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Development of a Web Based E-Commerce System for Bouquet Ordering: A Case Study of Maiflorist

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ABSTRACT

E-commerce has become a widely adopted method for online purchasing, providing convenience and accessibility for both businesses and consumers. A web-based sales information system expands sales reach and enables business operators to efficiently manage and access critical information. This study investigates the development of a website-based e-commerce information system specifically designed for bouquet orders, addressing the need for efficient order management in the floral retail sector. The research employs a descriptive qualitative approach, supported by library research, and utilizes system design tools including UML, activity diagrams, context diagrams, and flowcharts to design and streamline the bouquet ordering process. The system was evaluated through user testing, revealing that the proposed website-based e-commerce platform substantially simplifies the ordering experience for customers. Key features include an admin login page, administrator dashboard, customer registration and login pages, bouquet homepage, bouquet catalog, product information, and shopping cart. This system enables Maiflorist to manage inventory efficiently and supports warehouse, sales, and purchasing staff in organizing product management, leading to faster order processing and enhanced customer satisfaction.

Keywords: E-commerce, web-based sales system, bouquet ordering, information system, UML, system design

1. INTRODUCTION

In today's highly competitive business environment, entrepreneurs must consistently innovate to ensure their businesses thrive and remain forward-moving. Business owners are not only focused on acquiring new customers but also on maintaining customer loyalty to their products (1-3). With the advancement of technology, online shopping has become a common activity among consumers. E-commerce, which facilitates online buying and selling, allows businesses to directly market their products to customers (Business-to-Customer) as well as to other businesses (Business-to-Business) (4-6). Consumers often opt for online shopping due to the time, energy, and cost savings it offers. Those with limited time to visit physical stores can easily satisfy their needs by shopping online, where items are conveniently delivered directly to their location (7).

Today, the internet has become an integral part of daily life, reaching nearly all segments of society and offering vast, nearly limitless access. The internet enables users to perform various tasks simultaneously and has significantly contributed to enhancing productivity in many aspects of human life (8). Its development has also led many business owners to leverage the internet to boost sales. One such method is by creating a website to optimize sales information systems (9). A website is a collection of interlinked pages, accessible on the web, containing information such as text, images, recordings, and animations. The implementation of a website-based sales system broadens the reach of sales and provides business owners with quick access to critical information (10). Websites can serve various purposes, including business, education, entertainment, and more (11). However, despite its benefits, not all business owners, particularly in Indonesia, have adopted websites to support their business operations (12).

Existing literature on e-commerce website development highlights the growing trend of online platforms in optimizing sales and improving customer satisfaction. Studies by Lee et al. (2022) and Smith (2021) demonstrate that establishing a dedicated e-commerce website leads to significant sales growth, improved customer retention, and expanded market reach (9). Moreover, prior research by Arifin and Sari (2020) stresses the importance of website usability and user experience in enhancing customer engagement, showing that a well-designed website interface directly impacts customer satisfaction and loyalty (10). Research conducted by Putra et al. (2019) on the development of e-commerce systems for small businesses in Indonesia reveals that a user-friendly design and a simplified ordering process are critical factors for attracting and retaining customers (11). Furthermore, Kurniawan (2021) highlighted that many small businesses, lacking a digital presence, fail to fully capitalize on their sales potential and remain restricted to a local customer base (12).

One industry currently experiencing significant growth is the bouquet business, which involves handcrafted gifts such as bouquets for graduations, birthdays, weddings, and other celebratory events. Traditionally, family members, relatives, and friends present flower bouquets at graduation ceremonies to convey their congratulations. While the design of flower bouquets has remained relatively unchanged over the years, they are typically round in shape and wrapped in colorful paper. The design, color, and uniqueness of a bouquet play a key role in attracting customers (13-15).

Maiflorist is a business specializing in bouquet sales, offering a variety of options such as flower bouquets, snack bouquets, and money bouquets. However, Maiflorist currently relies on Instagram for its sales, which limits its visibility and hampers sales growth, preventing the business from reaching its sales targets. Moreover, the bouquet business is highly competitive, making a website an ideal solution to improve sales and market visibility. By developing a website, Maiflorist aims to expand its customer base and increase sales by making its products more widely accessible to the public.

2. METHOD

The research methodology employed in this study is structured to ensure systematic development and evaluation of the e-commerce system for bouquet ordering at Maiflorist.

2.1 Literature Review

This review will systematically collect and analyze existing research, including scholarly books, peer-reviewed articles, and case studies related to e-commerce systems, user experience design for online businesses, and the bouquet industry (16-17). The objective is to identify best practices in e-commerce platform design, assess the role of web-based systems in enhancing business processes, and address gaps within the current literature that this research intends to fill.

2.2 Data Collection

The data collection process for this research will integrate both qualitative and quantitative methods to gather comprehensive insights. Primary data will be sourced directly from Maiflorist, including transactional records, customer feedback, product catalog information, and sales reports. Secondary data will be gathered from a diverse range of academic and industry sources, including books, scholarly articles, and online resources, to provide context and support the design and implementation of the system. Furthermore, technical data such as source code and design documentation from various e-commerce websites will be reviewed to guide the development of the Maiflorist e-commerce platform. This mixed-methods approach will ensure that the research is informed by both theoretical perspectives and practical, real-world business operations.

2.3 Use Case Diagram

A use case diagram illustrates the processes carried out by actors within a system. The e-commerce system for bouquet ordering at Maiflorist, which is based on a website, involves two primary actors: the seller and the buyer. The use case diagram for the information system is shown in Figure 1 (18).

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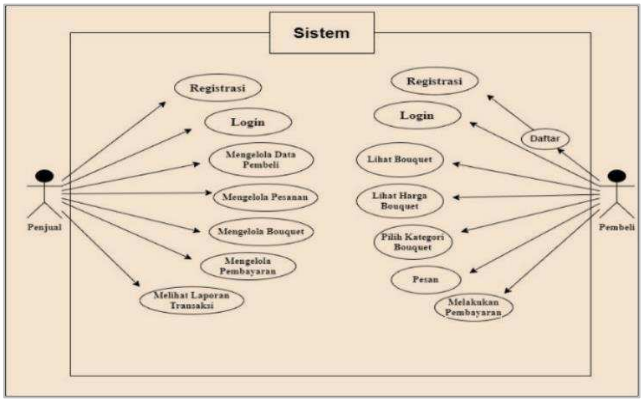

Figure 1. Use Case Diagram

2.4 Activity Diagram

An activity diagram depicts the flow of activities within a designed system, illustrating how each process starts, the outcomes achieved, and how the design concludes. This activity diagram represents the management area of the system, specifically focusing on the activities of both the seller and the buyer (19-26). The design is presented in Figure 2.

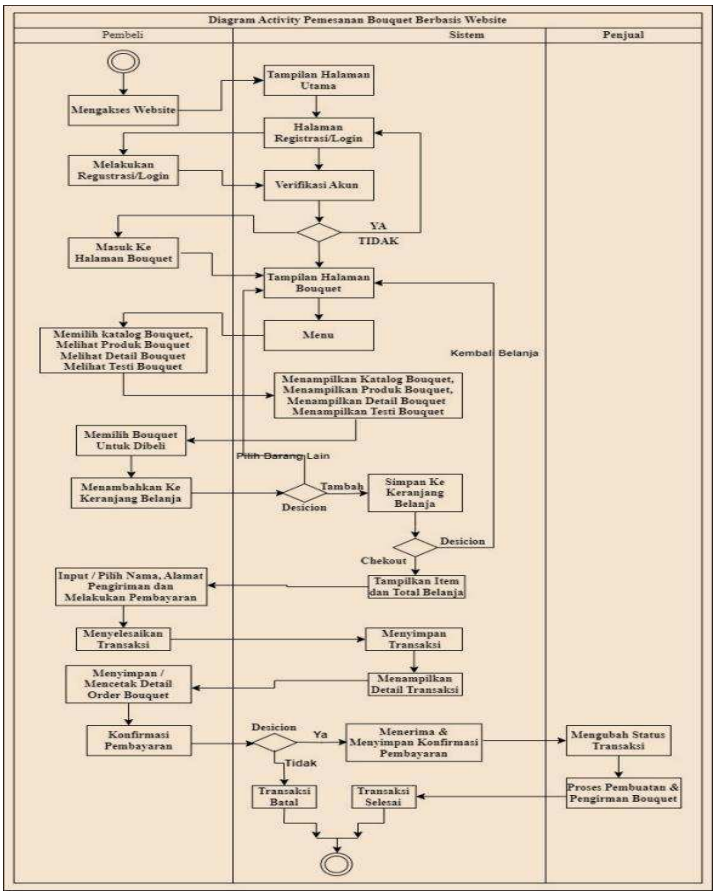

Figure 2. Activity Diagram of Buyer and Seller

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3. RESULTS AND DISCUSSION

3.1 Database Design

The database design for the E-Commerce Flower Bouquet Ordering System of Maiflorist, a website-based system, plays a crucial role in managing various aspects of the business, including product details, customer data, orders, and payments. The database consists of several interconnected tables, each designed to manage specific entities in the system. Below is a detailed description of each table in the database.

A. Admin Table

This table stores the details of the admin users who manage the system. It includes fields like the admin's ID, code, name, password, and profile image. The creation date of each admin account is also stored for administrative purposes. The Admin Table is essential for authenticating and managing system users with administrative privileges.

Table 1. Admin Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Int	11	Admin ID
2	Code	Varchar	255	Admin Code
3	Name	Varchar	255	Admin Name
4	Password	Varchar	255	Admin Password
5	Image	Varchar	255	Admin Image
6	Date Created	Datetime		Admin Creation Date

B. Order Details Table

The Order Details Table captures the specifics of each order placed by customers. It includes the order number, product ID, quantity, price, message content, and subtotal for each item in the order. This table ensures that all product details are accurately tracked throughout the ordering process.

Table 2. Order Details Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Int	11	Order ID
2	No	Varchar	255	Order Number
3	Product Id	Varchar	255	Product Order ID
4	Quantity	Int	11	Order Quantity
5	Message Content	Text		Order Message
6	Price	Int	11	Product Price
7	Subtotal	Int	11	Order Subtotal

C. Category Table

The Category Table categorizes products into different types (e.g., bouquets, arrangements, gifts). Each product is assigned a category ID to simplify the product management and searching process within the system.

Table 3. Category Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Int	11	Category ID
2	Name	Varchar	255	Category Name

D. Cart Table

The Cart Table stores temporary information about products selected by customers during their shopping experience. It includes details like the product ID, quantity, message content, and the subtotal for

each item added to the cart. This table enables the functionality of adding products to the cart before finalizing the purchase.

Table 4. Cart Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Int	11	Cart ID
2	Product Id	Varchar	255	Product ID
3	Quantity	Varchar	255	Product Quantity
4	Message Content	Varchar	255	Order Message Content
5	Customer Id	Varchar	50	Customer ID
6	Subtotal	Int	11	Order Subtotal

E. Customer Table

The Customer Table stores all the essential data about customers, including their ID, name, email, username, password, address, phone number, photo, gender, and account creation date. This table is crucial for managing customer information, authenticating users, and facilitating communication during order processing.

Table 5. Customer Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Varchar	50	Customer ID
2	Name	Varchar	150	Customer Name
3	Email	Varchar	100	Customer Email
4	Username	Varchar	150	Customer Username
5	Password	Varchar	255	Customer Password
6	Address	Text		Customer Address
7	Phone	Varchar	100	Customer Phone Number
8	Photo	Varchar	255	Customer Photo
9	Gender	Varchar	50	Customer Gender
10	Date Created	Datetime		Customer Account Date

F. Payment Table

The Payment Table records details of payments made by customers for their orders. It includes the payment ID, order number, payment amount, payment proof image, and payment date. This table ensures the accurate tracking of payments for each order placed.

Table 6. Payment Table

No	Field Name	Type	Size	Description
1	Id (Primary Key)	Int	11	Payment ID
2	No	Varchar	255	Order Number
3	Description	Text		Payment Description
4	Paid Amount	Int	11	Payment Amount
5	Payment Image	Varchar	255	Payment Proof Image
6	Payment Date	Datetime		Payment Date

G. Order Table

The Order Table stores information about the orders placed by customers. It includes the order number, transaction date, customer ID, order status, recipient details (name, address, phone, email), and the total amount for the order. This table is central for managing the order life cycle from placement to delivery.

Table 7. Order Table

No	Field Name	Type	Size	Description
1	No	Varchar	255	Order Number

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2	Date	Datetime		Transaction Date
3	Id	Varchar	100	Customer ID
4	Status	Int	11	Order Status
5	Name	Varchar	200	Recipient Name
6	Address	Text		Shipping Address
7	Phone	Varchar	20	Customer Phone Number
8	Email	Varchar	100	Customer Email
9	Grand Total	Int	11	Total Order Amount

H. Product Table

The Product Table contains all details about the products available in the Maiflorist store, including the product ID, code, category ID, price, description, size, weight, and images. This table helps manage and display products in the online store catalog.

Table 8. Product Table

No	Field Name	Type	Size	Description
1	Id	Int	11	Product ID
2	Code	Varchar	255	Product Code
3	Category Id	Int	11	Category ID
4	Price	Varchar	255	Product Price
5	Name	Varchar	200	Product Name
6	Order	Int	11	Minimum Order Quantity
7	Unit	Varchar	50	Order Unit
8	Size	Varchar	100	Product Size
9	Price (Size)	Varchar	50	Price for Size
10	Image	Varchar	255	Product Image
11	Weight	Varchar	255	Product Weight
12	Description	Text		Product Description

3.2 System Implementation

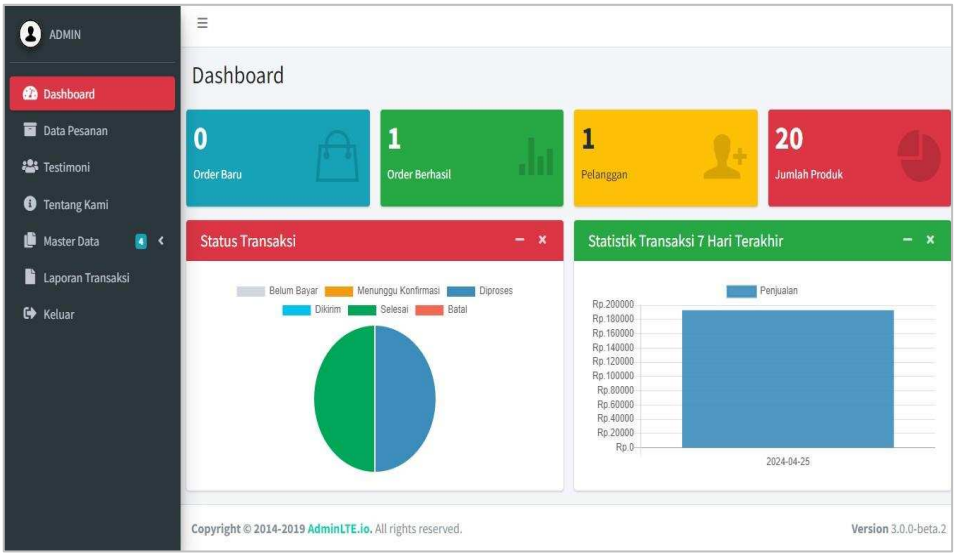

Figure 3. System Implementation

e-ISSN: 2721-9380

3.4 Testing

In the testing phase of the E-Commerce Flower Bouquet Ordering System, various types of testing were conducted to ensure that the system functions correctly and meets all user requirements. The testing process involved unit testing, integration testing, functional testing, usability testing, security testing, performance testing, regression testing, and system testing. The goal was to validate the functionality, security, performance, and overall user experience of the system. The following subsections describe each testing phase and the results obtained.

A. Unit Testing

Unit testing was performed on individual components of the system to ensure that each function behaves as expected. The tests included login functionality, order placement, and payment processing. All unit tests passed successfully.

B. Integration Testing

Integration testing was conducted to verify that different modules of the system work together. Key integration tests included user registration and login, order and payment flow, and admin/customer interaction. The system passed all integration tests, ensuring smooth interaction between modules.

C. Functional Testing

Functional testing was performed to validate that all the features of the system work as intended in a real-world scenario. This included verifying the product catalog display, order management, and payment processing. All functional tests passed successfully, confirming the system's correctness.

D. Usability Testing

Usability testing was carried out to assess the user interface and overall user experience. Admin and customer interfaces were evaluated for ease of use and functionality. Feedback from users indicated that the interfaces were intuitive and user-friendly.

E. Security Testing

Security testing was done to ensure that the system is protected against vulnerabilities such as SQL injection, cross-site scripting (XSS), and unauthorized data access. The system passed all security tests, ensuring data privacy and protection.

F. Performance Testing

Performance testing, including load and stress testing, was conducted to assess the system's responsiveness and stability under varying levels of traffic. The system was able to handle 500 simultaneous users without significant performance degradation.

G. Regression Testing

After implementing new features, regression testing was performed to ensure that the existing functionality was not affected. All previous features worked as expected, with no regressions found.

F. System Testing

System testing was conducted to verify that the entire system works as a cohesive unit. All system components—frontend, backend, database, and payment gateway—were tested together, and the system passed all tests. The table below summarizes the test cases, their objectives, and the results obtained:

e-ISSN: 2721-9380

Table 9. Testing Result

Test Type	Test Case	Objective	Result
Unit Testing	Login Functionality	Ensure users can log in with valid credentials	Passed
	Order Placement	Verify that products can be added to the cart and orders are processed	Passed
	Payment Processing	Check that payments are processed correctly and order status is updated	Passed
Integration Testing	User Registration and Login	Verify new users can register and log in	Passed
	Order and Payment Flow	Ensure correct interaction between order placement and payment processing	Passed
	Admin and Customer Interaction	Test the interaction between admin and customer modules	Passed
Functional Testing	Product Catalog	Ensure products are displayed with correct information	Passed
	Order Management	Verify customers can modify orders before submission	Passed
	Payment Gateway	Test that the payment system works correctly	Passed
Usability Testing	Admin Interface	Evaluate the ease of use for managing orders and products	Passed
	Customer Interface	Assess the efficiency of the customer ordering process	Passed
Security Testing	SQL Injection	Test the system's protection against SQL injection attacks	Passed
	Cross-Site Scripting (XSS)	Verify user input is sanitized to prevent XSS vulnerabilities	Passed
	Data Privacy	Ensure sensitive information is encrypted and stored securely	Passed
Performance Testing	Load Testing	Test the system's ability to handle high traffic (500 users simultaneously)	Passed
	Stress Testing	Assess the system's performance under extreme load conditions	Passed
Regression Testing	Feature Update	Ensure new features don't break existing functionality	Passed
System Testing	End-to-End System Functionality	Verify the entire system functions correctly when all components are integrated	Passed

These results indicate that the E-Commerce Flower Bouquet Ordering System has successfully passed all phases of testing, ensuring its readiness for deployment.

4. CONCLUSIONS

This study demonstrates that the design and implementation of a website-based e-commerce system can significantly enhance the customer experience for ordering bouquets. Through its structured design, the system offers essential functionalities, including an admin login, main administrator dashboard, customer registration and login, bouquet catalog, detailed product information, and an integrated shopping cart. These features streamline the ordering process for customers and provide them with a user-friendly interface. Additionally, the system improves operational efficiency at Maiflorist by facilitating better inventory management. It enables seamless collaboration across departments, including warehousing, sales, and procurement, thus supporting the store in meeting sales targets and improving service delivery. The study highlights the potential of e-commerce systems in enabling small to medium-sized businesses to reach broader markets, increase their operational efficiency, and foster customer satisfaction through technological adoption.

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