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## Research Article

### Mobile Ordering Application for a Generic Fast Food Restaurant

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#### ABSTRACT

In a restaurant, a customer waiting to be serviced is a phenomenon. Restaurant owners often overlook this matter which sometimes causes the customers to go to a competitor. There are some important factors to be considered a good restaurant such as taste, ambiance, and service. An establishment will attract a substantial number of customers when these factors are managed carefully. Fast service is one of the most important factors in fast food restaurants to avoid losing customers because of considerable delay on the line. During mealtime, customers rush to fast food restaurants to have a quick meal. This research aimed to develop a mobile ordering application for a fast-food restaurant that offers a series of functionalities wherein a customer can order food using this platform. The system was developed using the Agile Methodology in assuring its proper implementation. A survey was performed to establish the acceptability of the mobile application. Five small fast food and restaurant owners were invited to test and answer the survey and another set of fifty prospective customers undergone the same set. As a result, the expected acceptability rating was attained from the survey conducted. Improvements of the system were recommended that were not implemented in the current version due to time constraints and the non-applicability to the current study.

**Keywords:** Mobile Application, Ordering System, Fast Food, Long Queue, Agile Methodology

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#### Introduction

A fast-food restaurant, otherwise called a quick service restaurant (QSR), is a specific type of industry that serves fast food selections and has insignificant table assistance. This type of restaurant depends upon the guidelines of

food tended quickly with quality. Thus, the swiftness of administration in providing the service should not in any way be cut down in the business processes. Busy customers frequently visit this kind of restaurant to avoid

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consuming most of the time waiting for food to be served.

Queues are often seen in this industry. Numerous customers do not bother waiting for food if a long queue is moving. According to John Scardapane, the CEO and founder of Saladworks, "If the line is moving because you have [good] speed of service, customers don't mind waiting 10 minutes". Mr. Scardapane also added that "If you have only one or two people in front of you and it takes 10 minutes, you'll be annoyed by the time you get service. So, people appreciate speed of service, even if they have to queue up in line." (Brox, 2010).

In a fast-food restaurant, individuals lining up are typically seen and the number doubles amid mealtimes. Subsequently, the employees' work increases which results to delay of service. Due of this, fast food restaurants neglect to satisfy the principle of having a quick service. It becomes tiring for the customers to queue and wait for orders longer than the expected serving time.

With the mentioned predicament, creating a mobile application that would assist owners, employees and customers transact orders efficiently. The application provides efficient performance for fast food restaurants and customers. This also assists customers to place orders and obtain a summary before reaching fast food restaurants and thus benefitting customers, cashiers, employees, and the ownership.

### **Needs Analysis**

In a fast-food restaurant, individuals lining up are typically seen and the number doubles amid mealtimes. Subsequently, the employees' work increases which results to delay of service. Because of this, fast food restaurants neglect to satisfy the principle of having a quick service. It becomes tiring for the customers to queue and wait for orders longer than the expected serving time.

Creating a mobile application will greatly assist in employees and customers to transact orders efficiently. This will be possible with the development of a user-friendly interface for the customers delivering an efficient approach for faster transactions. Thus, initiating an alternative way of ordering in an ordinary fast-food place to avoid long queues. A provision of the

menu for the fast-food restaurant will allow the fast-food restaurant to accommodate more customers thus providing users to place an order, displaying summary, and generating a barcode for the orders. Due to time constraints and technology limitations, the mobile application would not be applicable for Apple phone users and customer accounts.

Providing efficient performance for the fast-food restaurant and customers is a must thus the implementation of the mobile application will help busy customers to place orders and get a summary before reaching the fast-food restaurant. This will be beneficial to the customers, cashiers, and fast-food restaurant. Customers could order and obtain a summary before even reaching the restaurant. Cashiers will only be scanning the code and process the customer's order and help fast-food restaurants from managing long queues resulting to accommodating more customers.

### **Related Literature**

According to Katz, Larson, and Larson (1991), clients/customers see waiting time in a negative manner. Customers might abandon the queue or cancel returning to the service provider as per Friedman & Friedman, 1997. A person's wait time would be subjective and would be centered on personal experiences. Research explored how people come up with choices, sense toward waiting, and ultimately judging the service provider while in line (Dube, Schmitt, & Leclerc, 1991; Hui & Tse, 1996). The impression of waiting time increments when individuals focus attention to time progression (Zakay, 1989). It was additionally noticed that giving info about time of waiting altogether improved the clients' assessment of the overall service being provided.

Commitment to service is not only having passionate employees and motivating banners. Commitment is sometimes the thoughtful construct on how the service is being delivered. In an exceedingly fast-food restaurant, people that are packed into a jam-packed zone find one spreading into separate lines ahead of the cashier. Each cashier would be busily moving its specific line as fast as possible but huge convoluted requests would obturate the line and would result to a slower pace.

In other restaurants, a single line organized with rope barriers would help obtain an orderly line for customers. When a register would be open, the next person inline would transfer and when the line would become long, a staff would be tasked to take orders for each person in line. For quicker ordering and payment, a piece of paper will be given in handing to the clerk at the register.

Consumers would see standardized identifications and standardized tag scanners being utilized constantly. It is available in online media applications and on store windows. Standardized tags were more than lines and spaces on singular items. Barcode checking frameworks would help organizations track an amazing measure of data which would build profita-

bility and productivity. The standardized identification would be utilized to code information in a graphical example that would be discernible by a system. It very well may be utilized for several purposes including tracking items, prices, and supply levels for incorporated chronicle into a computer system (Trujillo, 2014).

A long queue is one factor that would cause unsatisfactory emotions for customers when going to a fast-food restaurant. The services that would be expected were set aside and would leave the customers disappointed. A mobile purchasing application could help ease the inconvenience of queuing. It would also allow a customer to decide orders even before reaching the fast-food restaurant.

## Framework

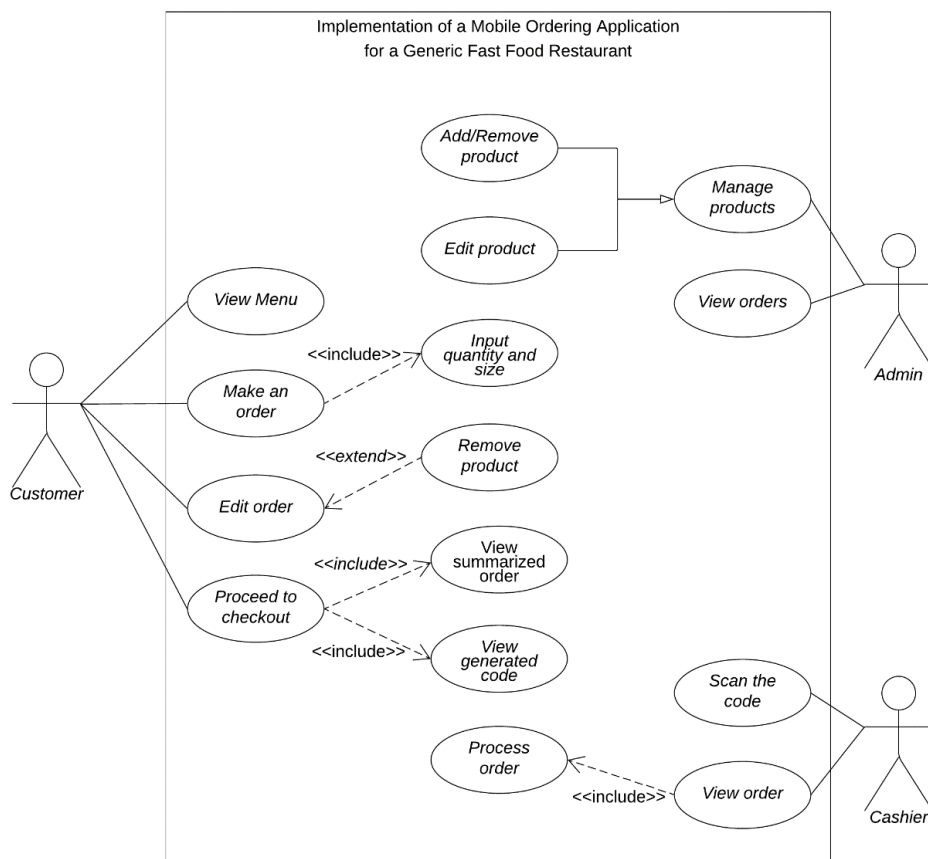


Figure 1. Project Framework

Figure 1 illustrated the use case diagram of the ordering application. An admin would manage the app wherein the products shown would

be updated and customers' orders could be saved. Customers could browse the menu through the app and make an order then

checkout to have a code. The system would summarize and store the data that the customer would input and then produce a barcode which could be used to scan and process an order. When the customer would arrive in the fast-food restaurant, the cashier could scan the code and would be able to view and process the order.

## Methods

The agile methodology was utilized in creating the mobile application. Agile is a software development methodology that is performed step-by-step and iterative manner. Agile application development puts together planning and arranging strategies, improvement, and testing techniques during a product lifecycle. The techniques in agile are depends on the standards involving quick reaction to changes through plan adaptation, expounding requirements, justification of tasks and step-by-step software development with time frames.



Figure 2. How agile development works

The creation of the plan on the development of the application through a series of activities were plotted. Requirements were obtained through the investigation of related applications and studies on the feasibility of the project especially the needed software and hardware to be used for the development.

The development of the application followed a sequence and activity design based on an object-oriented approach. These were illustrated in Figures 3 and 4.

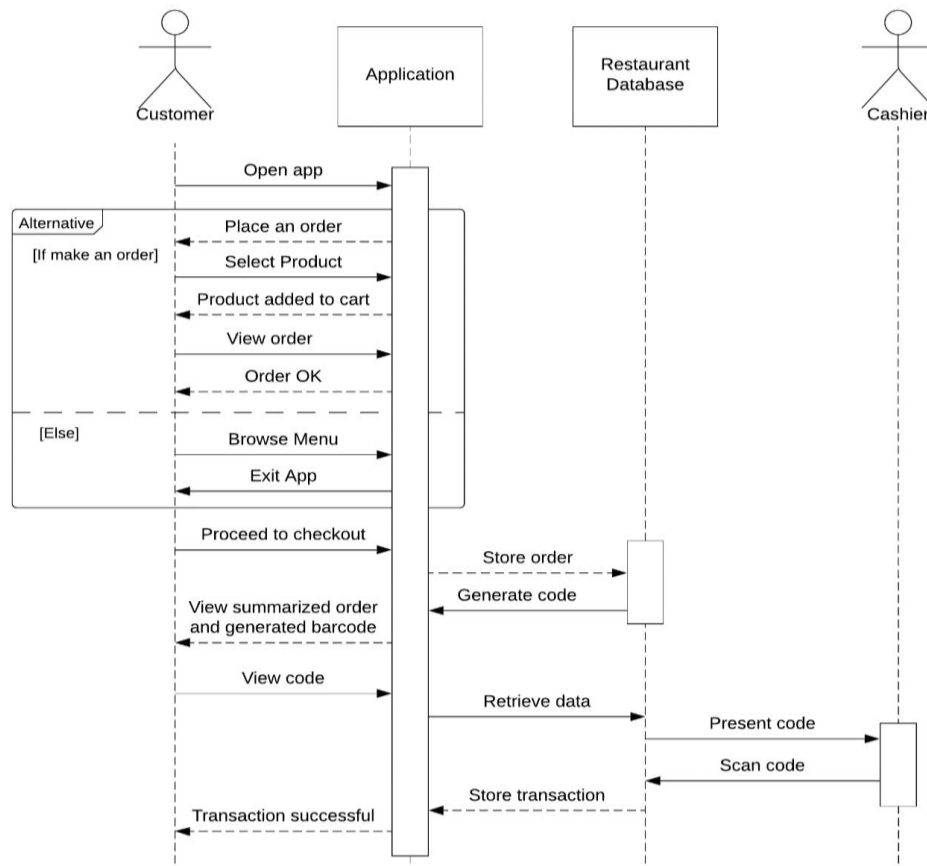


Figure 3. Sequence design

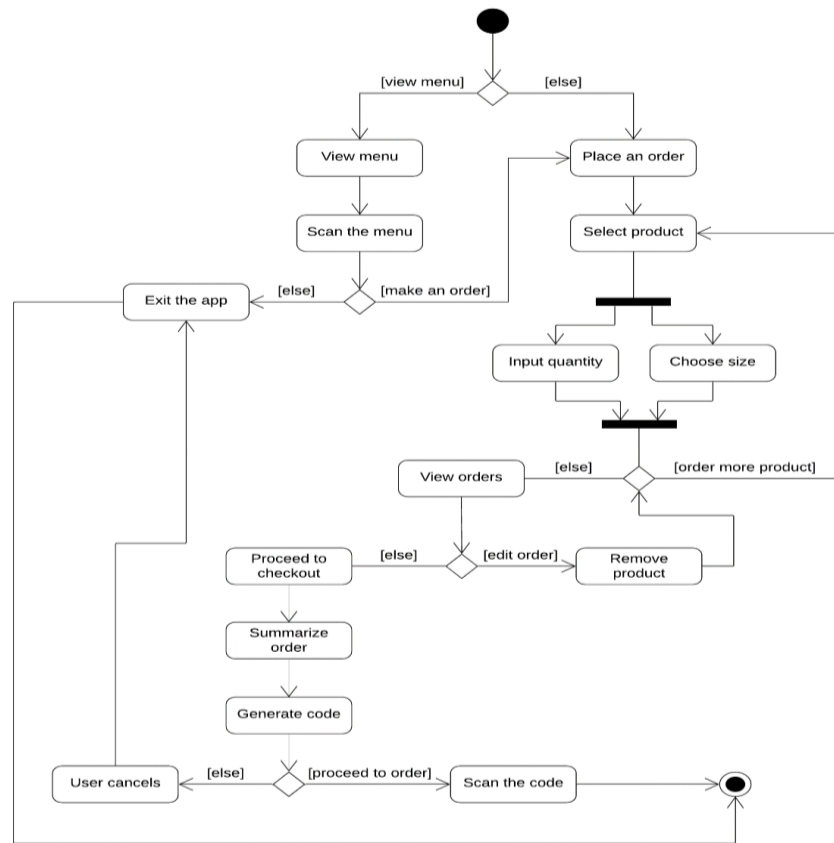


Figure 4. Activity design

Testing have been done through checking of the integrity of the system. Checking of connections, prevention of unauthorized access and the management of the administrator's panel were one of the key indicators that were given consideration. Server connection through android was also investigated to endure connections to the application were validated.

A survey was performed to establish the acceptability of the mobile application. Questionnaire was validated as it contains categories which were as follows: application design, system performance, system integrity, and security. Each of the category has indicators that were related to the specific requirement that relates to software acceptability.

#### Application Design

- 1.1. The design of the application is appealing to the eyes
- 1.2. The design of the application is suitable to the purpose

#### System Performance

- 2.1. The system gives a straightforward way to search for possible orders
- 2.2. The system presents a direct way to order food
- 2.3. The system quickly provides results of orders

#### System Integrity

- 3.1. The system provides correct information in orders, total cost, etc.
- 3.2. The system provides capabilities for error handling
- 3.3. The system provides flexibility in changing orders

#### Security

- 4.1. The system provides the security needed for accounts
- 4.2. Data stored cannot be tampered

Respondents of the survey were composed of five fast food restaurant owners, composed of small scale to medium scale operators and a set of randomly selected 50 customers. The random sampling technique was used in conducting the survey.

In determining of the acceptability of the system, a scaling system was used as a procedure to examine the respondents' results. The Likert scale was utilized to understand the entries in the survey as the scope and analysis of the five-point range are exhibited in Table 1.

Table 1. Five-point Likert Scale

Scale	Range	Interpretation
5	4.6 – 5.0	Excellent
4	3.7 – 4.5	Very Good
3	2.8 – 3.6	Good
2	1.9 – 2.7	Fair
1	1.0 – 1.8	Poor

The weighted mean was utilized to quantify overall sample responses based on the

perception in using the application. The formula in determining the weighted mean is given below.

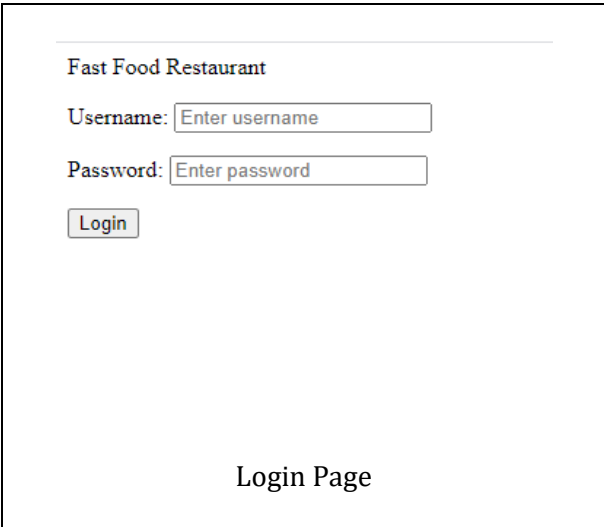
Where:

- $\bar{X}$  - Mean  
 $f$  - Weight given to every respondent  
 $X$  - Size of respondents  
 $n$  - Total respondents

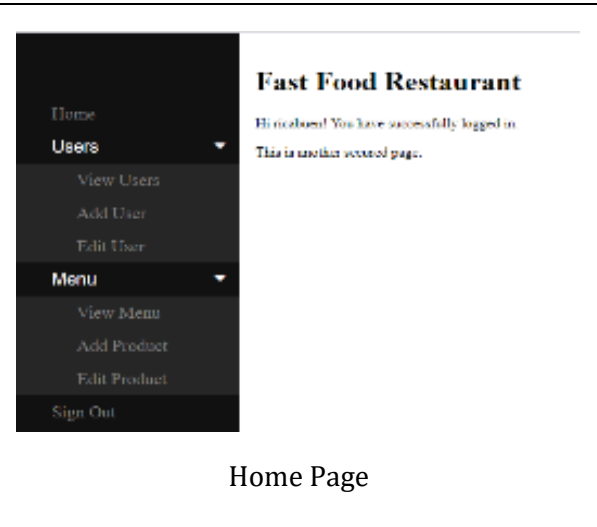
$$\bar{X} = \frac{\sum fX}{n} \quad \text{Percentage} \quad P = \frac{X}{n} \times 100$$

## Result and Discussion

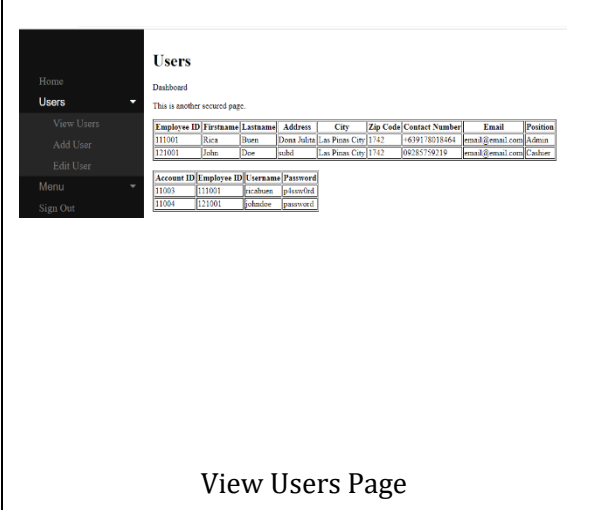
The current need for a mobile fast food ordering system brought about the following application that will serve the purpose of solving the stated requirements.



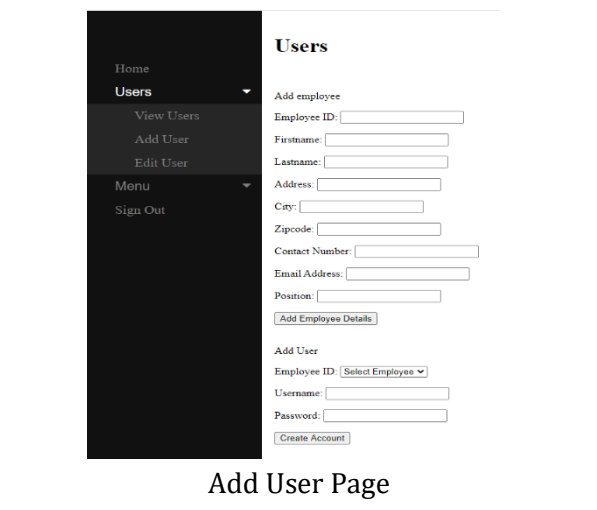
Login Page



Home Page



View Users Page



Add User Page

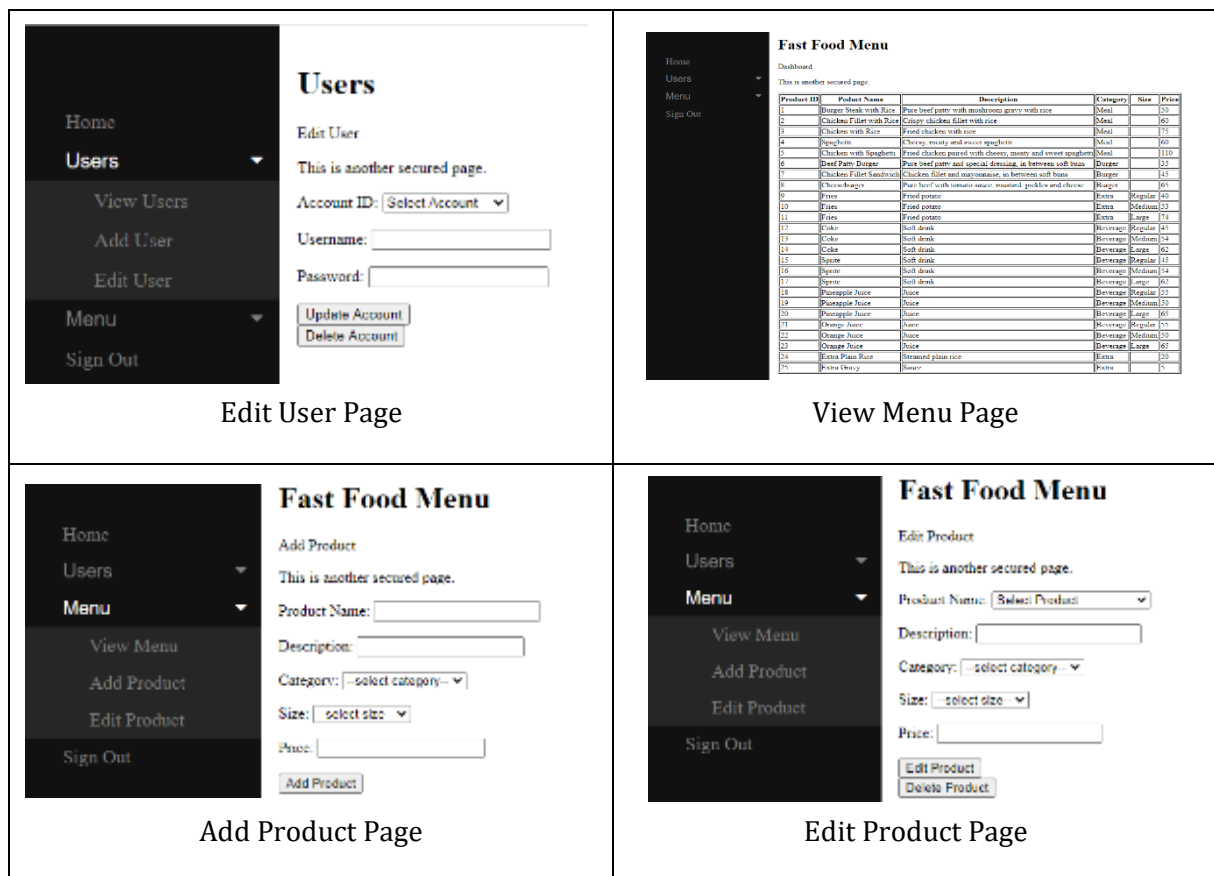


Figure 5. Admin Page

The login page of the admin panel allows authorized users to login their account to get access into the system. When a user failed to input data in either username or password field, an invalid message would show to inform the user that requires both fields to be filled. When a user entered an invalid username or password, an invalid message would show to inform the user that invalid credentials were entered.

Once the user would gain access in the admin panel, it will be directed to the home page. The sidebar could help the user navigate through the admin panel. Under the Users, items such as View Users, Add User, and Edit User pages can be selected which would allow the admin to modify the users and while under the Menu would be View Menu, Add Product, and Edit Product which would allow the user to modify the menu.

View Users shows the user the records of the Employee and Accounts table from the database.

Add User proceeds to the form where the user could input the details of an employee to be added in the record. The user could also create an account for an employee who would already be in the existing database. After the user entered specific details in the Add employee form and clicked on the Add Employee Details button, the information would be stored in the database and a message would be shown to inform that it was successfully added. When an employee information would be in the record and does not have an existing account, employee's Employee ID could be selected in this form to create an account. This message would show after the creation of the account. This will also be true with the Modify Users and Delete Users options.

View Menu page shows the menu of the fast-food restaurant that is stored in the database. Add Product page shows the form wherein the user could input the details of the new product that would be added in the menu. After the information has been entered in the form, the user could click on the Add Product button to store the record in the database and a message would show if the product were added successfully. This will also be true with the Modify Product and Delete Product options.

On the customer side of the application where the user would open the application, an interface would show wherein the user could see the logo of the fast-food restaurant and invites the user to click on the VIEW MENU button. When the user would access the VIEW MENU button from the home page, the page containing the menu of the restaurant would be seen. From this, ordering of products can now proceed.

*Table 2. Category 1: Application Design*

Category 1: Application Design	f = 5	4	3	2	1	Total (n)	$\bar{X}$
1.1	6	15	22	10	2	55	3.24
1.2	53	1	1	0	0	55	4.95
Average Mean							4.09

Category 1 application design shows diverse results based on the gathered information from the respondents. Question 1.1 referred to the design being appealing to the eyes since the application was designed to assist in the ordering process, it has not taken into consideration the aesthetics of the software. Thus, most of the respondents indicated a "3" rating with 22 responses. It was followed by rating "4" with 15 respondents, "2" with 10, "5" with six and "1" with two. This resulted with an average mean of 3.24 with an interpretation of "Good" based on the five-point Likert scale.

Question 1.2 on the other hand, shows that larger part of the respondents agree that the design of the application is suitable to the purpose with 53 respondents or 96% have indicated a "5" or excellent rating. The other two respondents have indicated a rating of "4" and "3" respectively. This resulted an average mean of 4.95 which is according to the Likert scale, is interpreted as "Excellent"

The average mean for category 1 system design of the application resulted at 4.09 which is according to the five-point scale is interpreted as "Very Good".

*Table 3. Category 2: System Performance*

Category 2: System Performance	f = 5	4	3	2	1	Total (n)	$\bar{X}$
2.1	54	1	0	0	0	55	4.98
2.2	52	3	0	0	0	55	4.95
2.3	50	1	2	2	0	55	4.80
Average Mean							4.91

Category 2 system performance shows that majority of the respondents indicated an excellent rating. In question 2.1 where out of the 55 respondents, 54 have indicated an excellent rating which corresponds to 98 percent from the total. The other remaining respondent indicated a rating of "4" that leads to an average mean of 4.98.

Question 2.2 presents an excellent rating with 52 respondents indicating "5" which corresponds to 94.5% from the total. The other three respondents or 5.5% from the total indicated a "4" which was still "very good" as stated in the rating of the five-point scale. The average mean as indicated in the table was at 4.95.



Question 2.3 shows an average mean of 4.80 with 50 of the respondents, or 91%, have indicated an excellent rating. One respondent indicated a “4” rating while two each indicated “3” and “2” ratings, respectively.

The average mean for category 2 system performance of the application resulted at 4.91 which is according to the five-point scale is interpreted as “Excellent”.

*Table 4. Category 3: System Integrity*

Category 3: System Integrity	f = 5	4	3	2	1	Total (n)	$\bar{X}$
3.1	55	0	0	0	0	55	5.00
3.2	52	3	0	0	0	55	4.95
3.3	51	3	1	0	0	55	4.91
Average Mean							4.95

In category 3 for system integrity based in the table, it shows again that most of the respondents have indicated an excellent rating for all the questions. In question 3.1, all respondents indicated a “5” rating resulting that all were satisfied with the information being provided by the application with regards to orders and related data.

52 of the respondents, or 94.5% from the total, for question 3.2 indicated a “5” rating. The

other three respondents indicated a “4” rating resulting an average mean of 4.95. Question 3.3 shows that 93% or 51 respondents indicated a “5” rating while the other three and one respondents indicated a “4” and “3” rating, respectively. This brings the average mean of 4.91 for question 3.3.

The average mean for category 3 system integrity of the application resulted at 4.95 with an interpretation of “Excellent”.

*Table 5. Category 4: Security*

Category 4: Security	f = 5	4	3	2	1	Total (n)	$\bar{X}$
4.1	5	0	35	12	3	55	2.85
4.2	50	1	4	0	0	55	4.84
Average Mean							3.85

Finally, for category 4 which measures security of the application, question 4.1 presented that most of the respondents who clearly prospective customers have indicated a “3” rating with “2” and “1” comprising 91% from the total. The other five respondents were the owners invited to undergo the survey which only had the capability of accessing the application through using an account bearing a username and password. Thus, bringing the average mean to 2.85 which is according to the five-point Likert scale is interpreted as still “Good”.

Question 4.2 shows a direct contrast to the previous question where 50 respondents or 91% from the total indicated a “5” rating. This implies that the stored information in the application will not be easily tampered based on the

perception of the respondents. The other five respondents indicated a “4” and “3” rating resulting an average mean of 4.84.

Category 4 security of the application resulted an average mean of 3.85 with an interpretation of “Very Good”.

Overall, obtaining all results from each category, the total average mean for the mobile application is 4.45 with an acceptability interpretation of “Very Good” based to the five-point Likert scale.

## Conclusion

The mobile application allows fast-food restaurants to maintain fast service and satisfy customers. This application helps lessen people interaction and focus more on the services that the restaurant could provide. In light of results

of the study, the application applied the placing of orders through adding or removing of products before arriving to the actual restaurant. More so, management of products and user accounts through the admin panel were implemented to maintain updated information and inventory of the said entities.

Application system design, performance, and integrity showed a superior acceptability rating. Application security needs attention as it only concentrated on the administrator side as clearly indicated from the result of the survey.

Recommendations were based on the results from the acceptability survey and features that were not included in the current version due to either the unavailability of technology or time constraints. Allowing the application to be accessed in other mobile platforms, sales tracking, and more importantly product customization are preferred improvements to the current version.

A more appealing graphical user interface with ease in navigation and an implementation of a more robust security through adding a layer of authentication will add a more secured environment within the application. Adding a personalization approach such as user profiles for customers will create a more engaging mobile application.

### Acknowledgement

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