

PHEP Cafeteria Management System

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Abstract

The existing manual system for cafeteria management, ordering and payments at Kafeteria PHEP, Universiti Tun Hussein Onn Malaysia, leads to inefficiencies such as long wait times, frequent order mistakes, and difficulties in managing stall rentals. This study focuses on designing a cafeteria management system using object-oriented principles, developing it as both a web-based and mobile-based application, and testing its functionality through user acceptance testing. The system was developed using the iterative model and includes features such as online ordering, real-time menu updates, online payment, and statistical report generation. The results show improved menu accuracy, reduced waiting times, and more efficient stall management processes. The system successfully enhances operational efficiency for customers, stall staff, and administrators, with potential for future enhancements, such as AI-driven analytics for predicting customer preferences and improving service delivery.

1. Introduction

The modernization of technology has significantly transformed daily tasks and business operations, including the food service industry. Technological innovation has improved customer satisfaction and operational efficiency, particularly in food courts, where manual methods are being replaced by digital solutions [1], [2]. At Universiti Tun Hussein Onn Malaysia (UTHM), the Kafeteria Pejabat Hal Ehwal Pelajar (PHEP) faces challenges due to traditional manual operations, which result in inefficiencies and customer dissatisfaction. This study explores the potential of a digital cafeteria management system tailored to address these challenges.

The current operational flow at Kafeteria PHEP is characterized by inefficiencies in menu management, order placement, and payment handling. Customers often face long waiting times and the inconvenience of browsing menu from multiple stalls to complete their orders. This manual process lacks centralized order tracking and leads to dissatisfaction, especially during peak hours [3]. For stall staff, challenges include time-consuming manual order management, heightened risk of errors, and difficulty in maintaining accurate sales records [4]. The cafeteria administrators also encounter issues in overseeing stall registrations, managing rental agreements, and ensuring operational compliance.

This study aims to investigate the challenges in the current manual operations and how a digital system can address these inefficiencies while enhancing customer satisfaction and workflow. Specifically, it seeks to understand the shortcomings in manual processes, explore ways a digital platform can improve efficiency, and identify the essential features and functionalities required for such a system. The hypothesis is that a digital cafeteria management system can significantly reduce customer waiting times, improve operational efficiency for stall staff, and streamline administrative tasks for cafeteria management. To achieve these goals, the study's objectives include designing the system based on object-oriented principles, developing a web-based and

mobile-compatible platform with the necessary features, and performing user acceptance testing to ensure it satisfies both functional and non-functional requirements [1], [5].

The proposed PHEP Cafeteria Management System will cater to three primary user roles, which are customers, stall staff, and administrators. Customers will have the convenience of placing orders via quick response (QR) codes or the system’s web link, enabling centralized payments for multiple stalls in a single transaction. Stall staff will benefit from streamlined menu management, real-time order tracking, and comprehensive sales reporting tools. Administrators will have a unified platform to manage stall registrations, rental agreements, and overall cafeteria operations. The system aims to enhance the dining experience for customers, reduce operational inefficiencies for staff, and provide administrators with effective management tools.

The system is included with eight modules to cater the needs of all user types while also meeting the stakeholder’s requirements [3], [4]. Table 1 shows the details of the modules.

Table 1 Scope of PHEP Cafeteria Management System

Modules	User	Functions
Login and Register	Customer, Stall Staff, Admin	<ul style="list-style-type: none"> Ensuring the system is more secure and only accessible to users with a registered account Redirect the customers, stall staff and admin to their dedicated pages based on user ID
	Customer	<ul style="list-style-type: none"> Providing a platform for new users to create an account to access the system Storing customer’s information such as name and phone number
Profile	Customer	<ul style="list-style-type: none"> Customer able to view their past orders Customer able to modify their information such as phone number and name
	Stall Staff	<ul style="list-style-type: none"> Stall Staff can view their stall’s information and the end date of their rental agreement Stall Staff able to modify all the stalls’ information on their profile except for the end date of their rental agreement
Manage Food Stall	Admin	<ul style="list-style-type: none"> Cafeteria admin able to add, remove and update renting stalls Cafeteria admin able to review all stall’ rental agreement end date
Manage Menu	Customer	<ul style="list-style-type: none"> Displays a list of food and drinks available from all stalls in the cafeteria Provide customers with buttons used to add, modify, remove and confirm the order Customers can choose whether they want to dine in or take away
	Stall Staff	<ul style="list-style-type: none"> Stall staff able to add, remove, update, hide and unhide menu items from displaying on the system
Payment	Customer	<ul style="list-style-type: none"> Provide a platform for customers to make online payments to the cafeteria system System will distribute all payments to the stalls based on whether their menu items are ordered or not
Manage Order	Customer	<ul style="list-style-type: none"> View updates on the order for each stall that the customer ordered from Receive notification from each stall once their order is ready for pickup
	Stall Staff	<ul style="list-style-type: none"> View the list of menu items the customer ordered from their stall View details of the order, such as type of order, price and customer details Stall staff will press the ‘Confirm Order’ button on the system once the order is completed to inform the customer to take their food or drinks
View Report	Stall Staff	<ul style="list-style-type: none"> Provide features for the stalls to review their stall’s statistical sales report Sales report data can be filtered by day, week, month and year

The following section discusses the related studies, which compare the three systems related to the developed system. Section Three discusses the methodology used in this study, and Section Four focuses on the analysis and design for the development of the PHEP Cafeteria Management System Food Ordering System.

2. Literature Review

This section will discuss the study of the current system flow at Kafeteria PHEP, UTHM. This section also include the analysis of three existing systems which are Easy Eat, TabSquare.AI and Beep. The systems have been examined to gather and collect related and useful information for the development of the proposed system, PHEP Cafeteria Management System.

2.1 Study of Manual Food Ordering Flow

The current food ordering flow at Kafeteria PHEP follows a traditional manual system, where customers must visit each food stall to view the menu and place their orders. This process is particularly inefficient during peak hours, as customers often face long waiting times due to overcrowding at the counters. Once an order is placed, staff record the details manually, typically using pen and paper, before passing the information to kitchen staff for preparation. This manual process is prone to human errors, such as incorrect orders or misplaced records, which can lead to customer dissatisfaction. Additionally, customers are not notified of the availability of menu items until they attempt to order, further contributing to frustration. The lack of centralized tracking also prevents effective workflow management, making it challenging for the cafeteria to operate efficiently during high-demand periods.

2.2 Study of Manual Food Stall Management

The management of food stalls at Kafeteria PHEP is handled manually by the consortium leader, who oversees stall registration, rental agreements, and operational compliance. Potential stall owners are selected based on specific criteria, such as the type of cuisine offered and compliance with food safety certifications. Details about the stalls, such as rental periods and vendor information, are recorded manually in logbooks. This manual system limits scalability and increases the likelihood of record-keeping errors. Moreover, the lack of a digital management platform makes it difficult to monitor rental agreements effectively, track upcoming expirations, or manage administrative tasks efficiently. This inefficiency can hinder timely decision-making and stall turnover, negatively affecting the overall operation of the cafeteria.

2.3 Easy Eat

Easy Eat is an online food ordering platform designed to enhance customer dining experiences and streamline restaurant management. Customers can use the platform to browse menus, place orders, and make payments through their mobile devices. The system includes AI-driven recommendations based on order history and customer preferences, allowing for a personalized user experience. Easy Eat also supports various payment methods, such as QR codes and online wallets, and provides real-time order tracking. For restaurant operators, the platform offers tools to manage menus, track orders, and analyze sales data. The integration of these features helps restaurants operate more efficiently while improving customer satisfaction. The PHEP Cafeteria Management System could benefit from adopting similar features, such as AI-driven menu recommendations and streamlined payment processing [6].

2.4 TabSquare.AI

TabSquare.AI is an AI-powered digital ordering platform designed to enhance restaurant operations and customer experiences. The system provides interactive digital menus, allowing customers to browse items, customize orders, and make payments through their smartphones. TabSquare leverages AI to provide personalized menu recommendations and promotions based on user behavior and preferences. Additionally, it includes features for order management and real-time sales analytics, enabling restaurants to optimize their operations. The platform also integrates loyalty programs to attract and retain customers. These advanced features align with the objectives of the PHEP Cafeteria Management System, particularly in improving customer satisfaction and operational efficiency through technology-driven solutions [7].

2.5 Beep

Beep is a digital platform that focuses on enhancing restaurant operations by enabling contactless ordering and payment. Customers can explore menus, place orders, and make payments using their mobile devices, reducing the need for physical interactions. Beep supports real-time order tracking, allowing customers to monitor their orders from preparation to completion. The platform also offers tools for table reservations, menu customization, and POS integration, ensuring smooth transaction processing. Restaurants can benefit from the platform's detailed analytics on sales and customer behavior, helping them make informed decisions to optimize operations. These functionalities make Beep a relevant benchmark for the PHEP Cafeteria Management System, especially in implementing real-time order tracking and analytics [8].

2.6 Comparison with Existing Systems

Table 2 shows the comparison of three existing systems include with the proposed system. The comparison made reveals several similarities and differences on this system. All systems offer features such as online menu browsing, order placement, and payment processing, which improve customer convenience and reduce waiting times. PHEP Cafeteria Management System aims to integrate the best features of these platforms while addressing the specific challenges faced by Kafeteria PHEP.

Table 2 Comparison with existing systems

Features/System	Easy Eat	TabSquare.AI	Beep	PHEP Cafeteria Management System
Login and Register	√	√	√	√
Profile	x	x	x	√
Manage Restaurant	x	x	x	√
Manage Menu	√	√	√	√
Payment	√	√	√	√
Manage Order	√	√	√	√
View Report	x	x	x	√

3. Methodology

This section explains the methodology employed in developing the PHEP Cafeteria Management System. The project utilized the iterative development model, which promotes flexibility and adaptability in software development. The methodology was chosen to address the shortcomings of traditional software development models and to ensure a structured and efficient approach to building the system.

3.1 Iterative Model

The software development life cycle (SDLC) is a step-by-step procedure that outlines the key phases and tasks during the development cycles of a software project [9]. The main focus of implementing the SDLC approaches is to plan, develop, and deliver systems or products on time while maintaining the appropriate budget [10]. The methodologies for the SDLC are important in system development because it shows promise for adaptation in the creation of projects and organisations [11]. Software development life cycle (SDLC) methodologies offer an organised framework that guides the process of designing, developing, and deploying software products [12]. Therefore, all developers in organisations should utilise the SDLC approach, and a suitable model should be selected for every project [13].

For this project, the software development life cycle (SDLC) model that will be used is the iterative model. The iterative model is somewhat of an agile model, but it is incorporated with an iterative approach [14]. In the iterative model development approach, the development process is divided into different cycles or iterations. Each iteration is used to develop small parts of the system by adding new features or refining existing ones, the iteration are then repeated until the desired version is achieved [15]. Therefore, the subset of designs will not be completely ready until the deployment phase is reached [9]. The iterative method quickly adjusts to the ever-changing needs of clients and projects in the shortest amount of time and money [16]. The iterative model is chosen as the software development model for developing the PHEP Cafeteria Management System because it offers several advantages to the development process of the system such as continuous quality improvement, constant client collaboration, easily adapt to changes and quicker delivery of functioning software [17]. As a result, the iteration approach brings a positive impact on both the developer and client because it will make the development more flexible and scalable, and it will also make it easier for testing and getting feedback. The gantt chart of the PHEP Cafeteria Management System can be referred in Appendix A.

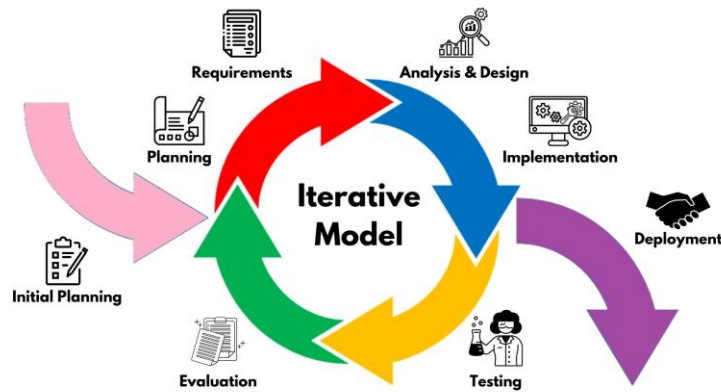


Fig. 1 Iterative model

3.2 System Development Workflow

The workflow of the iterative model is shown in Table 3. Each phase of the model has specific tasks and outputs to ensure clarity and progress throughout the development process.

Table 3 Software development phases and tasks

Phase	Task	Output
Initial Planning	<ul style="list-style-type: none"> Identify problem and requirements Define objectives, scope and goals Plan project timeline 	<ul style="list-style-type: none"> Project proposal Gantt chart
Planning	<ul style="list-style-type: none"> Identify features for the current iteration activities Review completed parts of the system made from past iterations 	<ul style="list-style-type: none"> Conduct stakeholder meeting (Refer Appendix B) Iteration plan
Requirements	<ul style="list-style-type: none"> Gather and refine requirements of the current iteration 	<ul style="list-style-type: none"> Requirements specification document
Analysis & Design	<ul style="list-style-type: none"> Create use case, activity, class and sequence diagram Design database Plan system architecture and user interface 	<ul style="list-style-type: none"> System design diagram System prototype
Implementation	<ul style="list-style-type: none"> Develop new modules Refine modules from past iteration 	<ul style="list-style-type: none"> Functional system components
Testing	<ul style="list-style-type: none"> Conduct user acceptance testing Conduct functional and non-functional testing 	<ul style="list-style-type: none"> Test case Test result
Evaluation	<ul style="list-style-type: none"> Gather feedback from stakeholders or users on implemented features 	<ul style="list-style-type: none"> User feedback
Deployment	<ul style="list-style-type: none"> Launch the fully developed system 	<ul style="list-style-type: none"> Fully deployed and operational system

3.3 User Requirement Analysis

System requirement analysis is a systematic approach for determining a suitable collection of resources to meet a system need, along with the specifications for those resources that serve as a solid foundation for their design or selection [18]. Early indication of an appropriate specification is provided by the formalisation and validation of system requirements, which helps minimising the need for expensive corrective actions and validation tests in later stages of system development [19].

3.4 Functional and Non-Functional Requirements

The main functions or features of the produced system are known as functional requirements, whereas a function is defined as a particular behaviour in the developed system that transforms input into output [20]. In the PHEP Cafeteria Management System, the system's functional requirements are organized into various modules, each detailing the primary functions of the system. These modules and their corresponding functional requirements are presented in Table 4.

Table 4 Functional requirements for PHEP Cafeteria Management System

Module	Functional Requirements
Login and Register	<ul style="list-style-type: none"> • Allow new customers to create an account • Store customer’s details into system’s database • Authenticate users • Redirect users to their dedicated pages based on their user role
Profile	<ul style="list-style-type: none"> • View and modify user information • View user’s past orders • View food stall’s rental details
Manage Food Stall	<ul style="list-style-type: none"> • Add, remove, update and view renting stall details • Monitor rental agreements
Manage Menu	<ul style="list-style-type: none"> • Add, remove, update, hide or unhide menu items displaying in PHEP Cafeteria Management System • Display all available menu items to customers
Payment	<ul style="list-style-type: none"> • Process online payments • Distribute payments to the relevant food stall
Manage Order	<ul style="list-style-type: none"> • Display customer’s order • Confirm order completion • Provide live order status update • Notify customers upon order being ready for pickup
View Report	<ul style="list-style-type: none"> • Generate sales report

Non-functional requirements indicate how the system behaves and what sets it apart from similar products, which consist of requirements such as availability, scalability, security, performance, usability, and maintainability [21]. In contrast, the system properties that are related to the non-functional requirements do not directly impact the functions that the system offers [22]. In the PHEP Cafeteria Management System, the non-functional requirements included in the system development are as described in Table 5.

Table 5 Non-functional requirements for PHEP Cafeteria Management System

Non-Functional Requirements	Description
Security	<ul style="list-style-type: none"> • The system is accessed only by registered users
Operational	<ul style="list-style-type: none"> • Function well on all web browsers • Loading time is no more than 1 minute
Scalability	<ul style="list-style-type: none"> • Support adding more food stalls or menu items into system easily
Usability	<ul style="list-style-type: none"> • Ensure user-friendly interface for all user roles • Suitable for users coming from all ages and IT knowledge
Accessibility	<ul style="list-style-type: none"> • Accessible on mobile and desktop devices

3.5 User Requirement Analysis

User requirements analysis defines the functionality and features in the system which represents the expectation need to be achieved to meet the user requirements in the system. The user requirement analysis for PHEP Cafeteria Management System is as shown in Table 6.

Table 6 User requirement analysis for PHEP Cafeteria Management System

No.	User Requirements
1.	Customer should be able to successfully log into the system
2.	Customer should be able to register an account in the system
3.	Customer should be able to view and modify their information
4.	Customer should be able to view their past orders
5.	Customer should be able to view, browse and search menu easily
6.	Customer should be able to add and remove item from the cart
7.	Customer should be able to successfully confirm their orders
8.	Customer should be able to choose whether to dine in or take away their orders
9.	Customer should be able to make online payments securely
10.	Customer should be able to view payment details and order status updates
11.	Customer should be able to receive notification on order that are ready for pickup
12.	Stall staff should be able to successfully log into the system
13.	Stall staff should be redirected into their dedicated pages when log into the system
14.	Stall staff should be able to view and modify their stall's information
15.	Stall staff should be able to view the end date of their rental agreements
16.	Stall staff should be able to add, remove, modify, hide and unhide menu items from their stall
17.	Stall staff should be able to view list of menu items and details of customer ordered from their stall
18.	Stall staff should be able to update the status of an order
19.	Stall staff should be able to view and manage sales report
20.	Admin should be able to successfully log into the system
21.	Admin should be redirected into their dedicated pages when log into the system
22.	Admin should be able to view, add, remove and update renting stalls information
23.	Admin should be able to review all renting stall's rental agreement end date

3.6 Use Case Diagram

A use case diagram is a sequence of operations carried out by the system, where actors act as users, or other system's components interacting with the system being modelled [23]. Actors, use cases, and relations form the use case diagram component. Actors represent the roles played by users or external entities that directly interact with the system, use cases in the other hand are sets of actions that the system can perform or that can be observed, often involving one or more actors or other stakeholders in the system [24]. Figure 2 shows the use case diagram for the PHEP Cafeteria Management System which consists of three actors and eight modules.

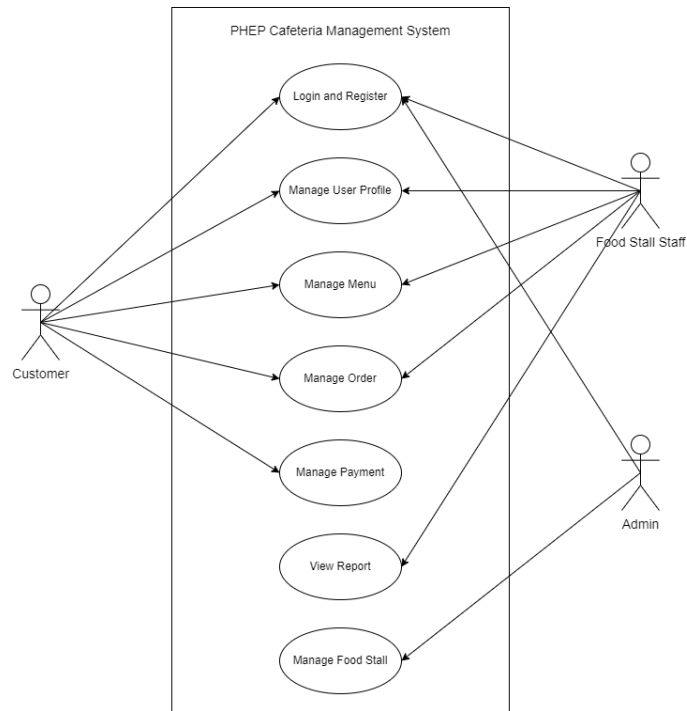


Fig 2 Use case diagram for PHEP Cafeteria Management System

3.7 System Architecture

The architectural design of the PHEP Cafeteria Management System is a multi-layered client-server structure that enables customers using browser-based interfaces to interact efficiently with food stall staff and admin. The Presentation Layer offers tailored UIs for each role, while the Application Layer handles core operations via controllers for authentication, orders, payments, and menus. The Business Logic Layer manages functions like order dispatching and payment distribution, integrating with Stripe for online transactions. All data is stored in a centralized MySQL database, ensuring efficient, secure, and scalable system performance. Figure 3 below shows the system architecture for PHEP Cafeteria Management System.

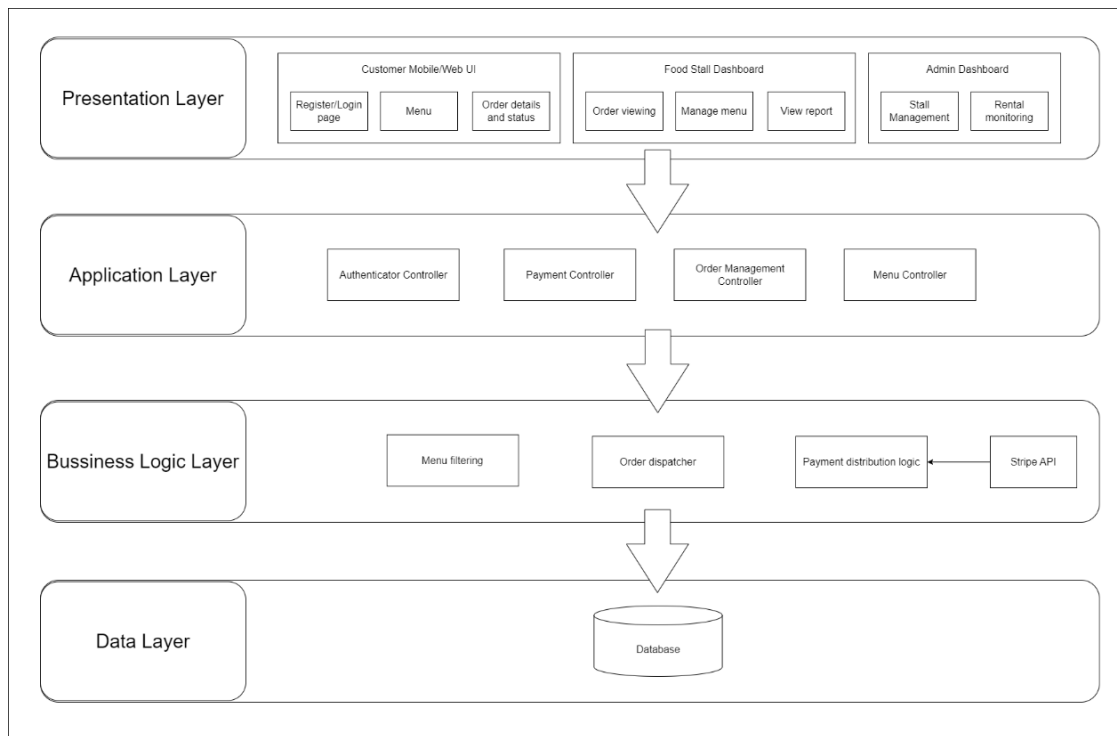


Fig 3 System architecture of PHEP Cafeteria Management System

3.8 Class Diagram

The class diagram is crucial for all developers since it helps them comprehend what the client wants and visualise the ideas that will be implemented [25]. Figure 4 shows the class diagram for the PHEP Cafeteria Management System that consists of nine classes, the diagram also includes the relationship between classes and inheritance of user class.

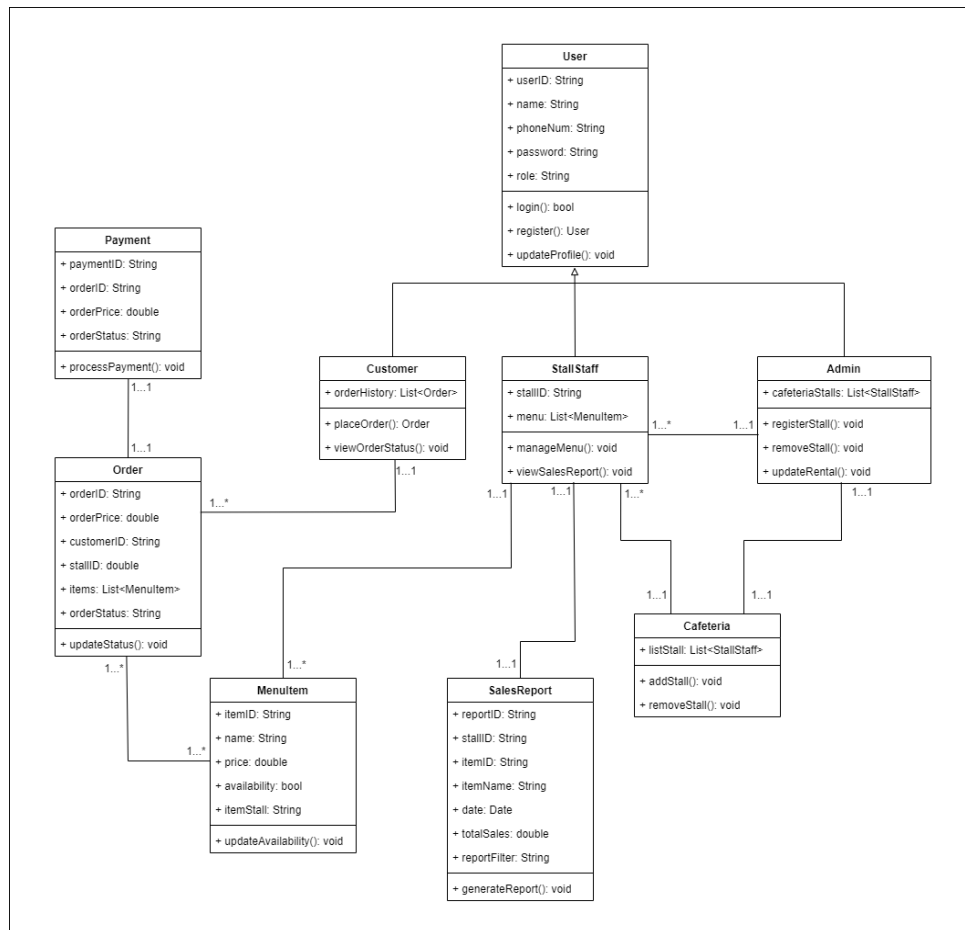


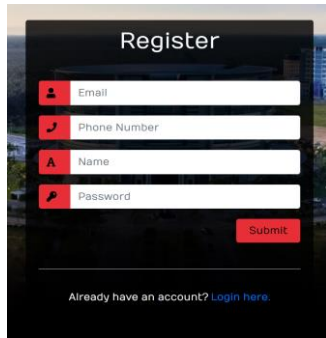
Fig 4 Class diagram for PHEP Cafeteria Management System

4. Implementation and Testing

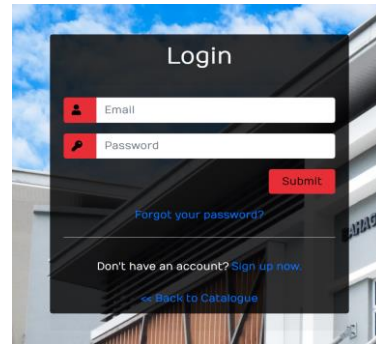
This section outlines the development of the PHEP Cafeteria Management System's functional modules, detailing the purpose and implementation of each major component. Each module was developed incrementally using the iterative development model to ensure flexibility and responsiveness to feedback. The development is followed by testing phases to identify and resolve any issues, ensuring the system's reliability and performance.

4.1 Implementation

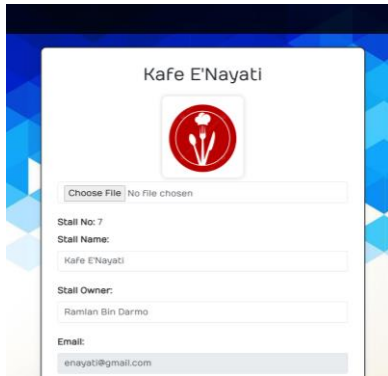
The PHEP Cafeteria Management System was developed using an iterative approach to address inefficiencies in order management, payment, and stall oversight at Kafeteria PHEP. Key modules, such as Register, Login, Manage Menu, and Manage Order, were designed to streamline processes for customers, stall staff, and admin. Customers can easily place orders and make payments, while stall staff can manage menus and orders in real time. The system also includes features like sales reporting and food stall management for administrators, ensuring smooth cafeteria operations. Figure 5 shows a screenshot for each part of the modules in the PHEP Cafeteria Management System.



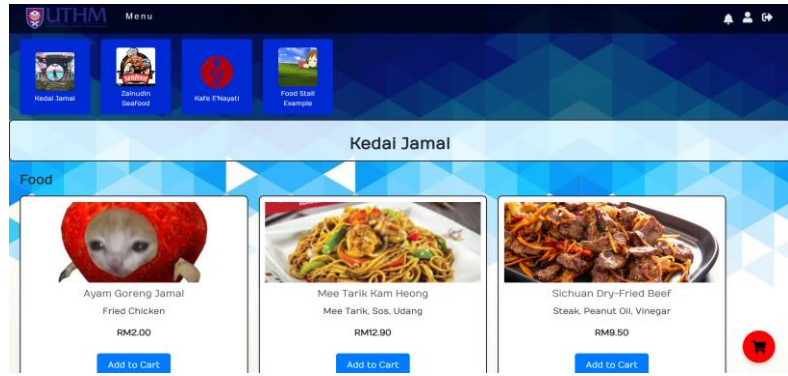
(a)



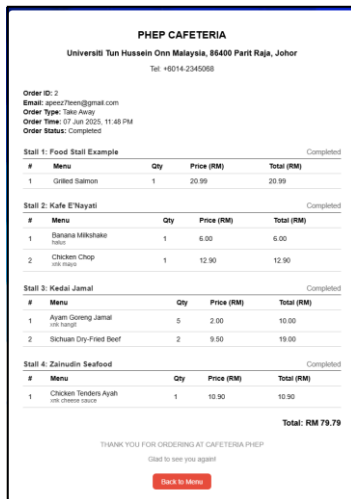
(b)



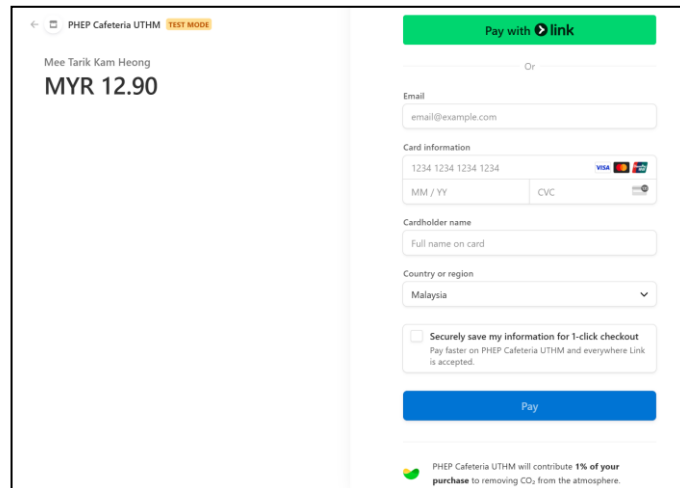
(c)



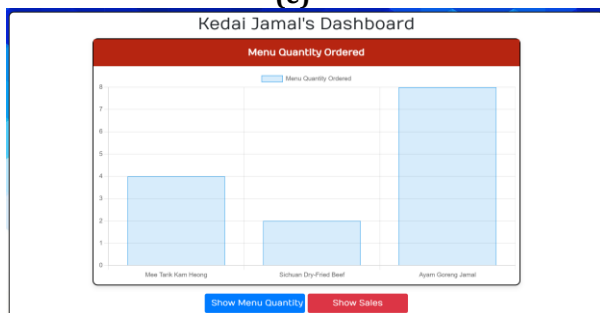
(d)



(e)



(f)



(g)



(h)

Fig 5 System design (a) Register; (b) Login; (c) Manage user profile for stall staff; (d) Menu; (e) Manage order; (f) Manage payment; (g) View report; (h) Manage food stall

Figure 5 shows the main interfaces of the PHEP Cafeteria Management System. The Register and Login, as shown in Figures 5(a) and 5(b), provide secure access for users, requiring credentials such as email, password, and phone number. After logging in, users are redirected based on their roles. Figure 5(c) shows the Stall Profile page, where stall staff can view and update stall information. Figure 5(d) displays the Menu interface, allowing customers to browse food items with images and prices and add them to the cart. The Manage Order page, as shown in Figure 5(e), categorizes completed orders by stall, listing item details and totals. Figure 5(f) shows the Online Payment screen, enabling secure card transactions using Stripe. Figure 5(g) shows the Sales Report Dashboard, using a bar chart to visualize menu item popularity. Lastly, Figure 5(h) shows the Manage Food Stall interface for administrators to register, view, edit, delete and track rental statuses of all food stalls. These interfaces collectively support efficient user registration, ordering, payment, and administration.

4.2 Testing

The system testing is conducted using test cases and user authentication testing to ensure that it meets the required functional and non-functional specifications. Test cases were created for each module. Most modules passed successfully, with only one failure in the Payment Distribution feature. In total, 38 out of 40 test cases passed, confirming that the system is reliable, though minor improvements, such as fixing the payment issue, will be implemented in future updates.

4.2.1 Test Case

The test cases are divided into 7 categories, corresponding to each module of the system. The functionalities tested are derived from the functional requirements and user requirement analysis outlined in Chapter 4. Ensuring comprehensive coverage and verification of all specified requirements. This approach helps track whether each requirement has been met. The test case and the results are presented in Tables 7 through 13.

Table 7 Test Case for Login and Register

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_100	TEST_100	Login and Register	
SRS_REQ_101	TEST_101	The system display login form	Pass
SRS_REQ_102	TEST_102	User enters valid phone and password	Pass
SRS_REQ_103	TEST_103	User enters wrong password	Pass
SRS_REQ_104	TEST_104	User enters unregistered email	Pass
SRS_REQ_105	TEST_105	Customer login without verifying email	Pass
SRS_REQ_106	TEST_106	If forgot password, user able to change password	Pass
SRS_REQ_107	TEST_107	System display a registration form	Pass
SRS_REQ_108	TEST_108	User enters valid name, phone, password	Pass
SRS_REQ_109	TEST_109	User tries to register with an existing email	Pass
SRS_REQ_110	TEST_110	System email registration verification code	Pass
SRS_REQ_111	TEST_111	Upon success, the user redirected to login page	Pass

Table 8 Test Case for Manage User Profile

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_200	TEST_200	Manage User Profile	
SRS_REQ_201	TEST_201	Customer view and edit profile details	Pass
SRS_REQ_202	TEST_202	Stall staff view and update stall information	Pass

Table 9 Test Case for Manage Menu

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_300	TEST_300	Manage Menu	
SRS_REQ_301	TEST_301	Customer view menu from all visible stalls	Pass
SRS_REQ_302	TEST_302	Customer use category button to find food stall	Pass
SRS_REQ_303	TEST_303	Stall staff add new menu item	Pass
SRS_REQ_304	TEST_304	Stall staff hide/unhide an item from menu	Pass
SRS_REQ_305	TEST_305	Stall staff view, filter and modify menu item	Pass
SRS_REQ_306	TEST_306	Stall staff manage sorting of menu item	Pass

Table 10 Test Case for Manage Order

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_400	TEST_400	Manage Order	
SRS_REQ_401	TEST_401	Customer adds items to cart	Pass
SRS_REQ_402	TEST_402	Customer choose add-ons for menu items	Fail
SRS_REQ_403	TEST_403	Customer view and confirm order in cart	Pass
SRS_REQ_404	TEST_404	Customer view order details and order status	Pass
SRS_REQ_405	TEST_405	Customer notified on order item ready for pickup	Pass
SRS_REQ_406	TEST_406	Customer confirm status of picked up item/order	Pass
SRS_REQ_407	TEST_407	Stall staff receive notification for new order	Pass
SRS_REQ_408	TEST_408	Stall staff views order details	Pass
SRS_REQ_409	TEST_409	Stall staff marks order as ready for pickup	Pass

Table 11 Test Case for Manage Payment

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_500	TEST_500	Manage Payment	
SRS_REQ_501	TEST_501	System display Stripe payment page	Pass
SRS_REQ_502	TEST_502	Customer fills in credit/debit details	Pass
SRS_REQ_503	TEST_503	Payment success	Pass
SRS_REQ_504	TEST_504	Payment fails	Pass
SRS_REQ_505	TEST_505	System distributes payment to stalls	Fail

Table 12 Test Case for View Report

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_600	TEST_600	View Report	
SRS_REQ_601	TEST_601	System displays dashboard with statistical graph	Pass
SRS_REQ_602	TEST_602	Stall staff choose type of graph to view	Pass

Table 13 Test Case for Manage Food Stall

Software Requirement Specification	Test Case ID	Test Case Description	Test Result (Pass/Fail)
SRS_REQ_700	TEST_700	Manage Food Stall	
SRS_REQ_701	TEST_701	Admin adds a new stall	Pass
SRS_REQ_702	TEST_702	Admin receive notification of stalls with expiring or expired rent period	Pass
SRS_REQ_703	TEST_703	Admin view and update stall information	Pass
SRS_REQ_704	TEST_704	Admin manages sorting of food stalls in system	Pass
SRS_REQ_705	TEST_705	Admin hide/unhide food stalls from system	Pass

4.2.2 Test Case Result

The testing phase of the system was essential to ensure that all modules met their specified functional and non-functional requirements. A total of 40 test cases were developed, covering all critical features of the system. Out of these, 38 test cases passed successfully, confirming that the system operates as expected in real-world conditions. The only failure occurred in the application of add-ons on the order and payment auto-distribution functions, which will be addressed in future updates. Table 14 shows the overall test case result for all 7 modules in the PHEP Cafeteria Management System.

Table 14 Overall Test Case

Test Case ID	Module	Total Test Case	Pass	Fail
TEST_100	Login and Register	11	11	0
TEST_200	Manage User Profile	2	2	0
TEST_300	Manage Menu	6	6	0
TEST_400	Manage Order	9	8	1
TEST_500	Manage Payment	5	4	1
TEST_600	View Report	2	2	0
TEST_700	Manage Food Stall	5	5	0
Total		40	38	2

4.2.3 User Acceptance Testing

User Acceptance Testing (UAT) was performed with Mr Ramlan, testing all of the functionalities and features of the system to verify that the PHEP Cafeteria Management System aligns with user expectations and specified functional requirements. During UAT, all user roles in the system, including customers, food stall staff, and admin, are tested to ensure the system works as expected by executing many test case scenarios to test features such as ordering, payment processing, order tracking, and food stall management. This testing process ensured that the system effectively supports most of the intended workflows and meets user needs. For a detailed overview of the UAT scenarios and procedures, please refer to Appendix C for the User Acceptance Testing form.

4.2.4 User Feedback Form

User Feedback Forms were distributed randomly to students in UTHM, as the students will be the main users of the system, which is the customer user role. A total of 24 students have filled in the form and answered the question given based on their opinion. 13 questions regarding the Kafeteria PHEP improvement and modules of the PHEP Cafeteria Management System are given and evaluated on aspects like system usability, interface clarity, operational effectiveness, and overall satisfaction, providing valuable qualitative data for further improvements. The feedback received through these forms was instrumental in identifying both strengths and areas requiring enhancement. Refer to Appendix D for the User Feedback Form.

5. Conclusion

The development of the PHEP Cafeteria Management System successfully modernizes and streamline operations at Kafeteria PHEP by addressing significant operational challenges such as manual order-taking, prolonged waiting times, and inefficient payment processes. This web-based and mobile-accessible platform facilitates seamless interaction among customers, food stall staff, and administrators, significantly enhancing overall efficiency. Notable advantages include intuitive stall management through drag-and-drop functionality reflecting their actual physical arrangement, flexible menu management that allows dynamic item sorting and visibility control, and integrated Stripe-based online payments for multi-stall orders. Despite its benefits, the system currently lacks menu sorting by price, limiting customers' ability to compare options based on budget. Additionally, report generation is confined to individual menu items, without support for broader stall-level or cafeteria-wide insights. Security also remains an area needing improvement, with potential vulnerabilities due to the absence of advanced measures such as data encryption, two-factor authentication, and detailed access controls. Future enhancements should introduce price-based sorting for menus, expand reporting capabilities to include stall-level and comprehensive cafeteria analyses, and implement robust security measures such as encryption, two-factor authentication, user access controls, and regular security audits to ensure user data protection and system integrity.

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Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

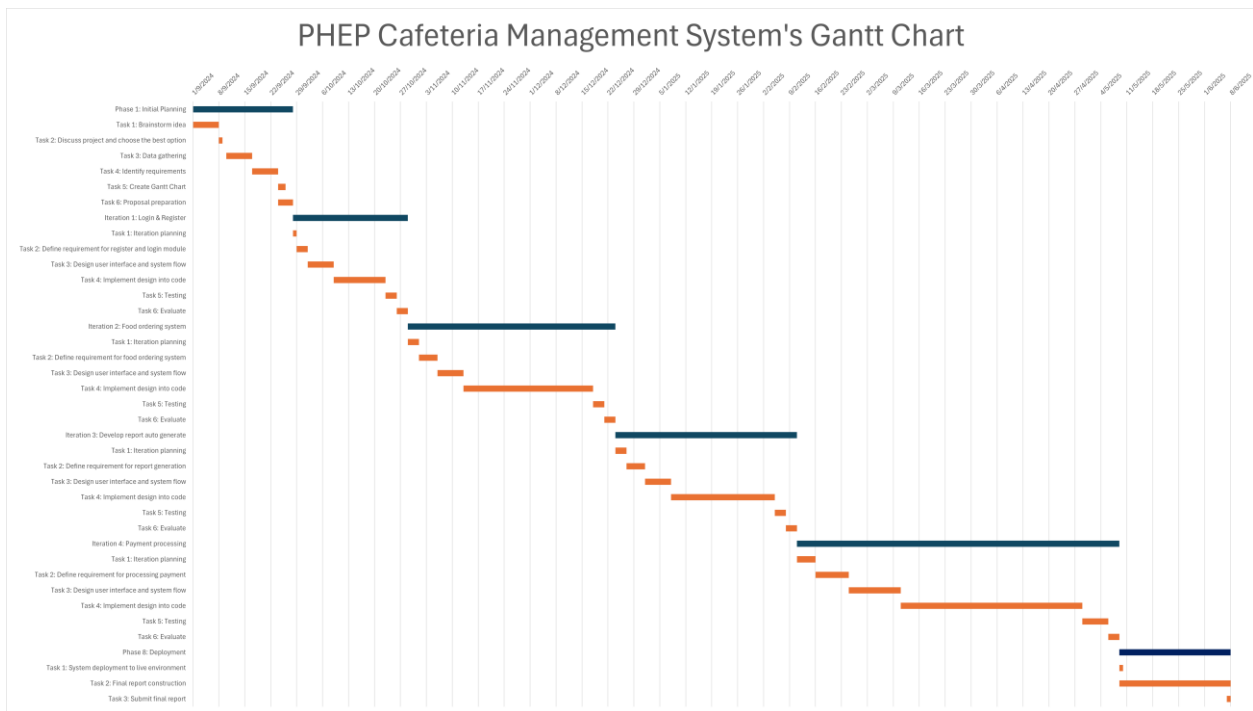
*The authors confirm contribution to the paper as follows: **study conception and design:** Muhammad Hafiz Zainudin, Nurezayana Zainal; **data collection:** Nurezayana Zainal; **analysis and interpretation of results:** Muhammad Hafiz Zainudin, Nurezayana Zainal; **manuscript preparation:** Muhammad Hafiz Zainudin, Nurezayana Zainal. All authors reviewed the results and approved the final version of the manuscript.*

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Appendix A: Gantt Chart



Appendix B: Stakeholder Meeting Question

Table B.1 Interview questions with stakeholders

No.	Question
1.	What is your full name?
2.	What is the position you hold at the Kafeteria PHEP?
3.	What is your responsibility in Kafeteria PHEP?
4.	How many food stalls you currently manage in the Kafeteria PHEP?
5.	How many food categories are available?
6.	Does each food stall sells different categories of food and drinks?
7.	What qualifications are required for people to rent a lot at Kafeteria PHEP?
8.	In the current system, how do you choose which applicants get to rent a lot?
9.	What information is needed from each vendor before starting their rent?
10.	How long is the contract for each vendor renting a lot?
11.	Can vendors renew their contracts once their rental period ends?
12.	Will vendors be notified when their rental contract is about to expire?
13.	Are there anyone who regularly visits Kafeteria PHEP weekly or monthly to ensure compliance with BIZDEC's rules and instructions?
14.	Does BIZDEC or the administrator require sales reports from each vendor?
15.	Do you have any suggestions on what to apply on the admin side of the system?

Appendix C: User Acceptance Testing

USER ACCEPTANCE TESTING (UAT)
PHEP CAFETERIA MANAGEMENT SYSTEM

Name : RAMLAN BIN DARMO
Date : 12/6/25
Phone Number : 081213104
Company : PHEP CAFETERIA

No.	Module/Acceptance Criteria	Test Result		Remark (optional)
		Pass	Fail	
1.	Register			
a)	There is a register page into the system	/		
b)	I able to register	/		
c)	I able to go to login after register	/		
d)	Error message shown if existing user email	/		
e)				
f)				
2.	Login			
a)	There is a login page in the system	/		
b)	I able to login into the system	/		
c)	I able to go to homepage after login	/		
d)	Error message shown if wrong credentials entered	/		
e)				
3.	Profile			
a)	User can view profile information	/		
b)	User can update profile information	/		
c)				
d)				
4.	Manage Food Stall			
a)	Admin can add new stall	/		
b)	Admin can delete food stall	/		
c)	Admin receive notification for expired rental	/		
d)	Admin manages cashing of food stall	/		
e)	Admin can hide/enable food stall	/		
5.	Manage Menu			
a)	User can view menu	/		
b)	User can edit menu item	/		
c)	User can delete menu	/		
d)	Menu item is categorized	/		
e)	Staff can sort, view, modify menu items	/		
6.	Payment			
a)	Customer can make payment	/		

b)	Invalid payments are rejected	/		
c)	There are multiple payments method	/		
d)	Valid payments is approved	/		
e)	Able to see payment details	/		
7.	Manage Order			
a)	Customer able to place order	/		
b)	Order details are displayed correctly	/		
c)	User can cancel order	/		
d)	Customer can edit order	/		
e)	Customer can delete order	/		
f)	Staff can view customer's order	/		
8.	Report			
a)	Admin can generate sales report	/		
b)	Admin can print reports	/		
c)	Reports are displayed correctly	/		
d)				
e)				

I am RAMLAN DARMO hereby declare that the information provided is true and correct.

Agreed by, [Signature] Witnessed by, [Signature]

Name: RAMLAN DARMO Name: Muhammad Hafiz Zairudin
Position: Wakil (PHEP) Position: Pelajar
Date: 12/6/25 Date: 12/6/2025

Appendix D: User Feedback Form

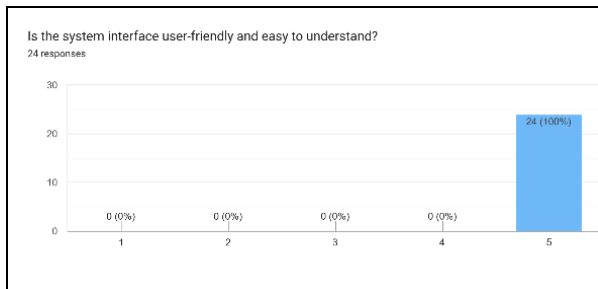


Fig C.1: User friendly

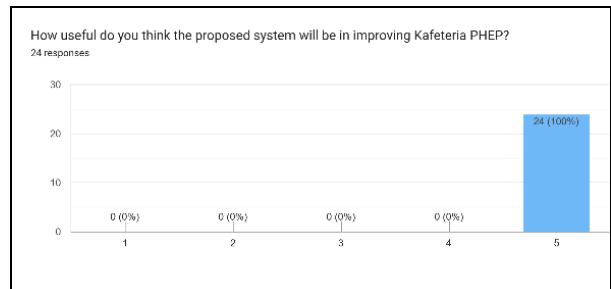


Fig C.2: Useful system

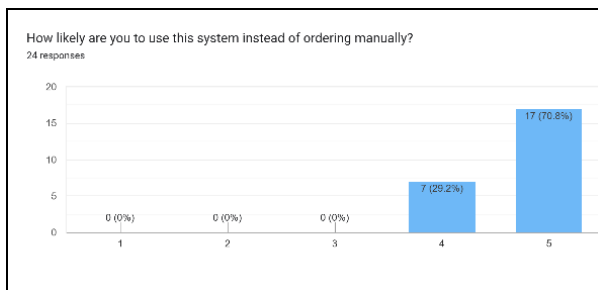


Fig C.3: Likely to use

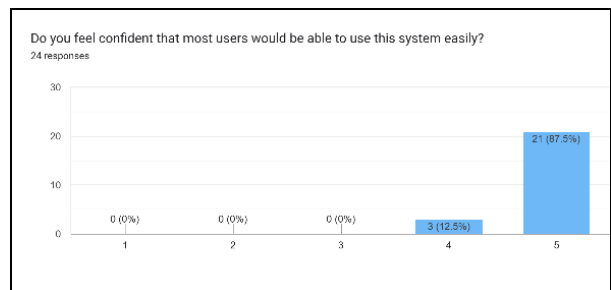


Fig C.4: Most feel easy to use

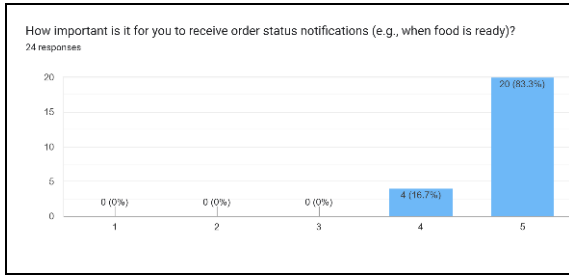


Fig C.5: Important order status

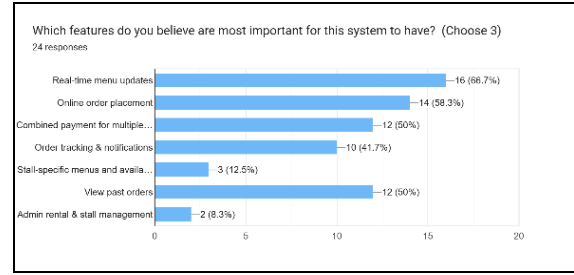


Fig C.6: Features most important

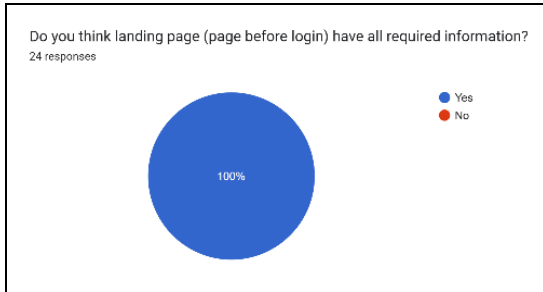


Fig C.7: Landing page



Fig C.8: Login & Register secure

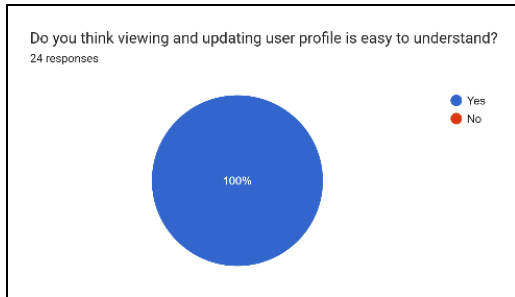


Fig C.9: View & update Profile

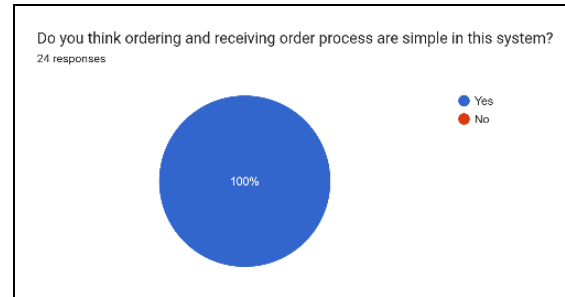


Fig C.10: Order and receive simple

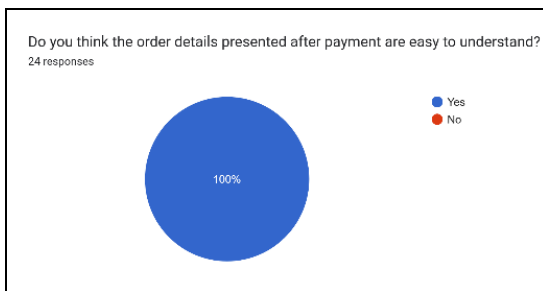


Fig C.11: Payment easy to understand

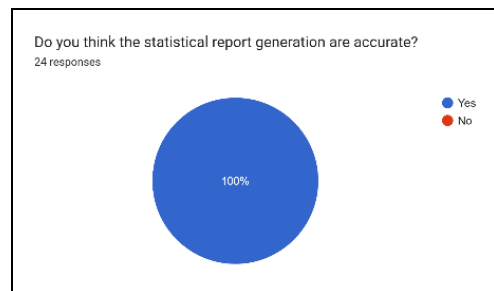


Fig C.12: Report accurate

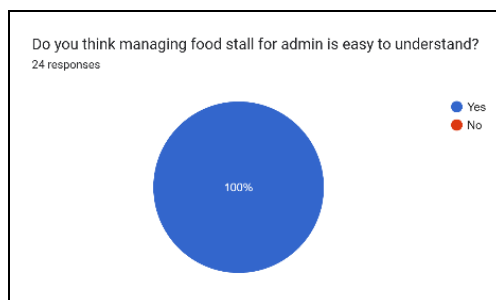


Fig C.13: Manage food stall easy