

Efficient Online Food Ordering Solution for Sultan Mizan Zainal Abidin Polytechnic's KAMSIS Cafeteria

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Abstract

This study investigates the implementation of an online food ordering system at the KAMSIS cafeteria of Sultan Mizan Zainal Abidin Polytechnic to streamline the ordering process for hostel students. The primary issue addressed is the prolonged waiting time during peak hours (8:00 p.m. - 10:00 p.m.), exacerbated by the large student population (1,000 - 1,200) and hostel policies restricting entry and exit after 7:00 p.m. The proposed system aims to reduce peak-hour waiting times from two hours to 30 minutes and eliminate errors associated with manual order-taking, thereby enhancing operational efficiency and student satisfaction.

Keywords: *Online food ordering system, efficiency, reducing*

1.0 Introduction

The proposed online ordering system significantly streamlines the ordering process for both customers and cafeteria staff. It features an interactive, real-time menu interface that presents available items in a clear and user-friendly format. Customers are able to select multiple food items and add them to a virtual cart, where they can review and modify their selections prior to checkout. Upon order confirmation, the system automatically records the transaction into the database, ensuring near-instantaneous retrieval. This real-time processing capability enables cafeteria personnel to promptly access incoming orders, facilitating efficient preparation and reducing miscommunication and wait times. The system's structured workflow not only enhances order accuracy but also improves overall service delivery, resulting in a more organized and responsive food service environment. In recent years, the digital transformation of traditional services has become a pivotal strategy in improving operational efficiency and customer satisfaction. Educational institutions, particularly those with residential facilities, face growing challenges in managing the daily demand for food services while ensuring speed, accuracy, and accessibility. At Sultan Mizan Zainal Abidin Polytechnic, the KAMSIS Cafeteria serves as a central hub for students and staff alike, yet its conventional food ordering process is often hindered by long queues, limited menu visibility, and inconsistent order fulfilment. This study introduces a dedicated online food ordering solution aimed at enhancing the cafeteria's service quality and streamlining its operations. By leveraging web-based technologies and user-friendly interfaces, the proposed system allows users to browse menus, place orders, and receive real-time updates eliminating inefficiencies and contributing to a more organized dining experience. The implementation is expected not only to reduce wait times and errors but also to offer valuable insights into consumption trends and inventory planning. Ultimately, this initiative aligns with the institution's broader commitment to digital innovation and student-centric service enhancement.

1.1 Problem Statement

The KAMSIS Cafeteria at Sultan Mizan Zainal Abidin Polytechnic currently relies on traditional, walk-in food ordering methods, which often lead to long queues, inefficient service, and limited order customization. During peak hours, students and staff face delays that disrupt their schedules and reduce overall satisfaction with cafeteria services.

Additionally, the cafeteria struggles with inventory management and forecasting demand due to the lack of digital tracking and analytics.

To address these challenges, there is a need for an efficient, user-friendly online food ordering system tailored to the needs of the polytechnic community. This solution should streamline the ordering process, reduce wait times, improve order accuracy, and provide valuable insights for cafeteria operations. Many cafeterias continue to rely on conventional, paper-based food ordering systems. In such setups, waitstaff manually record customer orders on paper and relay them to the kitchen. This method presents a high potential for errors, particularly due to misinterpretation of handwriting by the kitchen staff. To address these challenges, a digital food ordering system was developed to improve efficiency and accuracy in processing orders. Furthermore, the manual system lacks the capability to promptly and accurately generate daily sales reports. By transitioning to a computer-based system, the cafeteria can streamline sales tracking and minimize errors in calculating customers' total order costs.

1.2 Objective of Project

The development of the online food ordering system is guided by the following key objectives:

1. Digitization of ordering workflow to transition from a manual, paper-based food ordering process to a fully computerized system, thereby improving operational efficiency and reducing human error.
2. Sales history visualization to enable the systematic recording and presentation of daily sales transactions, providing valuable insights through accessible and structured historical data.
3. Automated price calculation to implement an automated pricing mechanism that accurately computes the total cost of customer orders, minimizing calculation discrepancies and enhancing billing precision.

1.3 Scope of Project

There are two types of scopes relates to this system which is system scope and user scope. User Scope: The user scope involves are Admin The manager cafe has the authority to manage this system such as updating the new menu available in the cafe every day. Students can access the system by entering a username and password. they can place orders online through this system. The system by the can be use sum admin and the student of Polytechnics Sultan Mizan Zainal Abidin. Each of user has their own interface through login. The project focused online cafeteria ordering system. Admin scope: This system will be organized by admin. For admin, they can access all the system including student page. Below is the process that will be operated by admin: Register, Manage the system, View, update, delete the menu, Collect and manage each other. Student scope: Student login, View menu and price, Place an order, View payment details.

2.0 Literature Review

Restaurants commonly utilize two primary methods for managing customer orders: the manual system and the computerized ordering system. The manual approach typically involves waitstaff recording orders with pen and paper, producing duplicate copies one forwarded to the kitchen for food preparation and the other sent to the cashier for bill calculation. While this system is straightforward, it is prone to errors, especially due to illegible handwriting or miscommunication. With the advancement of technology, many restaurants have adopted computerized ordering systems to address these limitations. However, some establishments still

rely on manual input, where orders are initially written by hand and then entered into a computer system. These digital records are stored in a database and automatically routed to the kitchen printer for processing. Simultaneously, order details are transmitted to the cashier for accurate billing and receipt generation. This hybrid system is widely implemented in fast food restaurants and has significantly enhanced the speed and reliability of the ordering process, contributing to a more systematic and streamlined service workflow.

Digital transformation in the food service sector has emerged as a key strategy for enhancing operational efficiency and customer satisfaction. Previous studies have demonstrated that web-based food ordering systems can effectively reduce congestion, accelerate the ordering process, and improve the accuracy of food preparation (Chong et al., 2019). These systems also offer users greater flexibility in making selections and provide real-time updates regarding menu availability and order status (Lee & Kim, 2020). Zhang et al. (2018) emphasized the importance of intuitive and responsive user interfaces in ensuring a positive user experience. Their findings suggest that user-friendly system design not only increases adoption rates but also minimizes errors during the ordering process. Furthermore, the integration of real-time databases enables more efficient inventory management and continuous monitoring of purchasing patterns (Rahman & Ismail, 2021).

In the context of educational institutions, online food ordering systems have shown promising results in improving cafeteria management. A study by Tan et al. (2022) at a public university revealed that the implementation of a digital ordering system reduced waiting times by up to 40% and significantly enhanced student satisfaction with food services. Additionally, data collected through such systems can be leveraged to design menus based on actual demand, thereby minimizing food waste (Norazman & Khalid, 2020). Despite these advantages, several studies have also highlighted potential challenges, including development costs, staff training requirements, and technological accessibility among users (Yusof et al., 2019). Therefore, the deployment of such systems must be tailored to the specific needs and capacities of the institution to ensure optimal effectiveness. Overall, current literature supports the adoption of online food ordering systems as an effective approach to improving food service delivery, particularly within educational environments. This study aims to evaluate the effectiveness of such a system in the context of the KAMSIS Cafeteria and contribute to a deeper understanding of the impact of digital transformation on food service management.

3.0 Methodology of Project

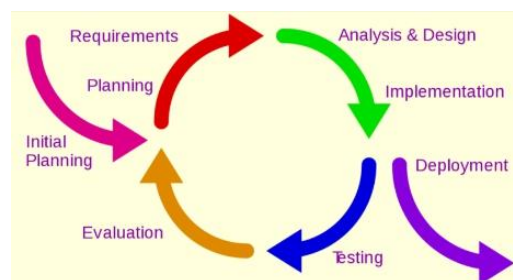


Figure 1: Iterative and incremental model

For the development of this project, the iterative and incremental model was selected due to its flexibility and robustness. This approach enables the system to be constructed through repeated development cycles, allowing for continual refinement and enhancement. One of the key advantages of this model is its capacity for comprehensive risk analysis, outperforming other conventional models in terms of adaptability. Additionally, it accommodates evolving requirements, making it well-suited for dynamic development environments. Even in the presence of unforeseen issues or mid-process modifications, the development can progress

without compromising project integrity. The iterative and incremental model comprises six distinct phases: the planning phase, requirement analysis phase, and design phase, among others, each contributing progressively to the realization of the final system.

3.1 Methodology Phases

Planning

In planning phase, to develop a new system which is a first step is to identify a need for the “Customer Ordering System” and plan how to develop the functional requirement of system. This will include determining whether a business problem or opportunity exists, conducting a feasibility study to determine the developing a project plan.

Analysis

In this phase, I have analyses considers the current system and investigates any problem associated with it. Other sources of information about system and the new requirement would be investigated at this time. The output from this stage would probably be more than set of notes.

Design

After the requirement have been determined, the necessary specifications for the hardware software people and data resources and the information products that will satisfy the functional requirement of the proposed system can be determined. The design will serve as a blueprint for the system and help detect problem before these errors or problem are built into the final system. I will create the system design by review the work with the scope to ensure the design meets the objective and requirement of the Customer Ordering System.

Implementation

The implementation phase in described as those activities that begin when the system design has been completed. These phases are production software code according to plan, analysis and system design that have been done. Coding and debugging are the act of creating the final system. The requirement documentation should be referred to throughout the rest of the system development process to ensure the developing project aligns with the needs and requirements of scope. The system also is tested to evaluate its actual functionality in relation to expected or intended functionality.

3.2 Requirement Specification

3.2.1 Functional Requirements

This is a Functional Requirements Specification for the Cafeteria Ordering System, to be used by the admin as a cafeteria manager and students as users who will place orders. The main of Functional Requirements Specification for the Cafeteria Ordering System is to computerize the food ordering system process. The processing of input to output is directed by the software but performed by the hardware. Second, this is a Functional Requirements Specification for the Cafeteria Ordering System, to be used by the admin as a cafeteria manager and students as users who will place orders. Last, with this technology students do not have to queue long just to order food at the cafe. They do not have to sit at the table for too long just to wait for the waiter to come. Because students can continue to order and pay for orders online.

3.2.2 Non-Functional Requirement

Security: Users shall be required to log in to the cafeteria ordering system for all operations except viewing a menu. The system shall permit only cafeteria staff members

who are on the list authorized Menu Managers to create or edit menus. Reliability: Makes it easier for students to order food and there is no need to queue. Performance: The system shall display confirmation messages to users within 2 minutes after the user submits information to the system. Maintainability: A commercial database is used for maintaining the database and the application care of the site.

Table 1: Hardware and software requirements

Hardware	Software
Laptop	Internet
Hand Phone	Linked

3.3 System Configuration

Firstly, the system configuration is to using PHP for create website. This project use PHP my admin as database to keep in data. Then, a system configuration is to using local host connect to the website. Moreover, Student can search link this website and admin can see when student register. User must register first at log in page for student before signing up to get the access for the website. Then, after students finish logging in to the website, they will be able to log in to the website using their username and password.

3.4 Security Requirement

- i. The system shall permit Patrons to view only their own previously placed orders, not orders placed by other Patrons.
- ii. This system has their respective passwords already registered by students and managers.

4.0 Test Description and Results

4.1 Unit Testing

Table 4.1: Unit Testing Plan (UTP)

No.	Test Case Name	Test Procedure	Pre-condition	Expected Result	Tester	Result (Pass/Failure)
1.	Login	User is required to fill the username and password field before access the system	users need to register or sign up before login.	Notification successful login to menu	Syaza	Pass
2.	Cafe Page	The user is required to view menu page in the system.	Users need to login before view menu page.	Successful login	Syaza	Pass

4.2 Integration Testing Plan (ITP)

Table 4.2: Integration Testing Plan (ITP)

No.	Test Case Name	Test Procedure	Pre-condition	Expected Result	Tester	Result (Pass/Failure)
1.	Login	User is required to login button	None	User will directly go to menu homepage.	Syaza	Pass
2.	Register	User is required to sign up	None	User will go login page after register	syaza	Pass

3.	Order	User can order between food and drink or both.	None	The staff will get the order form the user	syaza	Pass
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4.3 User Acceptance Testing (UAT)

Table 4.3: User Acceptance Testing (UAT)

NO.	Test Case Name	Acceptance Requirement	Test Result	Tester	Comments
1.	Login	User is required to fill in the username and password before access the website	pass	syaza	(comments are given bt client)

5.0 Discussions

5.1 Advantages of the Proposed System

The development and deployment of the online food ordering system for Sultan Mizan Zainal Abidin Polytechnic's KAMSIS Cafeteria has yielded several notable benefits:

1. **Enhanced User Convenience** The system significantly improves the ordering experience for students by providing a streamlined and accessible digital platform, eliminating the need to queue or rely on verbal communication.
2. **Operational Efficiency** The introduction of online ordering has simplified the workflow for cafeteria staff, particularly waitstaff, by automating the order-taking process and reducing manual input.
3. **Digital Transformation** Transitioning from a paper-based system to a computerized ordering platform represents a substantial technological upgrade, aligning with modern service expectations and institutional innovation goals.
4. **Improved Decision-Making** By leveraging a structured, data-driven system, the cafeteria can better analyze ordering trends and determine optimal solutions for menu management and service delivery.

5.2 List the limitations of the product

This system only works when the internet is activated but this system is not useful when the internet is not activated. Then, the users need to have enough data to use this system.

6.0 Conclusions and Recommendations

The development of the Online Food Ordering System at PSMZA Cafeteria represents a significant step toward digital transformation within the institution. By addressing common issues such as long queues, inefficient order handling, and lack of real-time communication, the system enhances the overall dining experience for students and staff.

Through features like scheduled pickups, live order tracking, and an intuitive user interface, the system not only improves operational efficiency but also promotes convenience and satisfaction. For cafeteria staff, the admin panel and reporting tools provide better control over menu management and sales tracking. This project demonstrates how technology can be effectively applied to solve real-world problems in a campus environment. It also opens opportunities for future enhancements such as mobile app integration, online payments, and AI-based recommendations. In conclusion, this system is not just a technical solution, it is an

innovation that supports a smarter, faster, and more user-friendly cafeteria experience at PSMZA.

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