e-Runner: A Mobile Application for Campus Food Delivery Service

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HIGHLIGHTS

- A student's life is hectic with academic and non-academic activities requiring systematic time management.
- Convenience is the prime factor for the students as the orders can be made as simple as a few clicks on any mobile device, and the food and beverages are delivered to their doorstep.
- This application has many benefits, such as saving time, convenience, an all-in-one platform, can enhance students' lifestyles, and can improve customer experience.

ABSTRACT

Nowadays, technology has played a vital role in revolutionizing the food delivery service and benefits the students, runners, and food outlets in many ways. Life as a student is known to be challenging due to academic load, assignment deadlines, bouncing back and forth to class, extra-curricular activities, etc. This is a typical daily scenario on campus that require good time management. In the preliminary investigation of this study, students prefer to take away their food and dine in their rooms so that they will not waste their time by spending too much time in the cafeteria. It is found that convenience is the prime factor for the students as the orders can be made as simple as a few clicks on any mobile device, and the food and beverages are delivered to their doorstep. Additionally, this can prevent them from spending too much or wasting time buying food. Since food delivery becoming popular and preferable recently, thus, this study is aimed to develop a mobile application named e-Runner for the campus food delivery system. Students can make a food order, check the order status, and view a variety of food and beverages from several food outlets. The modified Waterfall Model has been used as the methodology of this study and consists of 4 phases, namely Requirement Analysis, Design, Implementation, and Testing. The application has been tested using two types of testing; Functionality and Usability Testing. The testing results show that this application has many benefits, such as saving time, convenience and act as an all-in-one platform. Furthermore, it can enhance students' lifestyles and can improve customer experience.

Keywords: Campus food runner, mobile application, food delivery service

INTRODUCTION

Life as a student is generally challenging due to the academic load, assignments deadlines, bouncing back and forth to class, extra-curricular activities, etc. This is a typical daily scenario on campus that require

good time management. Students who are busy with daily routines or have no transportation on campus face problems buying food (Mei & Siok, 2019). Thus, students must spend time buying food and postponing their tasks. Unfortunately, when they buy food, much time is wasted due to long queues, slow food preparation, or the remote location of food outlets.

Nowadays, the advancement of mobile applications has contributed to the change in consumer preferences in their daily tasks, including buying food (Cho, Bonn & Li, 2019). Thus, there is a demand to develop a mobile application that allows students easy access to buy food delivered to their doorstep (Mei & Siok, 2019). The main idea of developing this app called eRunner is to enable students to get food more quickly. Hence, this application can ease students to enjoy their food while doing their work without interruption. Furthermore, this study is also aimed to provide online food delivering system among food outlets on campus.

This mobile application benefits its users as the ordering process, and payment can be made with a few clicks. It is also a good platform for campus food delivery service to provide its services to the campus community. On the food outlets' side, they can easily manage food orders and deliveries. So, it would significantly improve the food outlets' efficiency and can reduce human errors.

LITERATURE REVIEW

Food Delivery Services

Food ordering and delivery applications have influenced the current development of the food business and modified restaurant opinions (Muller, 2020). Customers may browse the restaurants in their neighborhood and their willingness to deliver meals to their homes (Zhao & Bacao, 2020).

There are many reasons for a user to choose an online food delivery service. As stated in Taylor (2020) research, convenience is one of the factors why customers such as students choose to use food delivery services. Other than that, factors such as the Covid-19 pandemic (Taylor, 2020; Tran, 2021) or during inclement weather, people may opt to order food online instead of going out to eat. Customers generally prefer to sit indoors to avoid disease or severe weather, so eateries are frequently more vacant than usual.

In other research conducted by Saad (2021), delivery time, service quality, price, and condition of food delivered are among the main factors that contribute to the success of online food delivery. Research conducted by Pitchay, Ganesan, Zulkifli and Khaliq (2022) also listed price savings, delivery time and service quality influence the choice of online food delivery services. Meanwhile, the variety and number of restaurants, menu, delivery tracking service, and attitude of a delivery person are not the main factors of the success of online food delivery (Saad, 2021).

Online food delivery services have changed the dining culture among customers and food outlets (Choi, 2020). Food outlets should sustain a stable sales stream while providing excellent customer service (Choi, 2020). According to Moondra, Mangwani, Deshpande, Bundela and Namdev (2020), the main advantage of an online ordering system is that it simplifies the ordering process for the customer and the restaurant. Meanwhile, Rahman, Foysal, Moon and Nur (2021) found that using an online food delivery system also helps save time and effort for both customers and sales assistants.

Existing Food Delivery Apps

Many food delivery apps are available in the market such as GrabFood, Foodpanda, and Lalamove as shown in Figure 1.

Figure 1: Food Delivery Systems

GrabFood, Foodpanda, and Lalamove are popular food delivery apps allowing users to order meals from food outlets in their area. Customers can easily place an order using the apps and their orders will be delivered directly to their door with a certain amount of delivery charge.

Other than that, there are also food delivery apps designed specifically for university campuses or colleges. The main idea is to enable the students to get food more quickly from the food outlets. Mei and Siok (2019) have developed a food delivery mobile app called Dabao that allows students to enjoy a variety of foods outside the university campus by reducing delivery charges compared to other public food delivery services. Feedback from the students indicates that this app is in demand and very useful to them.

An interactive campus food delivery app has been developed by Pavan, Sarma, Mutreje, Raj and Staffi (2021) to cater door-to-door food delivery for college students. The app called APPetite is aimed to bridge the gap between college residents as its target users and the shops outside the campus. This app can solve the problems faced by the students since they do not have time to go out to buy food.

Research conducted by Taylor (2020) suggested that each campus food service operation should consider offering mobile food-ordering apps as the apps allow students to place food orders at their convenience and save time from waiting in line to get their food.

Based on the literature, it is essential to have a mobile app for food ordering services for university or college campus residents, specifically students. However, if food outlets are located outside the campus, it may be time-consuming to reach the students. Since the campus has many food outlets, the eRunner app development focuses on the campus's food outlets rather than the outside outlets.

METHODOLOGY

The Modified Waterfall Model was chosen as the Software Development Life Cycle (SDLC) model to design the e-Runner prototype. It serves as a framework for the activities carried out during the software development phase. According to Eason (2016), this model from the engineering and construction sectors was customized for software development because there were no defined software development processes at the time of the industry's start.

The phases of the modified waterfall as illustrated in Figure 2, are the same as the original waterfall model. Modified waterfalls have been introduced in response to the perceived problems with the waterfall model (Munassar & Govardhan, 2010). The modified waterfall is an improved version of the waterfall model that

can produce faster results in less time while being more versatile than the waterfall. In each phase, the redesigned waterfall also collects feedback from end-users.
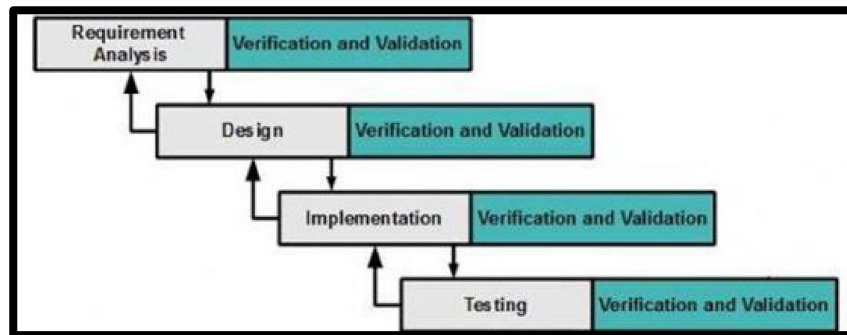

Figure 2: Modified Waterfall model

Figure 2 shows that each stage can return to the previous stage to enable user requirements and prototype design changes. The developer can amend the requirements before moving on to the design phase if there are any comments or input from the end-users. As a result of the required revisions, iteration may occur in each phase. The developer might provide the system design to the project's end-users for input or comments. They must interact during this phase to guarantee that there are no modifications during the implementation phase. End-users can provide design suggestions based on their experiences.

The testing phase is the most crucial step of development, where the application is examined for its usability for users. The testing is carried out by distributing questionnaires through online platforms to determine how simple and user-friendly the application is. A total of 30 respondents were comprised of lecturers, students, food outlet owners, and runners involved in this testing.

THE PROTOTYPE

This section shows some of the application's interface samples. The application has been developed using Android Studio, Canva, and Firebase as the database. The features of this application include Manage User Account, Menu Details, Make Order, Make Payment, Manage Orders and Deliveries, Manage Café, Order Status, Runner Delivery Page, and Notification to users.

When the user first opens the eRunner application, the Splash Screen page and Login page as shown in Figure 3 is displayed. The Login page requires users to enter their username and password to enable the application to direct them to their respective pages according to their user account type. A user can be a customer, a runner, or an owner of a food outlet.
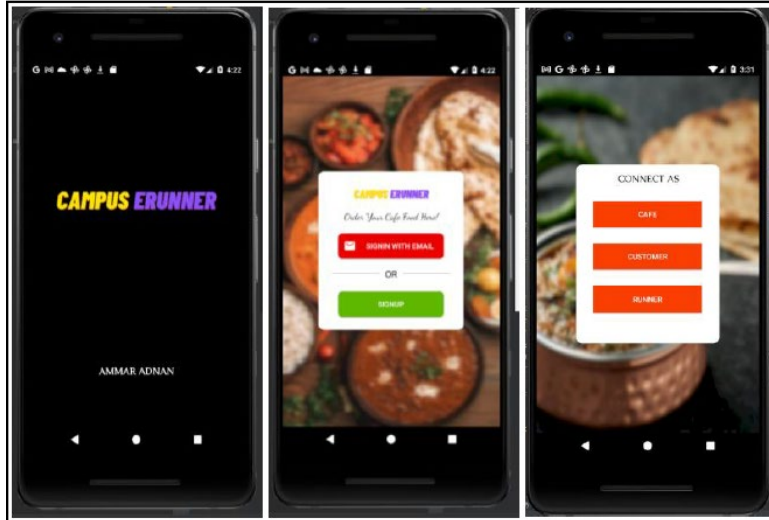
Figure 3: Splash Screen and Login page

The Customer Application features are shown in Figure 4, which consists of the Menu page, Cart page, and Payment page. The Menu page displays all menus available in each food outlet for that day. Users can select the menu and add it to the cart. Then, the application calculates the total price to be paid, and the Payment page is displayed to enable users to make payments.
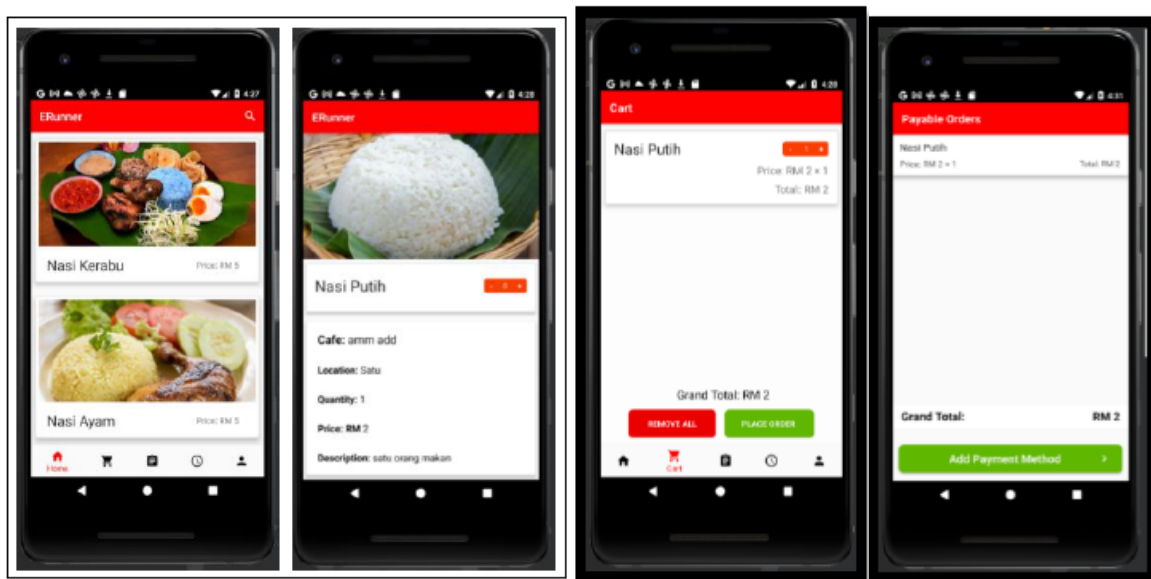

Figure 4: Menu, Cart and Payment page

This application also provides features for food outlets to manage orders and delivery as shown in Figure 5, such as the Pending Order page and Post Dish page.
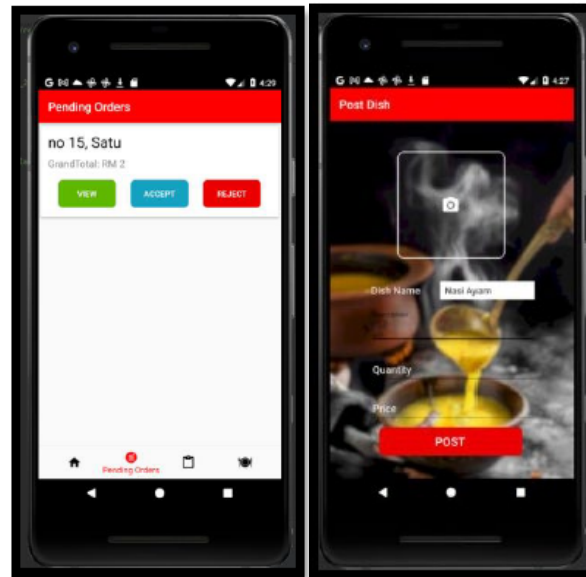
Figure 5: Food Outlets features

The features for the runner include the Delivery page and how to contact the customer page, as illustrated in Figure 6. The page provides information about the customer, and the runner can call or update the Delivery status as Delivered.
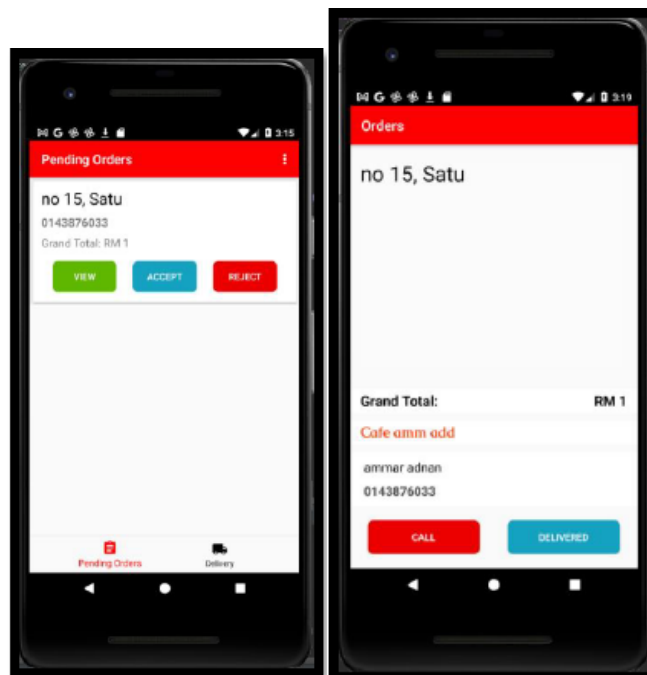

Figure 6: Runner's features

FINDINGS AND DISCUSSIONS

This mobile app has been tested using the Usability Test to uncover any problems with the app and evaluate how easy the app is. Since the usability testing is done through an online platform due to the Covid-19 pandemic, respondents were given a video that presented the flow and how the mobile app works by showing all of its features, capabilities and weaknesses. After watching the video, they were given a set of usability testing questionnaires and had to answer all questions. The result of the usability testing is shown in Table 1.

Table 1: Usability Testing Results

No	Question	Number of respondents				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Overall, I am satisfied with how easy it is to use this system.	21	6	0	1	2
2	It was simple to use this eRunner: Campus Food Runner Application.	18	10	1	1	0
3	It was easy to learn to use this eRunner: Campus Food Runner Application.	21	8	0	0	1
4	It was easy to find the information I needed.	18	10	0	2	0
5	The interface of this application was pleasant	23	5	0	1	1
6	This application has all the functions and capabilities I expect it to have.	18	11	0	0	1
7	Overall, I am satisfied with this application.	18	11	0	0	1

Based on the results, most of the users strongly agreed with each of the elements tested in this testing. Some users responded Disagree or Strongly Disagree because they were unfamiliar with the mobile application. Two (2) respondents (6.7%) responded Strongly Disagree with Question 1 because they cannot make payment for "Cash on Delivery" due to an inefficient page for runners. While for Question 4, two (2) respondents (6.7%) responded disagreed since they faced problems finding the available menu in the app.

CONCLUSION AND RECOMMENDATIONS

Feedback from the respondents indicates that this application has the potential to be used on any campus and shows its ability to make the food ordering and delivery process more accessible. Furthermore, the application helps the students to get their food without long queues and waste their time. This application can benefit not only the students but also the staff or visitors on the campus. However, this application still needs some improvement in listing the menu by displaying them in tab form. Other than that, the payment page should be improved so that the runner can do the "Cash on Delivery" payment.

ACKNOWLEDGMENTS

CONFLICT OF INTEREST DISCLOSURE

All authors declare that they have no conflicts of interest to disclose.

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