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Development of Food Ordering Application in School Canteen

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Abstract: The Canteen Ordering Application is a mobile-based application powered by Android which act as a new food ordering system instead of ordering food by face to face in secondary school. The aim of developing this mobile application is to solve the problem of students in ordering food manually during Covid-19 where students can register a new account and log in into Canteen Ordering Application to order food, while food seller in secondary school to edit food and beverages for students to take order. Agile methodology phases like envision, speculate, explore, adapt and close are used along this study. The development of this mobile application will lead students to reduce close contact between each of them and save a lot of time when they queue to purchase food and beverages in school canteen. Canteen Ordering Application is an opportunity to reform a school canteen system in the future, online payment method like PayPal is suggested for future work to make this mobile-based application getting stronger.

Keywords: Canteen, Order, Mobile Application

1. Introduction

Changing a traditional business process to automation has getting gradually widespread. For example, vending machines, ticket machines, self-service laundry shop and cash machines (Automatic Teller Machines - ATM) [1]. With advances of high technology and internet, people around the world are using digital and technology-based services to make life easy with presence of simplicity and efficiency [2].

Canteen Ordering application is a mobile-based application for people who order food without stepping into the canteen. This mobile-based application helps students to book their food and stay safe for any infection like Covid-19. A canteen in a school does not have enough space for students to perform good social distance. Students do not have much time to queue for food since their recess time is short. Food menu does not list out clearly in canteen.

The purpose of this study is to design and developed a mobile-based application based on android. English acts as official language and several modules will be included which are login, food item, order, profile, cart, track and notification. This mobile-based application should be able to implement digital

technology instead of manual system, provide paperless environment such as filling order system. It is expected to let students use it anywhere and anytime. Student may use Canteen Ordering applications to order and add food and beverages into cart. Food seller may set up food item, check order and proceed order. Both users can receive notification.

2. Related Work

2.1 Application Development

In application development, Android Studio is used to design Food Ordering Application and Firebase act a database to support this mobile application.

Android Studio is known as Integrated Development Environment (IDE) for Android application development officially based on IntelliJ IDEA. Android Studio provides a lot of features which can strengthen productivity of an Android application with developer tools and IntelliJ's powerful code editor. Android Studio is a platform that allows application developer to customize Android application with variety of features. It uses some tools which including Gradle-based build system, code templates, GitHub integration and emulator to support development of application within Android operating system. Android Studio consist of rich layout editor which support drag and drop in editing [3].

Firestore is free and can be used to build, improve and grow an Android application. Firestore act as a tool which cover large portion of services. Benefits of Firestore for application development includes real-time database, analytics, databases, authentication, file storage, hosting, storage, configuration and so on. These services are not hosted in any software but cloud [4].

API stands for Application Programming Interface. One of its function called notification API. This function allows web-based application or mobile-based application to send notifications which can be displayed outside the application for example, notification bar. API service also provides the ability to distribute certain techniques and tools to a range of professional or daily users [5].

2.2 Existing Application

There are three existing applications which are GrabFood, Foodpanda and DeliverEat that similar to Canteen Ordering Application. These three applications can be downloaded easily from Play Store without charges any fee.

GrabFood is supported by GrabPay which is introduced by Grab and it is a mobile wallet that let user shop, pay for rides and even transfer credits in GrabPay worry-free [6]. With GrabPay, user can complete an order with some simple steps without stepping into a food restaurant [7]. Step one, tap food icon shown on Grab home screen and then confirm GrabFood delivery address. After that, users need to pick restaurant nearby from restaurant list and add food items into basket. Users can apply any promotion code, choose payment method and place order.

Foodpanda is the first food ordering application in Malaysia and it started with one main goal in mind where the goal is to be the most convenient online food ordering service in this country. Foodpanda offers cuisines from not less than 115,100 restaurants around the world with providing many types of food to attract users [8]. To increase popularity of mobile application, Foodpanda prevents some restaurants from cooperating with other food ordering platform [9].

DeliverEat is designed to look simple and more understandable which can ease users to use and it is suitable for people from all walks of life. DeliverEat work with a mission which is to enable everyone to eat and live better through technology. DeliverEat got vegetarians covered too. They ensure to cover diners of all kinds of culinary preferences and ensuring to the content of users' heart. DeliverEat may strive for success once the management quality and quality of customer service are enhanced [8].

Table 1 shows the differences between these existing applications and Canteen Ordering Application.

Table 1: Comparison Between Existing Applications

	GrabFood	Food Panda	DeliverEat	Canteen Ordering Application
Mobile-based	Yes	Yes	Yes	Yes
Dependent to other application	Yes	No	No	No
Ads in Application	No	No	Yes	No
Free delivery	No	No	No	Yes
Easy to register an account	No	No	Yes	Yes
24 hours order	No	Yes	No	Yes
Delivery to classroom	No	No	No	Yes
No minimum order	Yes	No	No	Yes
Eco-friendly	No	No	No	Yes

3. Methodology/Framework

Agile methodology is a method which conduct continuous iteration of development also testing throughout mobile application development lifecycle of a project. Agile methodology includes five steps which are envision phase, speculate phase, explore phase, adapt phase and close phase [10].

3.1 Envision Phase

Envision phase is a phase to help in creating a preview for this study. In this mobile-based application, English is chosen as official language. Canteen Ordering Application is specially designed for students and food sellers in primary school or secondary school. There are seven modules which are login, food item, order, profile, cart, track and notification.

Students can use Canteen Ordering Application to order food and beverages by register, login, order, add to cart, pay, track order and receive notifications. While food sellers can add or drop food item, check order, proceed order and receive notifications. Students and food sellers use different interface but same application to ease the sell and buy process.

3.2 Speculate Phase

In this phase, possibilities of how this mobile-based application development is explored. Android studio and firebase are used to develop Canteen Ordering Application. Language chosen is Java programming language.

System requirements are Microsoft Window 10/8/7/Vista/2003 with 32 or 64 bits, 400 Giga Bytes hard disk space, 4 Giga Bytes RAM, at least 1 Giga Bytes for Android SDK, emulator system or connecting smart phone as emulator, catches and images [11]. Last but not least, Java Development Kit (JDK 7) must be included.

Canteen Ordering Application is planned to be fully completed within six months. For risk mitigation, data and coding are always backed up to prevent losing of information. This can increase efficiency in designing mobile-based application. Estimated cost for this study is zero as Android studio and firebase are providing free platform for developers to perform.

3.3 Explore Phase

In this phase, tested features in a short timeframe are delivered. Test plan for mobile application developer and user acceptance testing form for students and food seller are given and keep seeking to minimize risk also uncertainty of project. Once this project development is developed, users will give

feedback for developer to enhance the mobile application. This phase will only complete and continue to adapt phase when the application development reach user acceptance.

3.4 Adapt Phase

This phase focus on delivered result in mobile application development. The delivered results are reviewed and compare with current situation. Adaption of Canteen Ordering Application to current situation must be fulfilled and everything works fine.

3.5 Close Phase

Close phase determines the project’s endpoint. This phase brings Canteen Ordering Application to an end after iterations of speculate phase, explore phase and adapt phase. Key findings and knowledge gathered will be analyzed. Canteen Ordering Application will be finalized and completed.

4. Results and Discussion

In this section, general architecture system, test plan and user acceptance test will be discussed.

4.1 General System Architecture

There are two users of Canteen Ordering Application which are student and food seller as shown Figure 1. Student can visit to Canteen Ordering Application to order food and beverages after payment is made. Student can choose preferred food which can be added into cart. Tracking system is designed for student to check their order. Student can login into the app if he or she has an account; if not, registration of an account is compulsory. Food Seller does not have to register account since his or her account had been set before. Food Seller can use Canteen Ordering Application to set up food and beverages, check order and sales report as well. Both users will receive notifications according to actions made by another user.

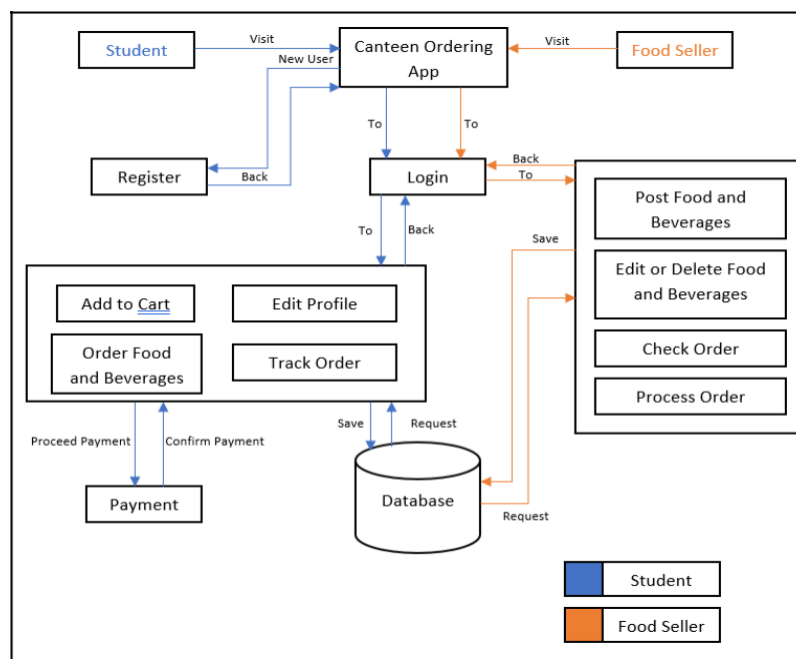


Figure 1: System Design Diagram of Canteen Ordering Application.

4.2 Test Plan

Table 2 shows test plan result which used by developer to check functionality of every module in Canteen Ordering Application.

Table 2: Test Plan Result

No	User Interface	Expected Result	Actual Result
1	Login	Error message prompt out if authentication data incorrect.	Pass/ Fail
		Password length should be at least 6 characters.	Pass/ Fail
		Login and register button are functioning.	Pass/ Fail
2	Register	Password length should be at least 6 characters.	Pass/ Fail
		Login and submit button are functioning.	Pass/ Fail
3	Food Seller	User can add, delete, edit, save changes and logout.	Pass/ Fail
		User can check, prepare and send order.	Pass/ Fail
4	Student	User can view menu, add to cart, take order, proceed payment and logout.	Pass/ Fail
		User can track order.	Pass/ Fail
		User can edit profile.	Pass/ Fail
5	Notification	Food seller can check notification.	Pass/ Fail
		Student can check notification.	Pass/ Fail
6	Student	User can view menu, add to cart, take order, proceed payment and logout.	Pass/ Fail
		User can track order.	Pass/ Fail
		User can edit profile.	Pass/ Fail

4.3 User Acceptance Test Result

Figure 2 shows user acceptance form results for food seller. These results show food seller can use this mobile application to carry out order services and the design is acceptable by him.

**Figure 2: UAT for Food Seller**

There are 15 students act as participants for this application test in SMK Tunku Abdul Rahman Putra. There are 2 participants which using iOS had complete the test by ordering food in other participants' android phone. Figure 3 shows there are 5 students are able to register as a new account as a food seller. After seeking answer from these 5 students, the reason they choose 'Yes' is because they did not try to register as food seller, so they cannot figure out this application only allows user to register as food seller after contact developer.

There is 1 student chose 'No' in whole user acceptance test. The reason that the student chose 'No' instead of 'Yes' is because his smartphone is a brand-new Huawei smartphone. New Huawei smartphone is non-google and this cause Canteen Ordering Applications cannot be used in it.

There are another 2 students chose 'No' when they were asked if they can edit profile in application. This is because they did not try the edit profile page and they miss understood the question. Thus, they decided to choose 'No'.



Figure 3: UAT for Students

4.4 User Interface

Figure 4 shows user interface for food seller to post food and beverages into Canteen Ordering Application. Food seller must upload an image, fills in dishes name, description, and price before click 'Post'. Figure 5 is the user interface for food seller to proceed order. This function allows students to receive notification or track the process of their order once food seller used the function.



Figure 4: Post Food and Beverages Interface



Figure 5: Process Order Interface

Figure 6 shows user interface for students to edit their profile information such as name, class, and the location of school. This helps food seller to figure out where to send the order. Figure 7 is the user interface for food seller to view the daily menu. After food seller changed the menu every day, students can check which food and beverages can be ordered.

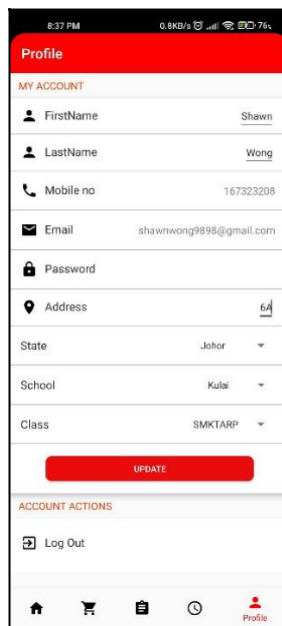


Figure 6: Edit Profile Interface

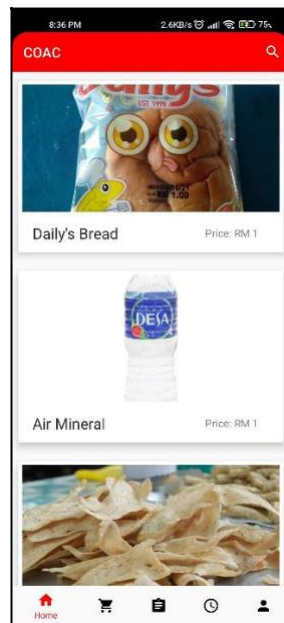


Figure 7: Daily Menu Interface

5. Conclusion

Canteen Ordering Application is developed and tested with form 6 students and food seller in SMK Tunku Abdul Rahman Putra. Students and food seller feel helpful with this mobile application especially during this pandemic.

In this study, literature review is done by reviewing Canteen Ordering Application and three other food ordering application which is GrabFood, Food Panda and DeliverEat. Among these four mobile applications, Canteen Ordering Application is better in some fields. Canteen Ordering Application does not charge delivery fee and it is easier to register an account which require less personal information. This mobile application is 24 hours per day for students to order food and beverages. Canteen Ordering Application provide delivery to classroom with no minimum order and it is eco-friendly which can be used instead of using pen and paper.

In the future improvement of Canteen Ordering Application, project is suggested to have PayPal implementation which allow students to perform online purchase or cashless payment.

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