Mindoro State University
College of Computer Studies

"Margatheo: A Cloud-Based Platform for Enhancing Access to School Supplies and Minimizing In-Person Transactions"

An
Application Development Project
Presented to the Faculty of
Mindoro State University Calapan City Campus
Masipit, Calapan City
Oriental Mindoro

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science in Information Technology

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CHAPTER I
INTRODUCTION

Project Context

In today's digital age, the demand for efficient and accessible solutions in educational settings is ever-growing. Traditional methods of procuring school supplies often involve time-consuming processes, physical visits to stores, and extensive paperwork. These inefficiencies can lead to delays in acquiring essential materials, impacting the overall effectiveness of educational institutions. Margatheo: A Cloud-Based Platform for Enhancing Access to School Supplies and Minimizing In-Person Transactions seeks to address these challenges by offering a streamlined, digital approach tailored specifically to the needs of educational institutions in District 1 of Oriental Mindoro.

The Margatheo platform functions as an online system where schools can browse, select, and order supplies with ease. By leveraging cloud technology, the platform ensures the availability of supplies while providing an efficient, scalable, and user-friendly solution for managing transactions. This is consistent with findings showing how cloud computing enhances accessibility, reduces administrative errors, and improves scalability in education, ultimately enriching the operational capabilities of institutions (Govea et al., 2023). Furthermore, integrating digital procurement technologies, such as e-procurement, has been shown to streamline supplier evaluation, minimize lead times, and reduce the need for manual interactions (Althabatah et al., 2023).

This shift to a cloud-based approach minimizes the need for in-person interactions, supporting a safer, more efficient, and convenient method for fulfilling educational supply needs. Additionally, features like real-time order tracking, notifications, and inventory management help schools maintain a seamless flow in acquiring necessary materials. Margatheo offers an innovative solution to modernize the procurement process, ultimately enhancing the operational efficiency of educational institutions.

Objectives

To develop an efficient, user-friendly online platform for ordering educational supplies from the Margatheo Supplier Online Shop, facilitating smooth transactions between suppliers and educational institutions in District 1, Oriental Mindoro.

Specific Objectives:

1. To design a web-based platform for educational institutions to manage their procurement process efficiently.

2. To enable educational institutions to search, filter, and order products with ease.

3. To implement a secure and user-friendly system for managing orders and deliveries.

4. To establish a notification system for order confirmation, delivery updates, and low-stock alerts.

5. To integrate cash-on-delivery as the primary payment method.

Scope and Limitations

The project focuses on the Margatheo Supplier Online Shop, an efficient platform designed to streamline the supply ordering process for educational institutions in District 1, Oriental Mindoro. It handles the entire ordering process, from browsing and selecting products to order confirmation and delivery status updates, exclusively for registered institutions within the district, ensuring a secure and localized service tailored to their needs. Cash-on-delivery is the sole payment method offered. However, the platform has certain limitations: it does not support online payment options such as credit cards or mobile wallets, and its service area is restricted to District 1, with no support for orders or deliveries beyond this region.

Definition of Terms

- **Supplier:** Refers to businesses or individuals who provide educational products such as books and stationery listed for sale on the Margatheo platform, allowing educational institutions to access and order these supplies digitally.
- **Cash-on-Delivery (COD):** Refers to a payment method within the Margatheo platform where customers pay for their orders upon delivery, providing a secure and convenient option for transactions, especially in areas with limited digital payment adoption.
- **Order Management:** Refers to the system implemented in the Margatheo platform that manages and tracks the ordering process, from product selection to delivery, including order confirmations and status notifications.
- **Stock Levels:** Refers to the quantity of products available on the platform, which suppliers must update regularly to ensure accurate availability for educational institutions using the Margatheo system.
- **Sales and Report Management:** Refers to the system's functionality within the Margatheo platform that generates detailed sales reports (daily, weekly, monthly, and yearly) to help suppliers and administrators track revenue and product performance.
- **Inventory Management:** The Margatheo platform ensures reliable sourcing of supplies for educational institutions by tracking product availability and facilitating timely restocking whenever stock levels are low.
- **Content Management**: Refers to the section in the platform where administrators manage static content such as "About Us," "Blog," and "Contact Us" pages to provide relevant information and updates to users of the Margatheo platform.

CHAPTER II
REQUIREMENTS SPECIFICATION

Hardware and Software Requirements

Requirement Specification	Description	Minimum Specifications	Hardware Requirements
Server Requirements	The server hosting the platform and managing data	- Processor: Intel Xeon or equivalent, min 4 cores	- 8GB RAM
		- Memory: 16GB RAM	- 500GB SSD Storage
		- Storage: 500GB SSD	- High-speed internet connection (1 Gbps)
		- Network: 1 Gbps	- 1TB external/cloud backup for backup storage
User Devices	Devices used by customers, suppliers, and admin	- Device: Laptop/Desktop	- Dual-core processor, 4GB RAM, 100GB storage
		- Display: 1280x720 screen resolution or higher	- Stable internet connection, 2 Mbps minimum

Frontend Technologies	Technologies used for developing the user interface	- HTML, CSS, JavaScript	- Frontend Framework: , Vue.js
		- Browser: Latest versions of Google Chrome	
Backend Technologies	Technologies used fo server-side development	- Node.js with Express	- MySQL for database management
Payment System	System for handling payments	- Cash-on-Delivery (manual integration), cheque	-
Development Tools	Tools for coding and version control	- Code Editor: Visual Studio Code	- Version Control: GitHub or GitLab for source code management
Server Software	Software installed on the server for web hosting	- Operating System: Linux ,Windows	- Web Server: MySql and Apache

Table 1: Hardware Requirements

Functional Requirement

User Registration & Authentication

- Users can register and log in securely.

-Admin have a static account

Product Management

- Admin can manage product listings, including adding, updating items.

Order Management

- Users can browse, select, and order products.

Payment System

- Supports cash-on-delivery (COD)

Inventory Management

- admin receive low-stock alerts when inventory reaches a critical level.

Search and Filter

- Customers can search by keyword and filter by name

Sales and Report Management

- Daily, weekly, monthly, and yearly sales reports are generated for admin review.

Point of Sale (POS)

- Real-time inventory updates after each POS transaction.

CSV Upload and Grive Integration

- Allows admins to upload CSV files for bulk updates to product listings or inventory.

Additional Pages

- About Us: Provides information about the platform and its purpose.

- Contact Us: Allows users to reach out for support or inquiries.

Non-Functional Requirements

Operational Requirements

- The platform must maintain a 94.9% uptime.

- Data is backed up daily to secure customer information and transaction history.

- The system should be compatible with both desktop and Laptop.

Performance Requirements

- Web pages should load within 3 seconds under typical internet conditions.

- The system must support up to 500 concurrent users during peak usage.

Security Requirements

- All sensitive data (passwords, payment details) must be encrypted.

- Role-based access control (RBAC) is enforced, providing different access levels for admin and customers.

- Regular security audits are performed to identify and mitigate vulnerabilities.

Scalability

- The system should be designed to accommodate potential expansion beyond District 1 if needed in the future.

Reliability

- The platform should have a reliable lending management system that ensures transactions are recorded accurately and pending requests are monitored.

Cultural Requirements

- The platform should be intuitive and easy to use, accommodating the needs of non-tech-savvy school staff and suppliers.

3.3 Security Requirements

- Data Encryption: All sensitive data such as passwords must be encrypted

- Access Control: Role-based access control (RBAC) should be implemented, where users have permissions based on their role (admin or customer).

- Security Audits: Regular audits must be conducted to detect any vulnerabilities.

Chapter III
Design and Development Methodologies

System Design

Database Design

Relational database management system (DBMS)is a program used to maintain a relational database. Relational database defines database relationships in form of tables. The tables are related to each other based on data common to each.
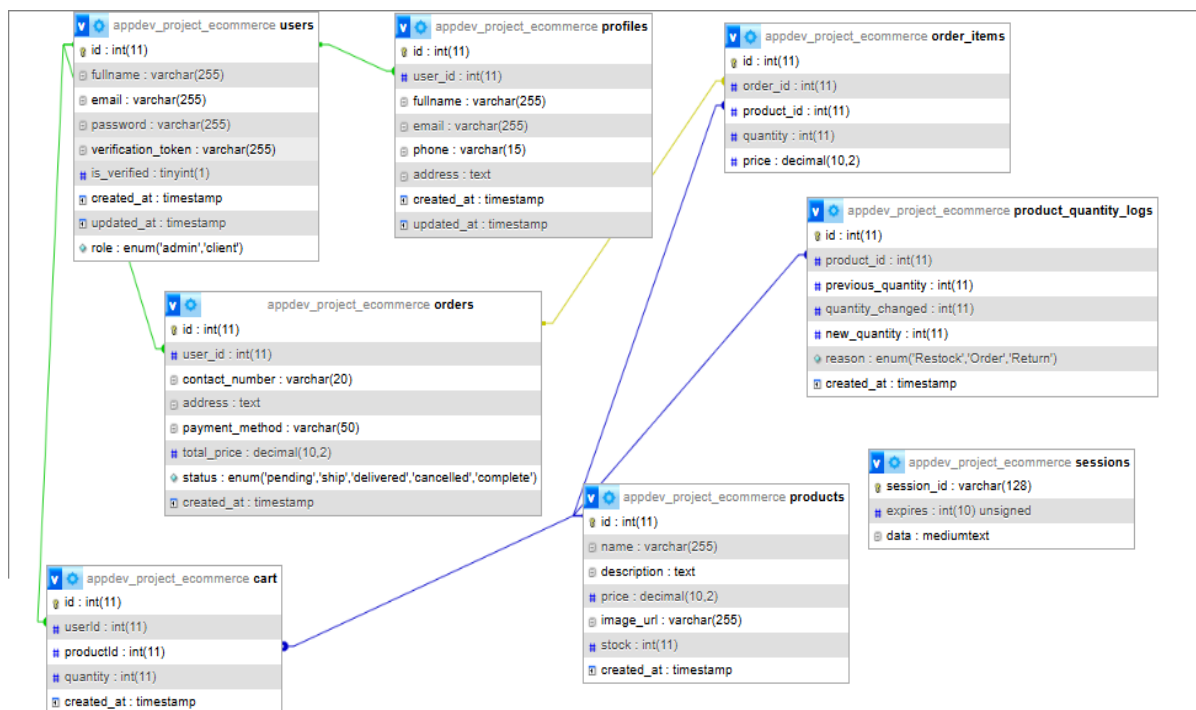

Figure 1. Database Design

The database design, or the arrangement of data in accordance with a database model, is depicted in the above graphic. To cut down on redundant data, it separates the data into subject-based tables. The information needed to link the data in the tables together as needed is accessible in this figure.

Users

Column	Type	Details
id	int(11)	Primary Key
fullname	varchar(255)	
email	varchar(255)	
verification_token	varchar(255)	
is_verified	tinyint(1)	
created_at	timestamp	
updated_at	timestamp	
role	enum('admin', 'client')	

Table 2: Fields For Users

Table 2 above contains this table stores basic user information, including their role (admin or client), email, password, and verification details. It's the core table for managing user accounts and permissions.

Profiles

Column	Type	Details
id	int(11)	Primary Key
user_id	int(11)	Foreign Key (`users.id`)
email	varchar(255)	
phone	varchar(15)	
created_at	timestamp	
updated_at	timestamp	

Table 3: Fields For Profiles

Table 3 Stores additional user details, such as phone numbers and email addresses, linked to the Users table. It helps manage user-specific data separately from login credentials.

Products

Column	Type	Details
id	int(11)	Primary Key
name	varchar(255)	
description	text	

image_url	varchar(255)	
price	decimal(10,2)	
stock	int(11)	
created_at	timestamp	

Table 4: Fields For Products

Table 4 Holds information about the items available in the store, including the name, description, price, stock level, and image URL. This table is central to inventory management.

Orders

Column	Type	Details
id	int(11)	Primary Key
user_id	int(11)	Foreign Key (users.id)
contact_number	varchar(20)	
address	text	
payment_method	varchar(50)	
total_price	decimal(10,2)	
status	enum('pending', 'ship', 'delivered', 'cancelled', 'complete')	
created_at	timestamp	

Table 5: Fields For Orders

Table 5 Tracks customer orders, including the user who placed the order, their contact details, delivery address, payment method, and the order's status. This table represents the main transaction records.

Order Items

Column	Type	Details
id	int(11)	Primary Key
order_id	int(11)	Foreign Key (orders.id)
product_id	int(11)	Foreign Key (products.id)
quantity	int(11)	
price	decimal(10,2)	

Table 6: Fields For Order Items

Table 6 Contains the details of each item within an order. It links to the Orders and Products tables, tracking the product, quantity, and price for every ordered item.

Product Quantity Logs

Column	Type	Details
id	int(11)	Primary Key
product_id	int(11)	Foreign Key (products.id)
previous_quantity	int(11)	
quantity_changed	int(11)	
new_quantity	int(11)	
reason	enum('Restock', 'Order', 'Return')	
created_at	timestamp	

Table 7: Fields For Product Quantity Logs

Table 7 Logs changes to product stock levels, such as restocking, ordering, or returns. It records the previous quantity, the change, the new quantity, and the reason for the change, helping with inventory auditing.

Cart

Column	Type	Details
id	int(11)	Primary Key
user_id	int(11)	Foreign Key (users.id)
product_id	int(11)	Foreign Key (products.id)
quantity	int(11)	
created_at	timestamp	

Table 8: Fields For Cart

Table 8 Manages the products that users add to their cart before checkout. It links a user to their selected products and tracks the quantities.

Sessions

Column	Type	Details
session_id	varchar(128)	Primary Key
expires	int(10) unsigned	
data	mediumtext	

Table 9: Fields For Sessions

Table 9 Stores session data for user authentication, ensuring secure and persistent logins. It tracks session IDs, expiration times, and associated data.

System Architecture
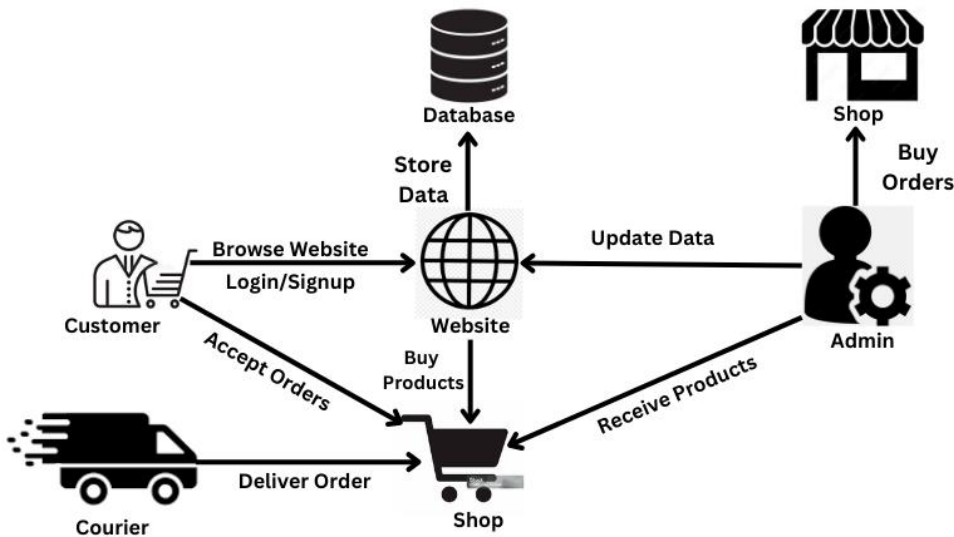
Figure 2. System Architecture

A system architecture shows the representation and structure of the system. It shows how the structure of the system data flow.

DFD Level
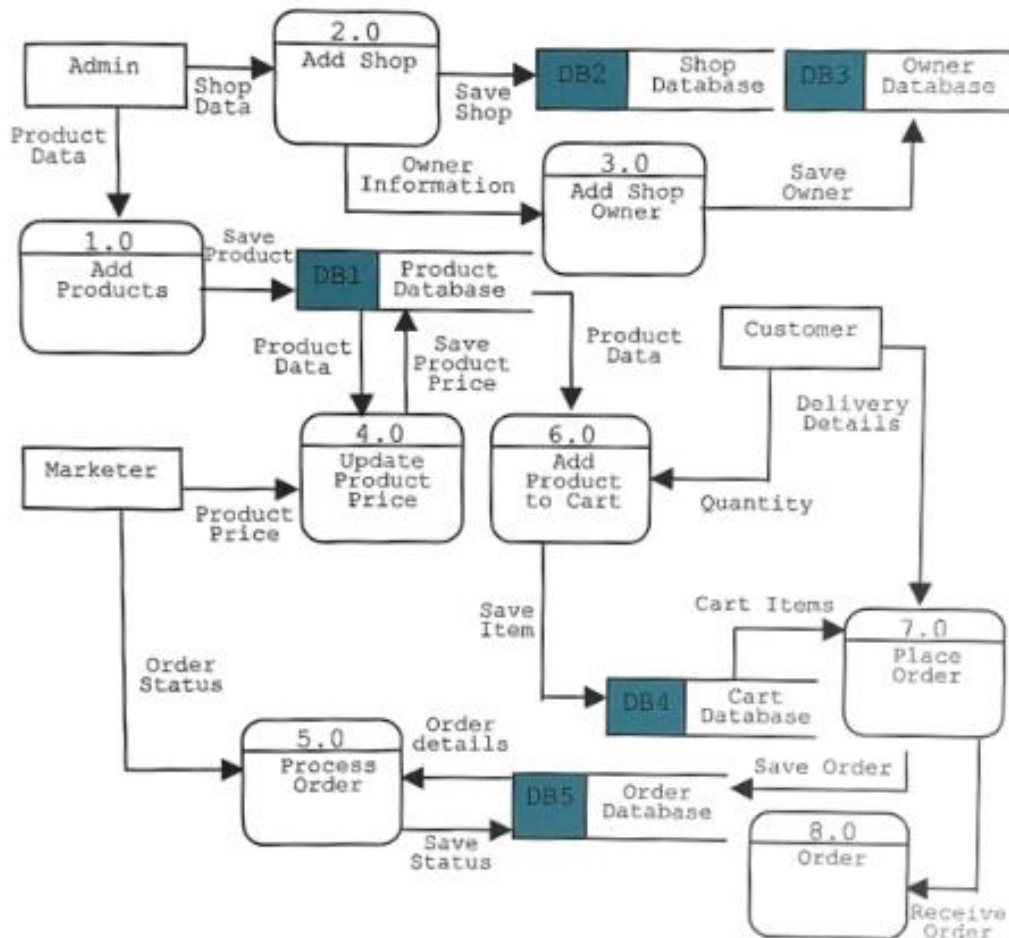
Figure 3. DFD Level 0

Shows the Level 0 DFD of the proposed e-commerce system. Both administrators and customers must register and log in first to access the Margatheo. Once logged in, administrators and customers can view and interact with the features of the website.

UML Use-case Diagram

Figure 4. UML Use-case Diagram

Shows the flow of the process that the website have. This diagram represent the view of the users of the website that consist the provided functionality

Methodology: Agile Software Development
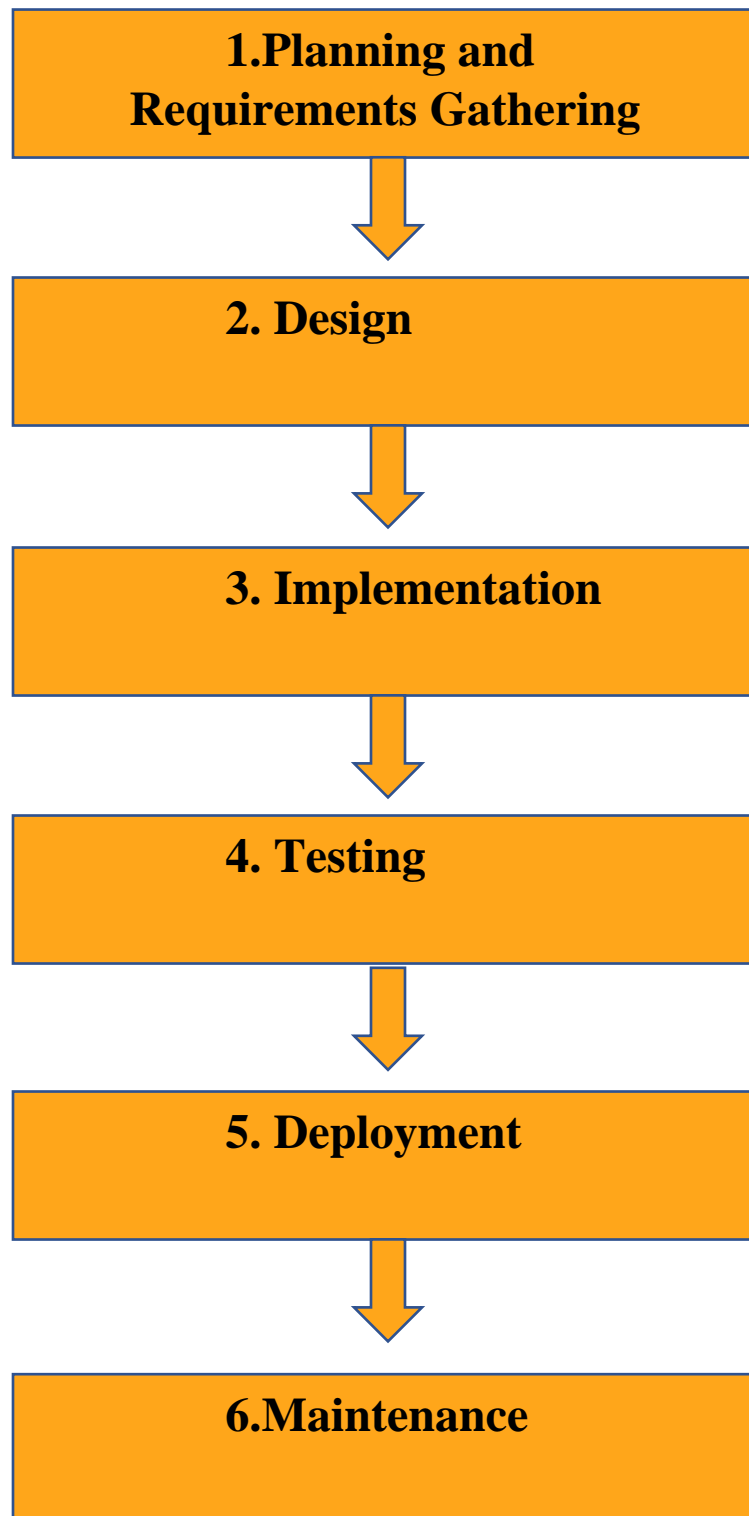
Figure 5. Methodology

Phases of the Agile Methodology:

Planning and Requirements Gathering

1. **Planning and Requirements Gathering**: Understanding the project needs and defining features such as cloud-based access to school supplies, minimizing in-person transactions, and integrating with a responsive front-end.

Design

2. **Design**: Creating the system architecture, choosing Node.js for the back-end, and Vue.js for the front-end.

Implementation

3. **Implementation**: Coding the system, building features for product catalog, order management, and cloud storage access.

Testing

4. **Testing**: Conducting various tests (unit testing, integration testing, user acceptance testing) to ensure the platform works seamlessly.

Deployment

5. **Deployment**: Deploying the platform to the cloud and performing post-launch monitoring.

Maintenance

6. **Maintenance:** Ongoing bug fixes and updates based on user feedback.

Testing: Testing Activities Performed

1. Unit Testing

Performed with: Jest (for Node.js back-end) and Vue Test Utils (for Vue.js components).

Purpose: To ensure individual components and functions in the back-end (e.g., APIs for product listings, user authentication) and front-end (e.g., cart functionality, product display) are working correctly.

2. Integration Testing

Performed with: Mocha/Chai (for Node.js) and Cypress (for end-to-end testing of the user journey).

Purpose: To ensure that different parts of the system (front-end and back-end) interact correctly. For example, verifying that users can browse products on the front-end and purchase them through secure payment transactions.

3. User Acceptance Testing (UAT)

Performed with: Involving real users (students, teachers, or school administrators).

Purpose: To ensure that the platform meets the actual needs of the users and that they can easily access school supplies, complete transactions, and navigate the interface without issues.

4. Load Testing

Performed with: Apache JMeter.

Purpose: To assess the system's performance and response time under varying levels of user traffic, ensuring that the platform can handle a high volume of concurrent users.

5. Security Testing

Performed with: Manual security review and automated vulnerability scans (e.g., OWASP ZAP).

Purpose: To ensure the platform is secure, particularly during transactions, and that personal data is protected through encryption and secure login mechanisms.

CHAPTER IV

DEVELOPMENT, TESTING AND EVALUATION RESULT

Presentation of the System Output
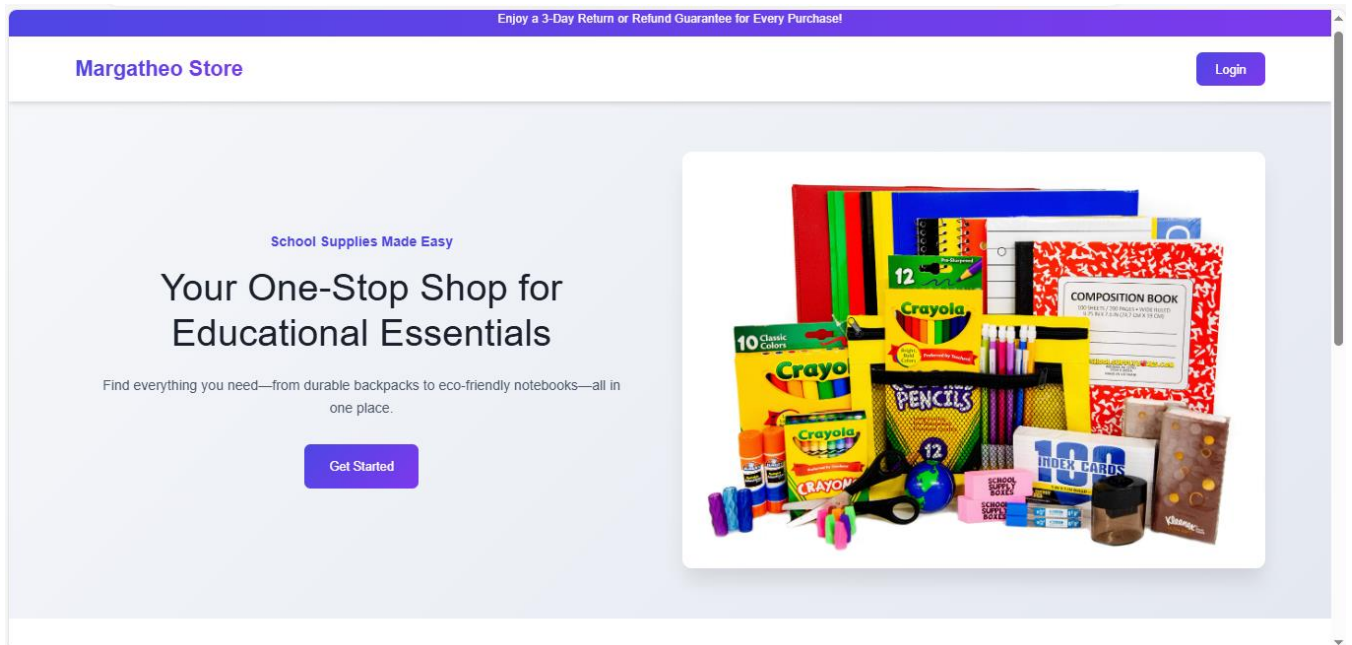
Figure 6.Landing page

Figure 6: The landing page of the school supplies e-commerce platform showcases an intuitive design that highlights featured products, easy navigation, and user-friendly access to categories such as stationery, textbooks, and school accessories.
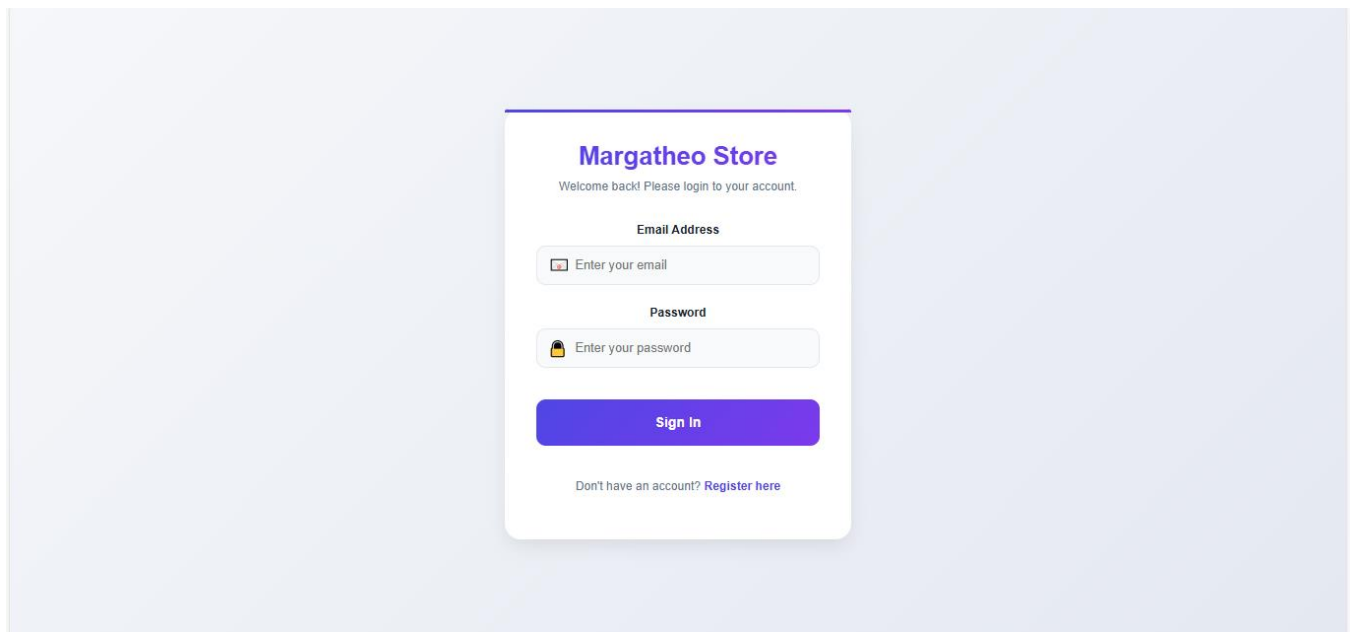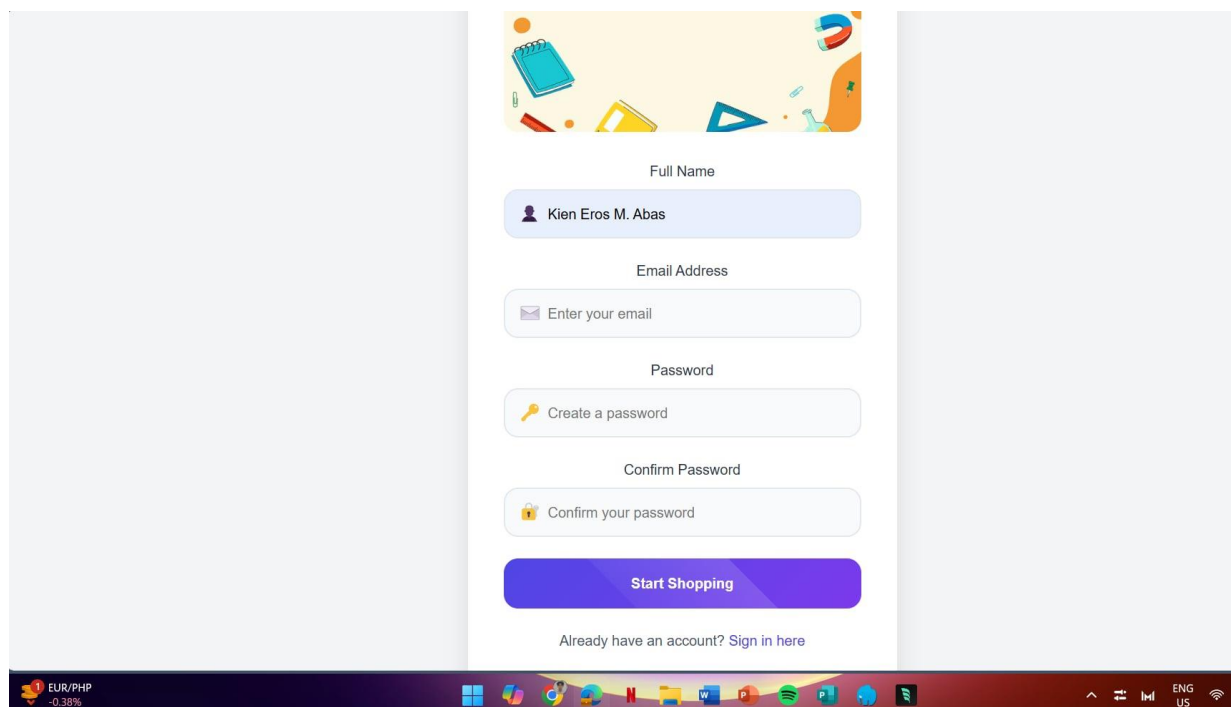
Figure 7.Log in Page

Featuring fields for username and password, along with options for password recovery and user registration, this page is designed to ensure secure and convenient login for schools and educators looking to manage their orders and account details.

Figure 8.Sign Up Page

Users can input their essential details, such as name, email, password, and school information, to create an account. This page ensures that new users can start shopping and managing their school supply orders with minimal hassle while maintaining data security and user convenience.
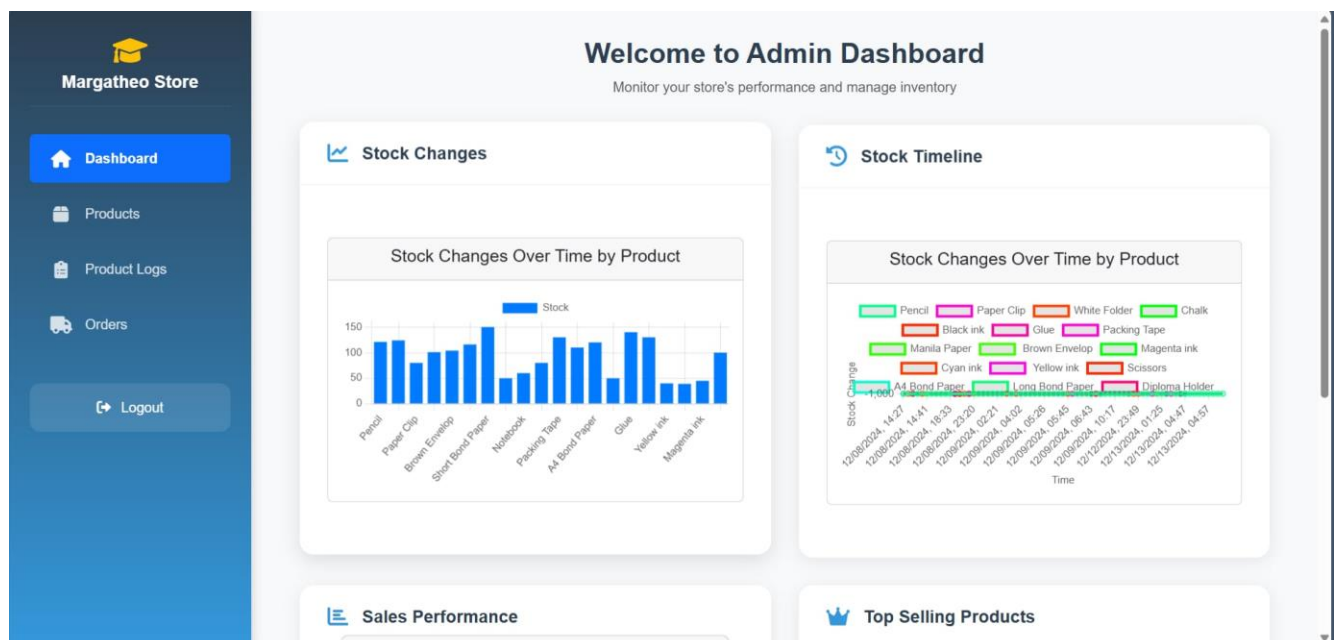
Figure 9.Dashboard Page

This graphical representation allows schools and educators to quickly analyze their purchasing patterns and make data-driven decisions to manage their inventory and budget effectively. The dashboard is designed for ease of use and provides a comprehensive overview of relevant data at a glance.

Figure 9.1.Products Page

Each product is accompanied by essential details such as name, description, price, and availability, enabling schools and educators to browse and select the supplies they need efficiently. The page is designed to offer a user-friendly experience with easy sorting and filtering options to help users find products that meet their specific requirements.

Figure 9.2.Product Logs Page

The product logs page of the Margatheo platform provides a detailed record of changes in product quantities.

Figure 9.3.Order Management Page

This page displays key order details, including order ID, user information, contact number, address, payment method, status (e.g., pending, shipped, delivered), and total price. It is designed to provide a clear overview of all current and past orders, facilitating smooth order fulfillment and customer service.

Figure 9.4. HomePage

The layout is designed to create a user-friendly experience, allowing schools and educators to quickly find and access the supplies they need while promoting special offers and new arrivals.
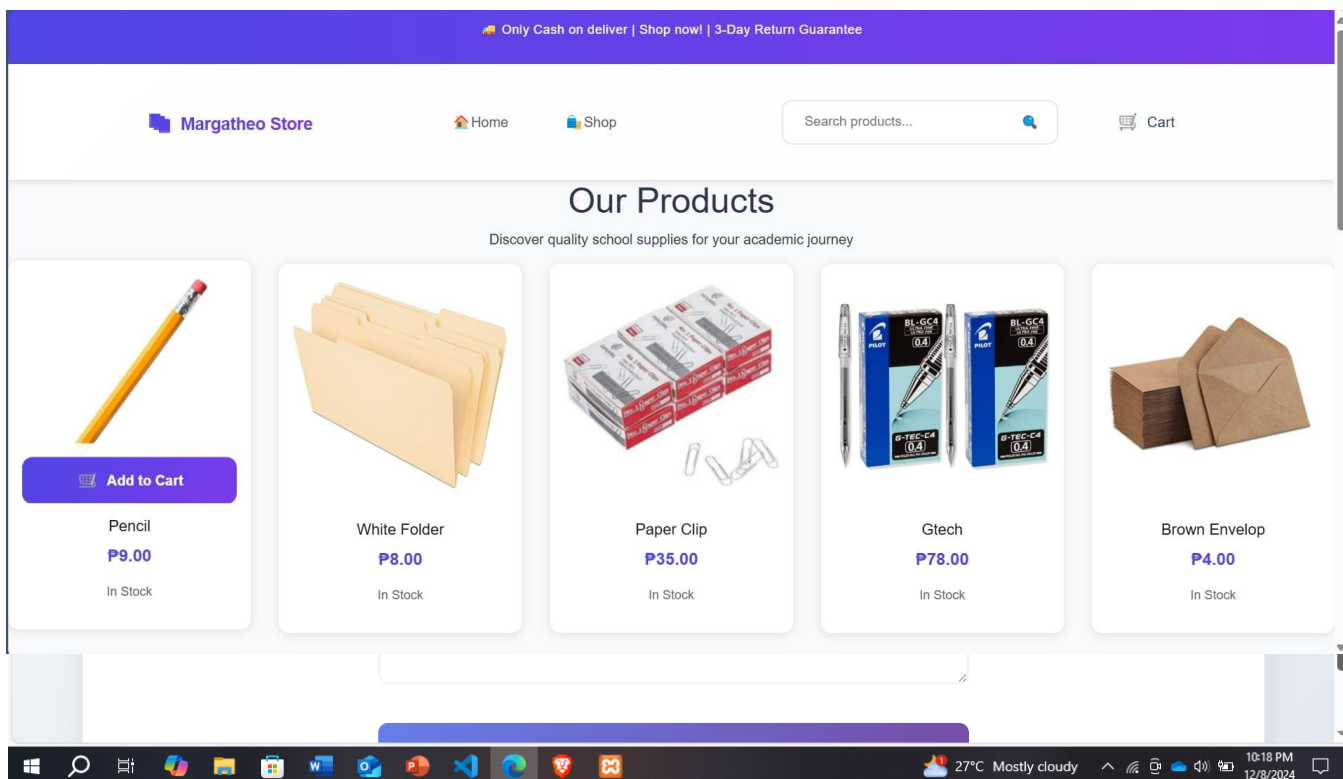
Figure 9.5. Shop

The page features detailed product listings with images, descriptions, prices, and stock availability, along with filtering and sorting options to help users find their desired items efficiently. This layout is designed to offer a seamless shopping experience for schools and educators.
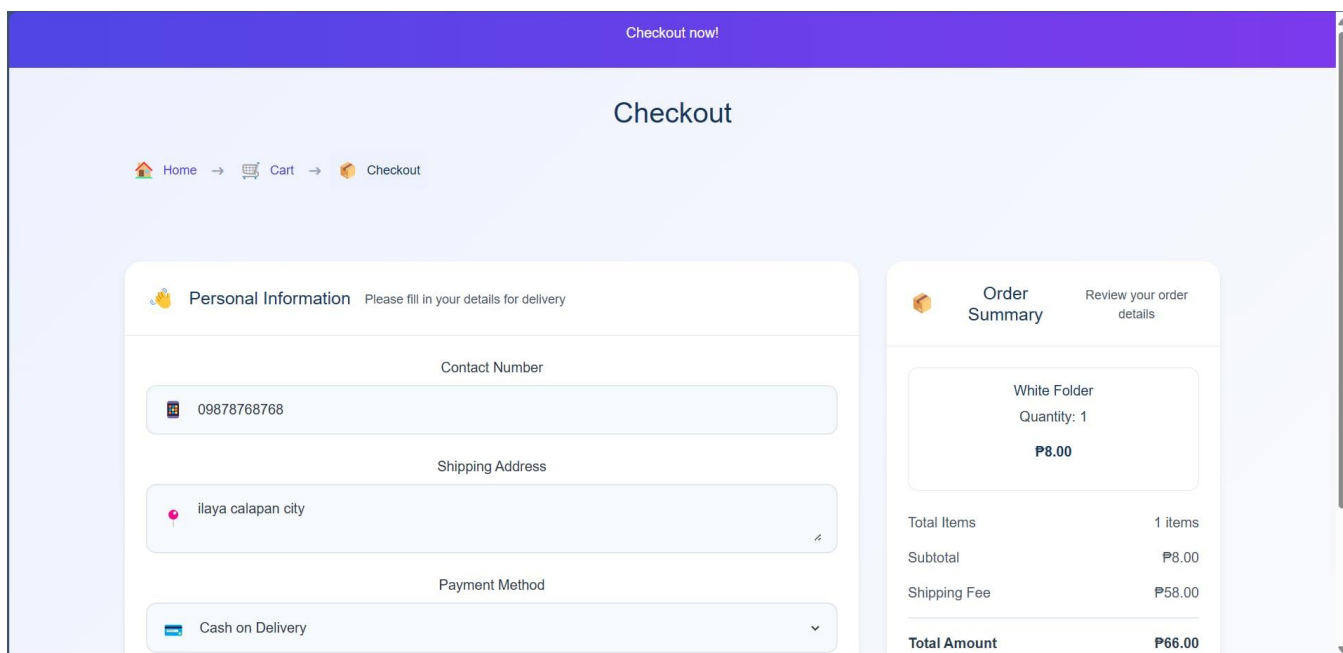

Figure 9.6. Check out

It allows users to modify item quantities, remove products, and view estimated shipping and payment details before proceeding to checkout. This page is designed to ensure a straightforward and efficient shopping experience, helping schools and educators review their orders before finalizing the purchase.

Figure 9.7. Profile

This page allows users to manage their account preferences, update their details, and review past transactions for better order tracking and user experience. It is designed to provide a convenient way for schools and educators to maintain and access their profile information.

CHAPTER V
CONCLUSION AND RECOMMENDATION

Conclusion

he Margatheo platform effectively addresses the inefficiencies in the traditional procurement of school supplies for educational institutions in District 1 of Oriental Mindoro. By leveraging cloud-based technology, it provides a streamlined, secure, and user-friendly solution for managing transactions between suppliers and schools. Key features, such as real-time inventory updates, notification systems, and detailed sales reporting, enhance operational efficiency for both suppliers and customers. Furthermore, the platform's focus on minimizing in-person interactions aligns with the growing demand for digital transformation in education.

From a technical perspective, the platform's use of agile methodology ensured its development was adaptive to feedback, resulting in a robust system that adheres to ISO 25010 standards. Testing confirmed its reliability, security, and performance efficiency, making it well-suited to meet the region's needs.

Recommendation

1. **Expand Payment Options:** While cash-on-delivery and cheque methods are practical, integrating digital payment options like mobile wallets or bank transfers can attract a broader user base and improve transaction efficiency.

2. **Extend Service Coverage:** Explore the feasibility of expanding the platform's reach beyond District 1 to cater to other regions, increasing its scalability and potential impact.

3. **Enhance User Support:** Implement a dedicated customer support feature (e.g., live chat or chatbot) to address user queries in real-time and improve user satisfaction.

4. **Invest in Training and Onboarding:** Provide training materials or sessions for suppliers and educational institutions, ensuring smooth adoption of the platform, especially for non-tech-savvy users.

5. **Regular Updates and Maintenance:** Continue periodic security audits and updates to maintain data integrity, scalability, and compliance with evolving digital standards.

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Appendices

Appendix A: Personal Information

Researcher

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Marital Status: Single

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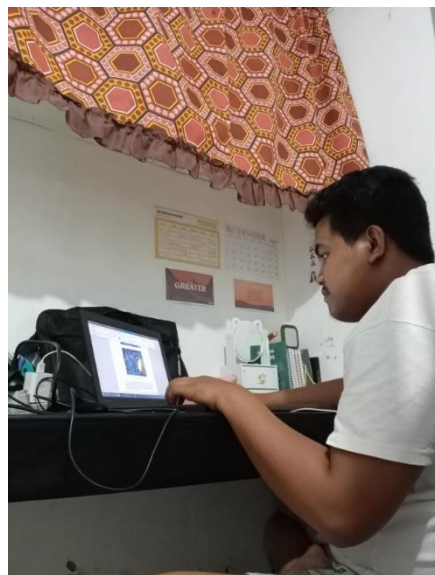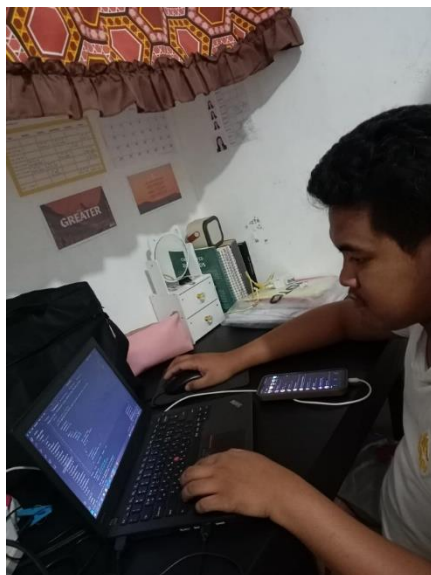**Picture During Development, Testing & Evaluation**

Figure 17, Development and Testing

This figure illustrates the development process of the **"Margatheo: A Cloud-Based Platform for Enhancing Access to School Supplies and Minimizing In-Person Transactions"**, showcasing the team working collaboratively on the design and functionality of the platform.