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# Design and Implementation of a Computerized Sales and Inventory System with Stock Monitoring and Income Reporting for MacSull Grocery

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**ABSTRACT:** This study focused on the design and implementation of a Computerized Sales and Inventory System with Stock Monitoring and Income Reporting for MacSull Grocery Store located in Talangan, Madridejos, Cebu. The store previously relied on a manual method of recording sales transactions and tracking inventory, which resulted in frequent calculation errors, inaccurate stock counts, misplaced records, and delayed preparation of financial reports. These operational challenges affected efficiency, decision-making, and overall business performance. To address these issues, a computerized system was developed to automate sales transactions, inventory updates, and income report generation. The system was created using the Rapid Application Development (RAD) model, which includes requirements planning, prototyping, construction, and implementation phases. The developed application features real-time stock monitoring, automatic deduction of inventory after each transaction, centralized data storage, and generation of daily, weekly, and monthly income

reports with graphical summaries. The system was evaluated based on the ISO/IEC 25010 software quality model, focusing on functional suitability, performance efficiency, compatibility, reliability, and security. Evaluation results showed that the system achieved a “Very Satisfactory” rating across all measured criteria. Users reported improvements in transaction speed, stock accuracy, report reliability, and overall usability compared to the previous manual process. The findings indicate that implementing a localized and customized computerized sales and inventory system significantly enhances operational efficiency, reduces human errors, strengthens financial monitoring, and supports better decision-making. The study concludes that implementing a computerized sales and inventory system evaluated under international software quality standards is an effective solution for improving productivity, accountability, and sustainability in small retail businesses.

**Keywords:** Computerized system, ISO/IEC 25010, income reporting, Inventory automation, Retail Management, Stock Monitoring.

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## I. INTRODUCTION

The retail industry continues to expand in response to increasing consumer demand and market competition, making efficient inventory management an essential component of business success (Macas, C. V. M., Aguirre, J. A. E., Arcentales-Carrión, R., & Peña, M. 2021, March). Retail establishments, including small grocery stores, depend on accurate stock monitoring, systematic sales recording, and organized financial reporting to sustain profitability and maintain operational stability (Dubinina, M. 2025). Effective inventory management not only prevents overstocking and stock shortages but also reduces product wastage and improves customer satisfaction. As Competition Intensifies, business must adopt reliable systems to ensure that operations remain accurate, timely and well-documented.

MacSull Grocery Store, located in Talangnan, Madridejos, Cebu, currently relies on a manual system for recording sales transactions and managing inventory. This method involves handwritten records, manual calculations, and physical logbooks for tracking stock movement and daily income. While this traditional approach may be manageable for small-scale operations, it is highly susceptible to human error, miscalculations, misplaced records, and stock discrepancies (Kang, Y., & Gershwin, S. B. 2005). Moreover, manual systems often delay inventory updates and make it difficult to generate comprehensive financial reports. These inefficiencies consume valuable time and effort, which could otherwise be allocated to improving customer service and business growth (Dutta, A., & Roy, R. 2006, January).

With the rapid advancement of technology, computerized sales and inventory management systems have emerged as effective solutions for improving accuracy, efficiency, and data reliability (Yao, A. C., & Carlson, J. G. (1999). However, despite the documented advantages of computerized systems, limited research has focused on developing and implementing a localized, integrated sales and inventory system tailored specifically for small grocery stores in rural communities. Many existing systems are either costly, complex, or not customized to the operational needs of small-scale retail businesses. Therefore, this study aims to design and implement a computerized sales and inventory system with stock monitoring and income reporting to enhance operational efficiency, improve stock control accuracy, and provide reliable financial reporting for MacSull Grocery Store.

However, existing Computerized Sales and Inventory System are often expensive, complex, and not tailored to the needs of small-scale grocery stores in rural communities. Moreover, there is limited research focusing on localized and customized systems that integrate stock monitoring and income reporting specifically for small retail business. This gap highlights the need for a simple, affordable, and efficient system designed for MacSull Grocery Store.

### General Objective

The general objective of this study is to design, develop, and implement a computerized sales and inventory management system with stock monitoring and income reporting for MacSull Grocery Store in Talangan, Madridejos, Cebu.

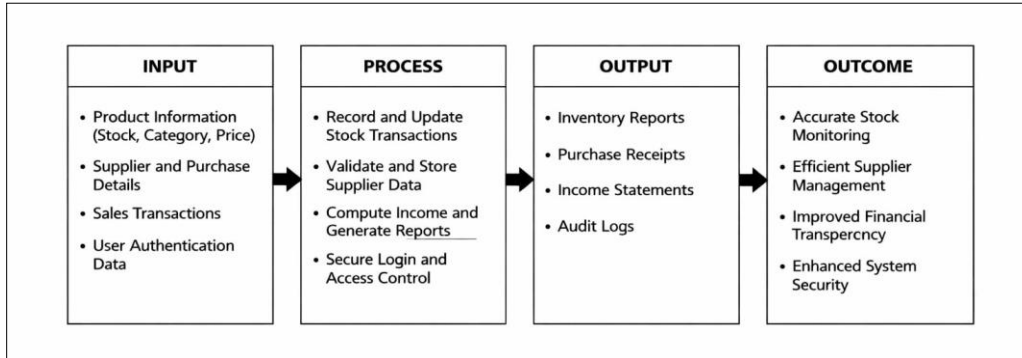
### Specific Objectives

Specifically, this study aims to:

1. General Objective Develop a Macsull Sales and Inventory System to improve inventory management and sales operations.
  - 1.1 Ensure accurate and efficient tracking of stock transactions.
  - 1.2 Develop a real-time dashboard to visualize stock levels and monitor sales transactions.

- 1.3 Reduce errors caused by manual inventory processes.
- 1.4 Provide a user-friendly system for easy data management.
- 1.5 Generate reliable reports for better decision-making.
- 1.6 Develop a mobile enable user management module to facilitate efficient staff administration and role monitoring.
2. Evaluate the system based on ISO/IEC 25010 software quality standards.
3. Assess user acceptance and system usability through USE standardized questionnaire (Lund,2001).

**CONCEPTUAL FRAMEWORK OF MacSull GROCERIES**



**Figure 1. Conceptual Framework of the Computerized Sales and Inventory System for MacSull Grocery**

This figure illustrates the logical flow of the computerized sales and inventory system, showing how data moves from input to outcome. The input stage gathers essential information such as product details, supplier data, sales transactions, and user authentication. The process stage involves recording and updating stock transactions, validating supplier data, computing income, and securing system access. The output stage generates inventory reports, purchase receipts, income statements, and audit logs. Finally, the outcome reflects the system’s impact accurate stock monitoring, efficient supplier management, improved financial transparency, and enhanced system security.

**II. METHODOLOGY**

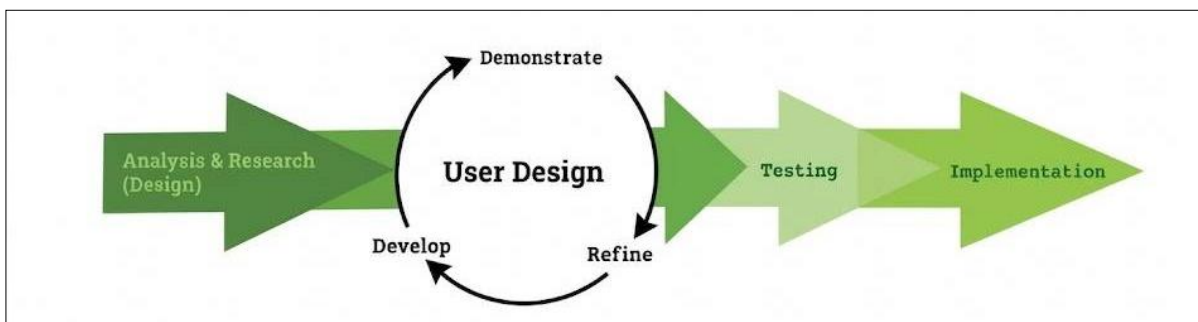
This study applied the developmental research methodology to design, develop, and evaluate the proposed system. This method is defined as the systematic process of designing, developing, and evaluating systems to ensure internal consistency and effectiveness (Richey & Klein, 2005).

The system will be evaluated using a questionnaire survey administered to IT experts and system users to measure the system’s functionality, usability, reliability, and efficiency based on the ISO/IEC 25010 standard.

This study employed a developmental research design to design, develop, and implement a Computerized Sales and Inventory System with Stock Monitoring and Income Reporting for MacSull Grocery Store. The study aimed to improve operational efficiency by replacing the existing manual system with an automated solution.

**Software Development Life Cycle (SDLC)**

The system was developed using the Rapid Application Development (RAD) model. The SDLC consisted of the following phases: requirements planning, user design and prototyping, construction and testing, and system implementation.



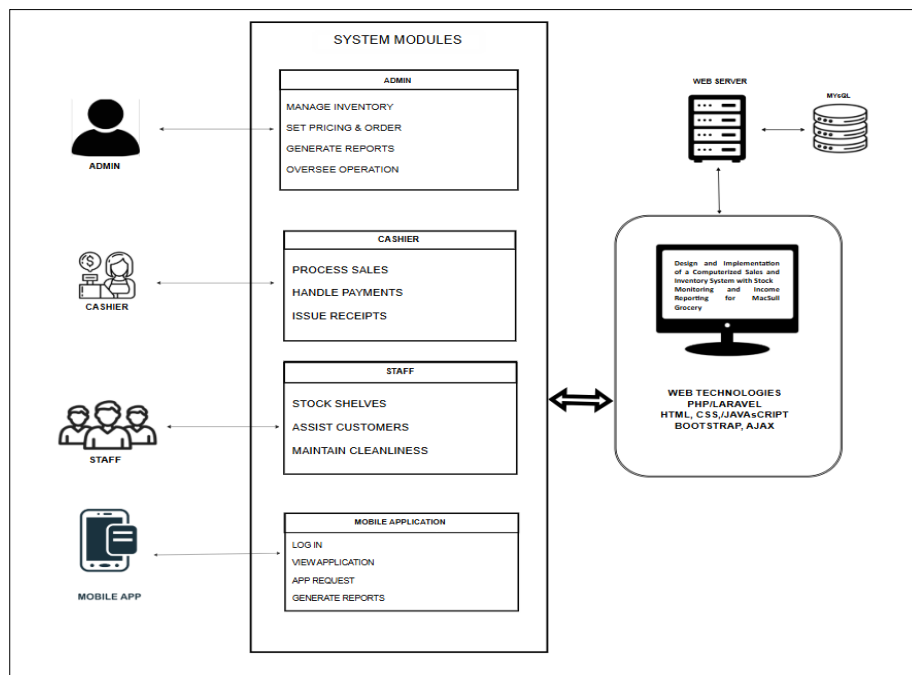
**Figure 1. Software Development Life Cycle (RAD Model)**

The SDLC guided the structured development of the system from requirement gathering to deployment.

1. **Planning** - This is the initial stage where the project’s scope, objectives, and feasibility are defined. It involves resource allocation, risk assessment, and scheduling to ensure the project is viable and aligned with organizational goals.
2. **Requirement Analysis** - In this phase, detailed functional and non-functional requirements are gathered from stakeholders. The outcome is a Software Requirement Specification (SRS) document that serves as the foundation for the design.
3. **Design** - The requirements are translated into system architecture and detailed module specifications. Both high-level design (overall system structure) and low-level design (module details) are prepared to guide developers.
4. **Implementation** - Developers write the actual code based on the design documents. This stage converts the blueprint into working software modules, following coding standards and integrating components.
5. **Testing** - The system is thoroughly tested to ensure it meets requirements and is free of defects. This includes unit testing, integration testing, system testing, and user acceptance testing to validate quality.
6. **Deployment** - Once tested, the software is released into the production environment. This stage involves installation, configuration, and training users to operate the system effectively.
7. **Maintenance** - After deployment, the system requires ongoing support. This includes fixing bugs, updating features, and adapting the software to new requirements or technologies to ensure long-term sustainability

**System Architecture and Technologies**

The developed system follows a centralized architecture composed of a user interface layer, application processing layer, and database layer. The Admin and Cashier access the system through a computer interface, where transactions are processed and stored in a centralized database. A receipt printing module is integrated for customer transactions.



**Figure 2. System Architecture of MacSull Grocery.**

This figure illustrates the architecture of the computerized Sales and Inventory System designed for MacSull Grocery. The system integrates three user roles—Administrator, Cashier, and Staff—each associated with specific modules to streamline grocery operations. The Admin Module enables product management, while the Sales Module facilitates transaction processing. Staff members utilize the Inventory Module to monitor stock levels and generate daily, weekly, and monthly income reports, consolidated through the Reporting Module. The backend employs PHP/Laravel, HTML, CSS, JavaScript, Bootstrap, AJAX, and MySQL, secured by a role-based authentication system. Server infrastructure, deployed on localhost using Apache or Nginx, handles application logic and request processing, while the MySQL database ensures reliable data storage. This architecture emphasizes modularity, secure authentication, and efficient reporting for effective stock monitoring and income analysis

### System Implementation

The completed system was deployed at MacSull Grocery Store. The application includes modules for login authentication, product management, stock monitoring, transaction processing, and income reporting.

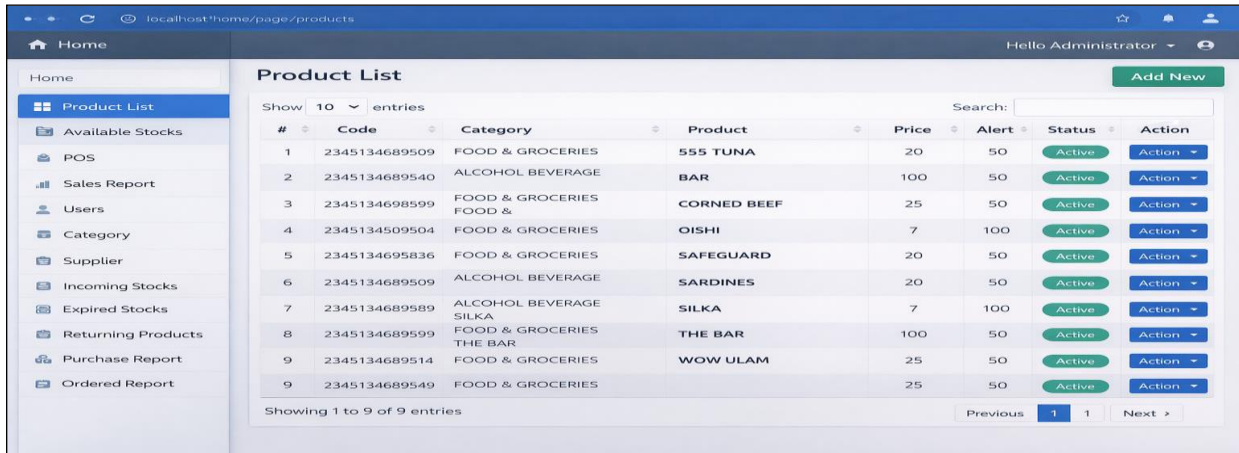


Figure 3. Product List interface for accurate tracking of stock transactions.

Ensure accurate and efficient tracking of stock transactions Figure 3 illustrates the Product List interface of the Macsull Sales and Inventory System. This module provides a structured view of product codes, categories, prices, and stock alerts, enabling administrators to monitor inventory levels with precision. By consolidating all stock information into a centralized dashboard, the system ensures that transactions are recorded accurately and efficiently, minimizing discrepancies in stock movement and supporting reliable inventory control.

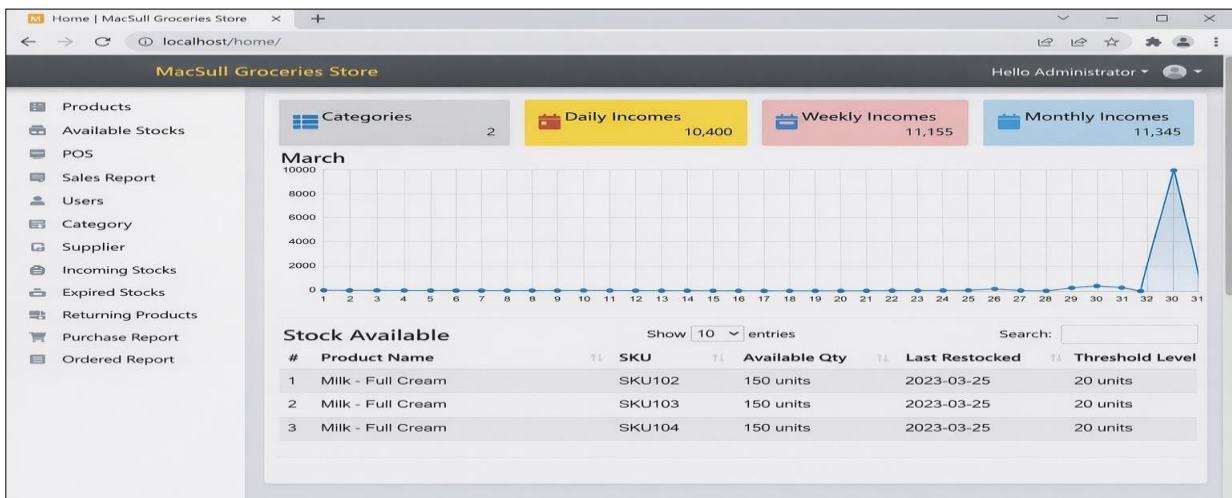
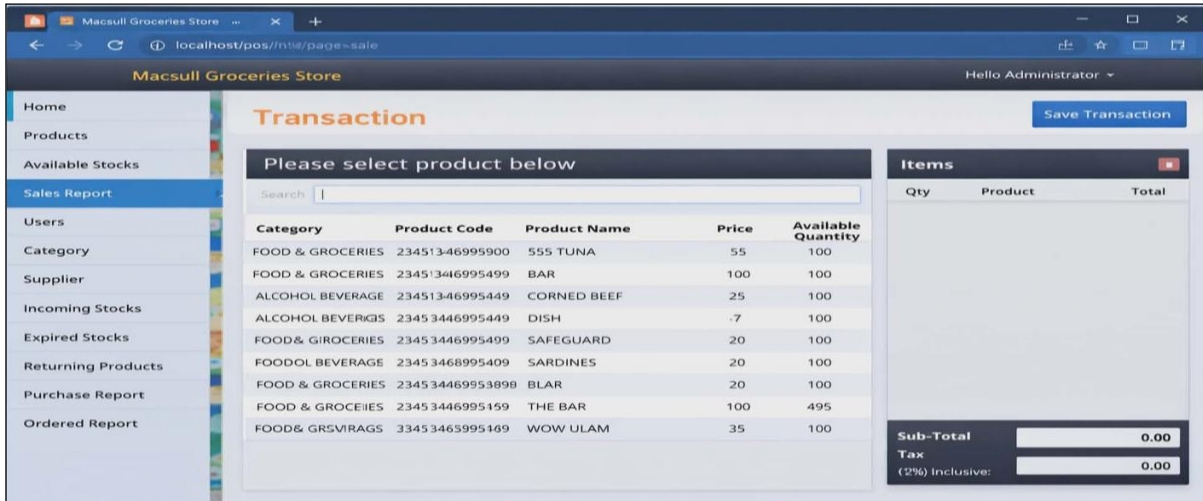


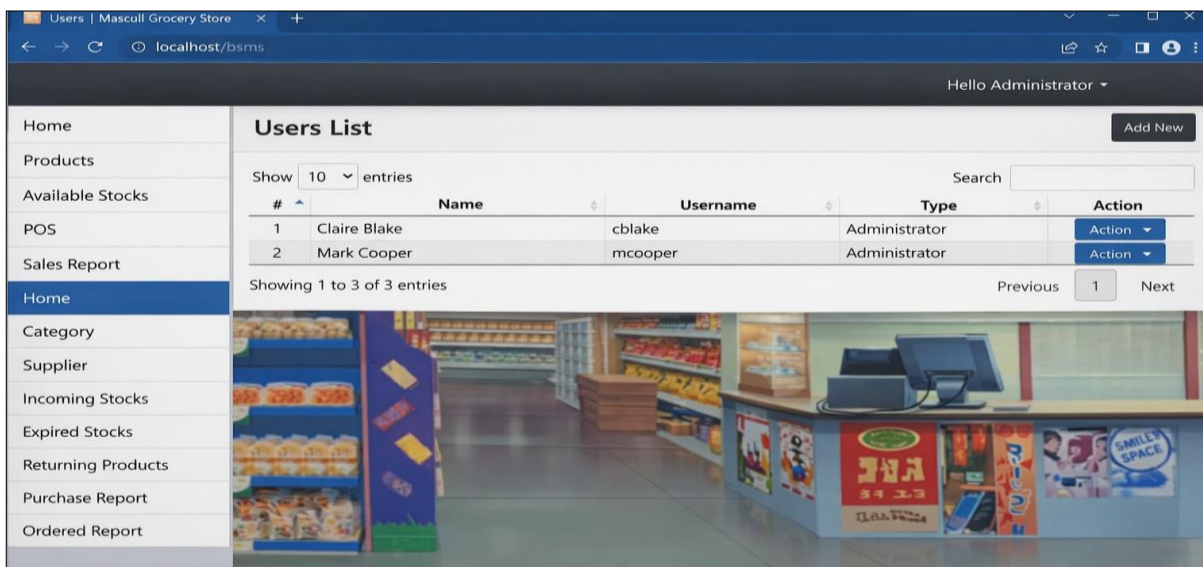
Figure 4. Develop a real-time dashboard to visualize stock levels and monitor sales transactions.

This figure presents the Dashboard interface, which provides a visual summary of inventory levels and sales activities. Unlike manual tracking methods that conceal data within written logs, this system displays critical metrics through charts and status indicators. The visualization enables users to instantly assess stock availability, track revenue flow, and make timely management decisions without the need for manual data computation.



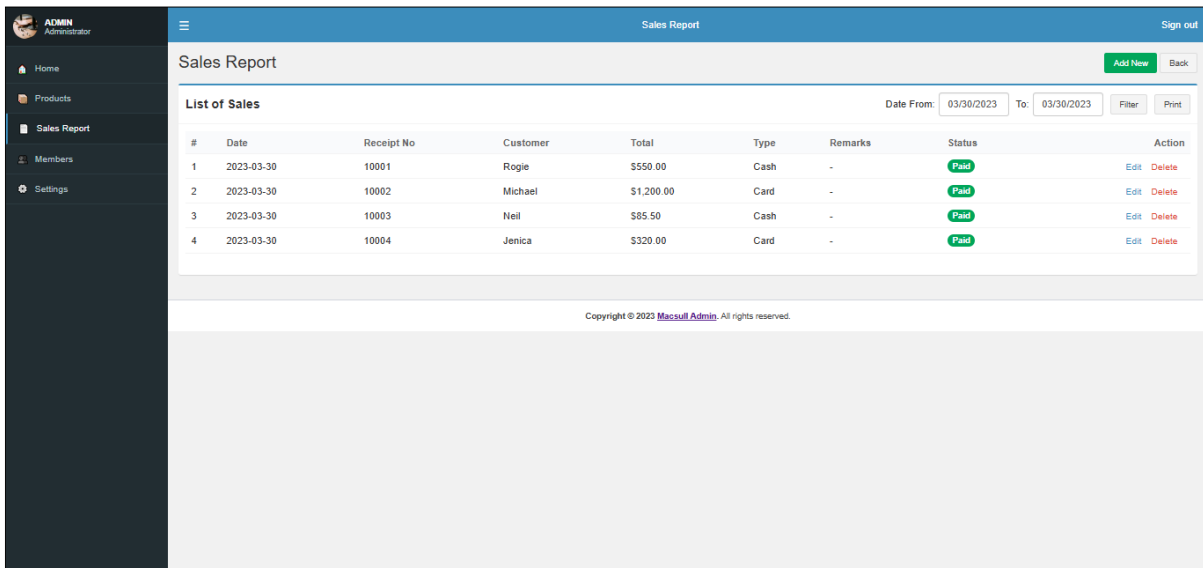
**Figure 5. Point of Sale interface for automated transaction recording.**

This figure presents the Point of Sale (POS) interface, which automates the recording of sales transactions. Unlike manual methods that are prone to miscalculations and misplaced records, this system captures product details, quantities, and totals in real time. The automation reduces human error, ensures consistency in transaction handling, and provides a dependable mechanism for managing inventory updates during customer purchases.



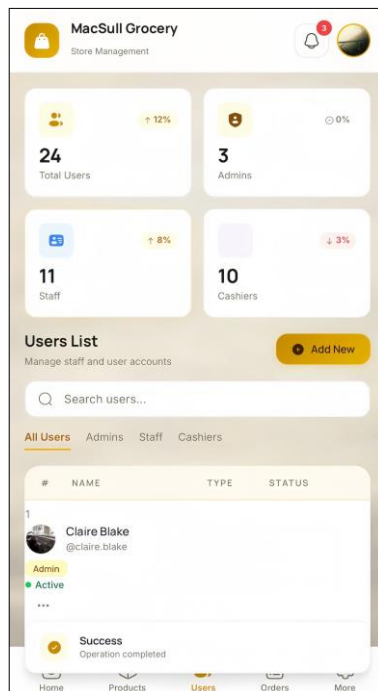
**Figure 6. Sales Report interface for generating reliable reports.**

Provide a user-friendly system for easy data management Figure 4 shows the User Management interface, highlighting the system’s intuitive design for administrators. Through simple navigation menus and CRUD (create, read, update, delete) functionalities, users can easily manage product and account information. The streamlined interface reduces complexity, making data management accessible even to non-technical users, thereby enhancing usability and efficiency in day-to-day operations.



**FIGURE 7. Sales Report interface for generating reliable reports.**

Generate reliable reports for better decision-making Figure 5 depicts the Sales Report module, which allows administrators to filter transactions, view receipts, and print detailed reports. This functionality ensures that decision-makers have access to accurate and timely information about sales performance. By generating reliable reports, the system supports better planning, evaluation of business strategies, and informed decision-making, ultimately contributing to improved organizational productivity.



**Figure 8. Mobile Application Interface for User Management and Role Statistics.**

This figure presents the mobile application interface designed for managing store personnel and viewing user distribution. The "Users List" section provides a categorized breakdown of staff roles Admins, Staff, and Cashiers alongside statistical trends and search functionalities. This feature allows administrators to efficiently monitor the workforce, track role distribution, and manage user accounts through a centralized mobile platform, enhancing accessibility and administrative control compared to traditional record-keeping.

**III. RESULT AND DISCUSSION**

The results revealed that the system achieved a high level of functional performance, with an overall mean score of 4.34 interpreted as “Very Satisfactory.” This indicates that the system effectively met the required functional objectives, including stock monitoring, sales tracking, and report generation.

In terms of software quality characteristics based on ISO/IEC 25010, the system obtained an overall mean of 4.22, which is also interpreted as “Very Satisfactory.” This suggests that the system is reliable, efficient, and secure for actual use.

Furthermore, user evaluation results showed an overall mean of 4.43, indicating that users found the system highly useful, easy to use, and satisfactory. This demonstrates that the system improved operational efficiency compared to the previous manual method.

**Table 1. Likert Scale interpretation**

Mean Range	Verbal Interpretation
4.21 – 5.00	Strongly Agree
3.41 – 4.20	Agree
2.61 – 3.40	Neutral
1.81 – 2.60	Disagree
1.00 – 1.80	Strongly Disagree

Table 1 The study utilize a 5-point Likert scale to measure respondents’ evaluation of the system in terms of usability and software quality. Each responds was assigned a numerical value ranging from 1 to 5, where higher values indicate a more positive evaluation.

**Table 2: In Terms of System Objectives (Functional Requirements Evaluation**

System Objectives	Mean	Verbal Interpretation
Ensure accurate and efficient tracking of stock transactions.	4.33	Very Satisfactory
Develop a real-time dashboard to visualize stock levels and monitor sales transactions	4.33	Very Satisfactory
Reduce errors caused by manual inventory processes.	4.37	Very Satisfactory
Provide a user-friendly system for easy data management.	4.37	Very Satisfactory
Generate reliable reports for better decision-making.	4.34	Very Satisfactory
Develop a mobile enable user management module to facilitate efficient staff administration and role monitoring.	4.34	Very Satisfactory
<b>Overall Mean</b>	4.35	Very Satisfactory

Table 2 shows the result of the data inputted into Mascull Sales and Inventory System, the incoming and available stocks, daily, monthly, and weekly incomes, and graph for profitability, create, read, update, delete, sales of product, returned, report product, a listing of expired products.

**Table 3: In Terms of ISO/IEC 25010 Software Quality Characteristics**

ISO 25010 Criteria	Mean	Verbal Interpretation
Functional Suitability	4.22	Very Satisfactory
Performance Efficiency	4.11	Very Satisfaction
Compatibility	4.30	Very Satisfaction
Reliability	4.34	Very Satisfaction
Security	4.22	Very Satisfactory
<b>Overall Mean</b>	4.22	Very Satisfactory

Table 3 shows the result of I.T. Expert’s feednback in determining the quality of the Mascull Sales and Inventory System with data analysis based on the characteristics set in the ISO 25010 Software quality model.

**Table 4: In Terms of System Use/User Evaluation**

User Evaluation Criteria	Mean	Verbal Interpretation
Usefulness	4.80	Very Satisfactory
Satisfaction	4.14	Very Satisfaction
Ease of Use	4.43	Very Satisfaction
Ease of Learning	4.26	Very Satisfaction
<b>Overall Mean</b>	4.43	Very Satisfactory

Table 4 shows the results of the users feedback in terming the usability of the Mascull Sales and Inventory System with Data analysis based on usefulness, Satisfaction, and ease of use and learning.

#### IV. CONCLUSION

The study concludes that the developed computerized sales and inventory system has significantly revolutionized the operational workflow of MacSull Grocery Store. By transitioning from traditional manual methods to a digital platform, the system successfully mitigated the critical issues associated with paper-based recording. Specifically, the study addressed the problem of human error and data redundancy inherent in manual logs; the system’s automated calculation features now ensure that every sales transaction is recorded with mathematical precision, eliminating discrepancies in financial totals.

Furthermore, the system resolved the issue of poor stock visibility, which previously led to inefficiencies such as overstocking or stockouts. Through the implementation of a real-time dashboard and stock monitoring features, the store management can now instantly track inventory levels, replacing the slow and labor-intensive process of physical counting. Additionally, the challenge of delayed financial reporting was rectified by the system’s ability to generate immediate, reliable income reports, thereby facilitating faster and more informed decision-making.

The evaluation results further confirm that the software meets ISO/IEC 25010 quality standards and achieved a high level of user acceptance based on the USE questionnaire. Therefore, the implementation of this system is highly recommended not only for MacSull Grocery Store but for other small retail businesses seeking to eliminate the inefficiencies of manual processes, enhance data integrity, and optimize overall productivity.

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