strong level of user satisfaction with the system's interface design and functionality.

With an overall mean score of 1.49, classified as "Very Usable," the Interface Quality subscale results suggest that the Labadero Laundry Management Information System provided a positive and satisfying interface experience for users. The findings of this study suggest that the system's interface was successfully designed to be user-friendly, intuitive, and functional, thereby meeting the usability standards expected in user-centered design.

Chapter 5

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The evaluation of the Labadero Laundry Management Information System (LLMIS) guided by Post-Study System Usability Questionnaire (PSSUQ) standards demonstrates a high level of user acceptance, with the system achieving an overall mean score of 1.51, interpreted as "Very Usable." This positive outcome suggests that the system effectively fulfills its intended purpose, providing a user-friendly and efficient tool for managing laundry operations. The assessment covered three main usability subscales: System Usefulness, Information Quality, and Interface Quality, each contributing to a comprehensive understanding of the system's performance from the users' perspective.

The System Usefulness subscale received a mean score of 1.42, indicating high user satisfaction with the system's ability to facilitate task completion and support productive workflows. In terms of Information Quality, the system achieved a mean score of 1.63, classified as "Very Usable," signifying that users find the system's information clear, accessible, and effective in supporting decision-making tasks. Users noted particular satisfaction with the ease of finding information with a mean score of

1.52 and the clarity of the screen layout with a mean score of 1.4. However, there was a minor area for improvement in error message clarity with a mean score of 2.04, where users indicated that the system occasionally lacked adequate guidance for resolving issues.

The Interface Quality subscale achieved a high usability rating with an overall mean score of 1.49. Items in this category, such as interface pleasantness and functionality meeting user expectations, suggest that users found the system visually appealing and functionally robust, making it enjoyable to use. This satisfaction is critical in specialized management systems, as noted by Duck Design (2023), where visually intuitive interfaces contribute to user retention and overall productivity.

The overall usability results confirm that the Labadero Laundry Management Information System is a well-accepted tool, meeting user expectations and system objectives. Key features, such as intuitive design, effective task facilitation, and high-quality information, contributed to strong positive feedback from users. The results suggest that minor improvements in error messaging could enhance usability further. Overall, the system demonstrates a successful user-centered design approach that effectively

supports daily laundry management tasks, ensuring productivity and user satisfaction across various operational roles within the system.

Conclusions

Based on the findings of the study, the following conclusions were formulated:

1. The design and development of Labadero laundry Management Information System provides easy to use UI, data management and generate reports are fundamental parts of the system. This demonstrates the system's potential to enhance operational efficiency and user satisfaction in a real-world setting. The integration of core features such as transaction management, inventory tracking, and report generation contributes significantly to the system's value, supporting informed decision-making and streamlined workflows for both staff and management. Consequently, the Labadero Laundry Management Information System is positioned as a robust solution for meeting the daily operational needs of Labadero Laundry Shop.

2. The Labadero Laundry Management System usability was satisfactory, including its sub-scales: System Usefulness, Information Quality and Interface Quality. Therefore, the system can be used and implemented in Labadero laundry Shop. The high ratings across all usability subscales, particularly in System Usefulness and Interface Quality, indicate that the Labadero Laundry Management Information System effectively meets user expectations for task completion, interface design, and functional adequacy. The findings suggest that minor improvements in Information Quality, specifically in error messaging clarity, could further elevate the user experience by making troubleshooting and error resolution more intuitive.

Recommendations

Based on the summary of findings and conclusions, the following recommendations were formulated:

1. **Push notifications.** This feature would be especially relevant to the delivery functionality, as clients will receive information as soon as it is updated.
2. **Integrating tutorial with AI capabilities.** Could support users, especially new ones, by adding a help

feature. This feature might include interactive tutorials, a help center with FAQs, or an onboarding guide that walks users through essential system functions. This addition would promote ease of learning, reduce onboarding time, and help users fully utilize the system's capabilities.

3. Integration of loyalty programs. Integrate a loyalty program within the system can encourage repeat business by offering clients points or rewards for each transaction. Clients could redeem these rewards for discounts or additional services, promoting customer retention and increasing client satisfaction.

4. Integrated online payment. To accommodate a wider range of clients, consider adding support for multiple payment options, including mobile payments, online banking, and digital wallets. Providing diverse payment options enhances client convenience and accessibility, potentially attracting more clients who prefer cashless transactions.

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APPENDICES

Appendix A - FORMS

Appendix B - SYSTEM EVALUATION

