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A Mobile Application for Customer Collaborative Review System

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Abstract
People love to shop whether through online shopping or physically visiting the store. However, sometimes people buy products out of influence from advertisements and then it turns out that the products bought were not up to their expectation. This can be avoided if a potential customer can view a product review first before the product is bought. Presently, there is limited number of independent product review, which are not tied to any shopping platforms, that can be used to read the reviews and ratings of products. To accommodate this need, a mobile application named Customer Collaborative Review System is developed as a platform for any individual to read, rate or write comments for any chosen product. Using the Rapid Application Development (RAD) methodology, a prototype of the system has been developed based on the requirements gathered. Then, the final prototype was evaluated by 30 respondents in terms of ease of use, usefulness, and satisfaction. From the evaluation result, it is found that majority of the respondents are satisfied with this application. This study contributes toward the understanding of the development requirements and usability of a mobile application that can provide a platform for collaboratively assisting people in making the correct decision before buying products.

Keywords: *Customer rating, Collaboration product review, Review-based system, Mobile application*

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I. INTRODUCTION

Shopping is a term used to describe an activity in which a consumer peruses the products or services offered by one or more merchants with the probable intention to purchase a satisfactory selection of them [1]. According to a taxonomy of shopper types [2], recreational shoppers are a type of shoppers that perform the shopping activities anytime and anywhere using online shopping platforms. Furthermore, shopping is considered a complex life skill that involves a person to learn and experience several steps including planning, doing the actual shopping, and evaluating the post-shopping activities [3]. Before the shopping takes place, either online or offline, one should first identify the items to be purchased. However, sometimes people are influenced by advertisements and buy products without any rational thinking. After they bought the products, they realized that the products are not really up to their expectations. Hence, the products will be just kept in storerooms or even being disposed of, which resulted in the waste of money and time.

Studies have shown that the reason of buying those non-used products are because customers are willing to satisfice. For certain product categories, some consumers may be unwilling to exert substantial effort in their search processes. They are willing to satisfice, that is, find a brand that they believe is "good enough," but not necessarily the best. A consumer may find later that the purchased item is not even "good enough" and thus, fail to use it [4, 5]. Due to this problem, there is an urgent need for a platform for product reviewing. The emergence of smartphone technology opens up opportunities towards providing an effective way for customers to perform this task. As the smartphone became pervasive into our lives [7, 8], a mobile application is the most suitable platform for a such customer review system.

Currently, there exist several shopping platforms such as Shopee, Lazada that allow buyers to write reviews and ratings regarding the products that they have brought form these platforms. However, these buyers can give reviews for the products using the seller's platform only. On the other hand, in the case of offline shopping, there is no such platforms for the buyers to write their opinions and reviews. Presently, there is a lack of independent platform, which is not tied to any shopping platforms, that can be used by a potential buyer to read the reviews and ratings of a product before making the decision to buy the product or not. This study aims to design and develop a mobile application platform for the crowd to collaborate in writing reviews about any product. As a result, a prototype of a mobile application named Customer Collaborative Review System (CCRS) was developed and evaluated. The study contributes towards an understanding the requirements for such application and could be a reference model for developers and researchers to improve an electronic process for

creating and managing customer collaborative review system. The next section describes the background and related studies. Next, the section describes the design and development of a prototype of this system. The subsequent section explains the prototype's usability evaluation. The last section concludes the study.

II. BACKGROUND AND RELATED STUDIES

In the last few years, a number of unique e-shopping review systems have been developed to provide guidelines to online individual customers [9]. E-shopping is a specialized and highly popular field of e-commerce. Rating is a common function in e-shopping systems, especially for electronic products [10]. For example, in the iTunes2 store, customers are able to provide feedback by allocating a value between 1 and 5 to purchased items (tracks or albums). These rating data can subsequently be used to make recommendations. Many of the largest commerce websites, such as Amazon and eBay, already use review systems to help their customers find products to purchase [8]. In these B2C e-commerce websites, products can be recommended based on the top overall sellers, customer demographics, or an analysis of the past buying behavior of the customer as a prediction for future buying behavior. Some advanced models are also proposed by academic literatures for different criteria of e-shopping environments [6].

Commonly, people can only review those products which they bought from the online platform and post their own reviews below the products. There is a lack of independent platforms for public to post their reviews about product, services or websites [11]. At this moment, there are similar customer collaborative review systems in the market such as TrustPilot [12] and YotPo [13]. However, these platforms are web-based systems rather than mobile-based applications. Besides that, most of these platforms can only review the services of a company or a website. Furthermore, in these platforms, a user cannot attach a photo of a product and upload it to the platform.

III. METHODOLOGY

Every project is developed by utilizing a technique that serves as a roadmap for the developers. The Rapid Application Development (RAD) methodology was adopted for the study. The project development process consists of 4 stages as depicted in Figure 1.

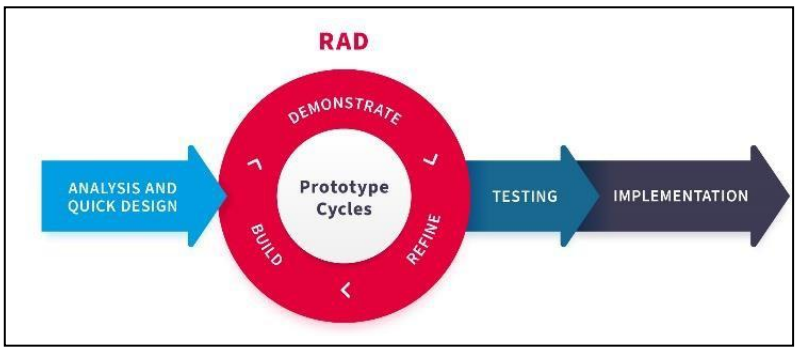

Figure 1: Rapid Application Development (RAD) methodology

The first stage which is requirement analysis is a very important phase in the project development. In this phase, information about the functional requirements of CCRS were gathered. In the second stage, a prototype of the CCRS was developed based on the requirements by using Dart as the programming language and MySQL as the database to store the required data. After completing the prototype, testing and evaluation were conducted with potential users. The beta version installation file was created in this phase. All the flow of the system will be checked thoroughly to ensure the system fulfills the requirements and avoid any error or bug that can lead to the system's failure. Once the system is done with the testing process, CCRS is ready to be launched where it is deployed to users for downloading and installation before they can start using it.

IV. DESIGN AND DEVELOPMENT

This section describes the design and development of CCRS following the first three stages of RAD. The section is divided into two sub-sections; (1) the requirements of the application for creating and managing post and product category list and (2) the prototype development of CCRS.

A requirement gathering process was carried out using two methods that are (1) interviewing selected shoppers who performed online and offline shopping on a regular basis, and (2) analyzing documents and apps from the Internet that are related to product review. The interview was conducted informally with five shoppers. They were asked a few open-ended questions primarily on the features of the mobile app. Some examples of the

questions are: what are the features of a mobile app for review product that you would like to have; how would you like to search a review for specific product; how would you like to view others review regarding a product. Their opinions were recorded, and the requirements were elicited. The respondents were also actively involved during the construction (development) phase where the user interfaces of the prototype were shown to them to get their feedbacks and comments.

For the secondary requirements gathering process, the documents were searched using Google search engine by providing keywords primarily "application for review," "review system," "review platform," and "product review system,". The documents were analyzed to elicit the requirements for a mobile app that can create post, comment, and rate. Table 1 lists the significant requirements (and their priority) produced from the requirements gathering process. These requirements include functions such as new user registration, login to the app, manage user profile, manage user postings (reviews) and manage product categories.

Table 1: The functional requirements for CCRS

No	Requirement ID	Requirement Description	Priority
	CCS_01	**Sign Up**	
1	CCS_01_01	Users have to register account by using email and password. For admin user, id and password will be given by the management.	M
	CCS_02	**Login**	
2	CCS_02_01	User can login their account by using the email as their id and the password which they set before.	M
3	CCS_02_02	Once users successfully login, system will redirect them to user dashboard. For admin user, system will redirect them to admin dashboard.	M
4	CCS_02_03	Users and admin can reset their password.	O
	CCS_03	**Log out**	
5	CCS_03_01	Users and admin can log out.	O
	CCS_04	**Manage Product's Category**	
6	CCS_04_01	Admin can add the category of product.	M
7	CCS_04_02	Admin can delete the category of product.	M
8	CCS_04_03	Admin can edit the category of product.	M
	CCS_05	**Manage Post**	
8	CCS_05_01	Users are able to create a post to review the product they bought before.	O
9	CCS_05_02	Users are able to search post or product.	O
10	CCS_05_03	Users are able to view other's post.	O
11	CCS_05_04	Users are able to view the comment under other user's post.	O
12	CCS_05_05	Users are able to comment other's post.	O
13	CCS_05_06	Users are able to like other's post.	O
14	CCS_05_07	Users are able to edit their post.	O
15	CCS_05_08	Users are able to delete their post.	O
16	CCS_05_09	Admins are able to delete user's post.	O
	CCS_06	**Manage user profile**	
17	CCS_06_01	Users are able to update their personal details.	O
18	CCS_06_02	Users are able to change their password.	O

The requirements presented in Table 1 were translated into the computer system functionalities. The next process is visualizing and modelling the requirements of the application using the appropriate modelling method and tools. In this work, the Unified Modelling Language (UML) was used to visualize and model the requirements. The models used in this work are two behavioral diagrams namely the use case and the class diagram that represents the structural components of the application. Figure 2 illustrates the use case diagram and the communications between the use cases and the actors for CCRS. The major use cases are Signup, Login, Manage Post, Manage Product Category, Manage User Profile and Logout. The use case of Manage Post (Review) allows users to perform subfunctions including "Search Post," "Delete Post," "Add Post," and "Report Post".

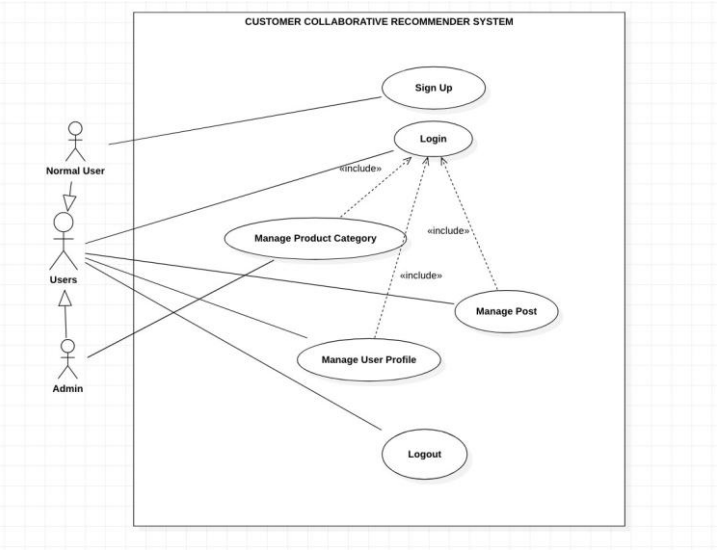

Figure 2: Use Case Diagram for CCRS

The structural components of CCRS are represented in a class diagram as illustrated in Figure 3. This class diagram shows the attributes and operations of the application. In this work, three main classes were identified namely user, reviewed post and category list. The interactions between the classes are illustrated in the diagram.

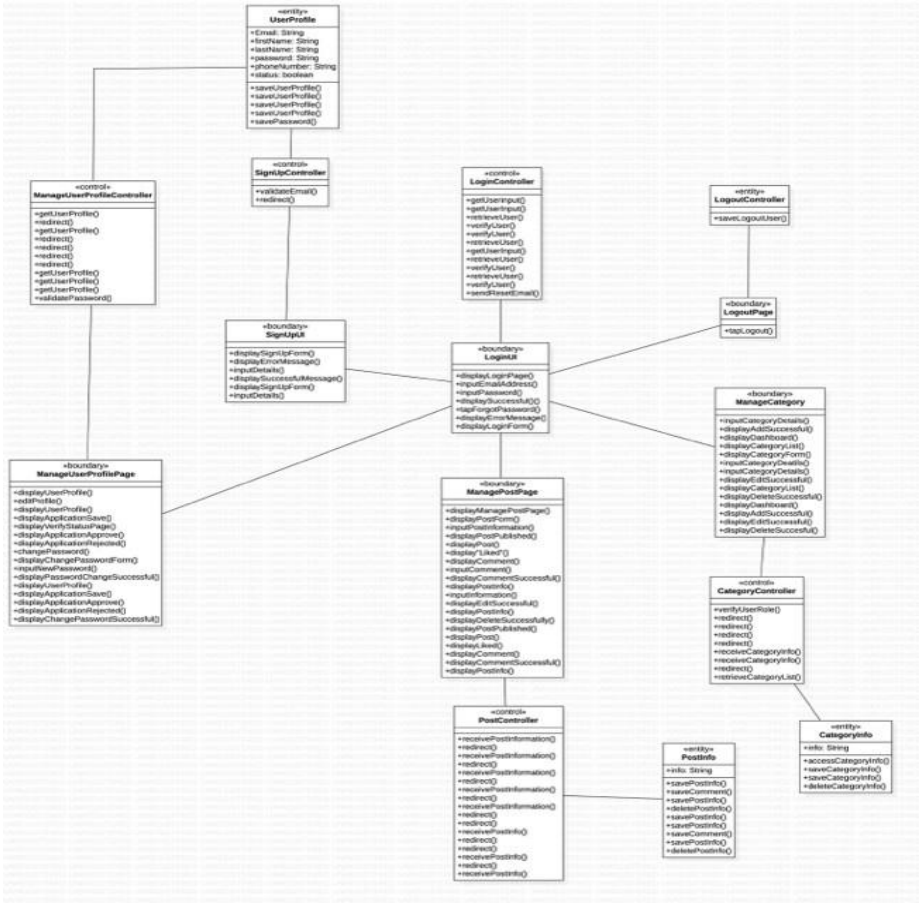

Figure 3: Class Diagram for CCRS

V. PROTOTYPE DEVELOPMENT

In this stage, a prototype of the mobile app for CCRS was developed. It represents the requirements explained in the previous subsection. Software prototyping is a standard way of demonstrating the software

requirements so that further comments and suggestions could be obtained from the users based on their experience in interacting with the prototype. The Visual Studio Code (VS Code) was used as the main integrated development environment (IDE) tool. Furthermore, the C Panel online server was used to manage the database for data storage. Some screenshots show the selected interface of CCRS. For example, Figure 4 shows the login page where any registered user can use to log into the system. Figure 5 shows the registration page which is used by a new user to sign in before he or she can use the system. Once the user has logged into the system, the user can view his/her details in the profile page as shown in Figure 6. Here, the user can edit the his/her details by clicking the Edit Profile button.

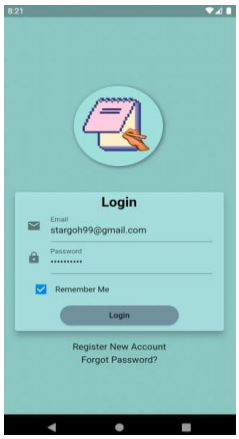

Figure 4: Registration Page

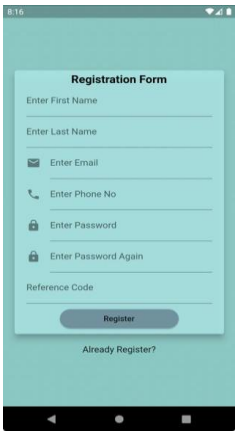

Figure 5: Profile Page

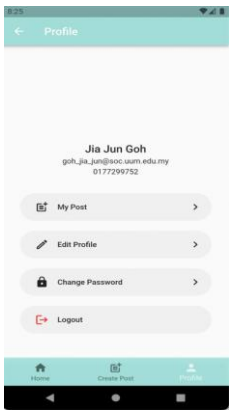

Figure 6: Login Page

User can post a review of a product in the Create Post page as shown in Figure 7. The user must select the product category to be reviewed, write its reviews and finally, rate the product. User can also upload the product image. The user can click the Publish button to post the review. If the user clicks the Home button, the system goes to the Home screen where the user can view or search reviews of all products by all registered users that have been published in the system as shown in Figure 8. On the other hand, the administrator type can manage the product categories for the system in the Manage Product Category page as shown in Figure 9.

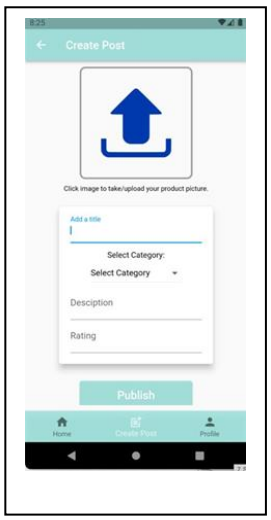

Figure 7: Create Post Page

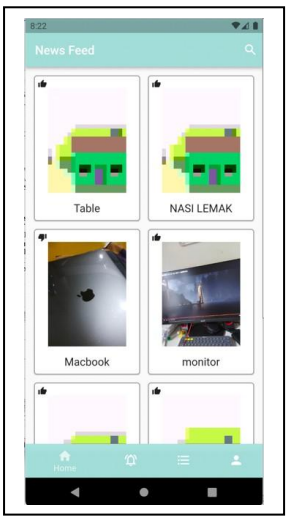

Figure 8: Home Page

Figure 9: Category Page

VI. EVALUATION OF CCRS

CCRS has to be evaluated to gain feedbacks from the users in terms of its usability. This can help to determine which features are working well and which features need to be improved. A total of 30 respondents were selected to participate in this usability test. Each of them has to install and use the application on his/her device. Then each respondent has to answer a post-task questionnaire in Google Form based on his/her

experience on using CCRS. The questions are divided into 4 parts which are Demography and Background Information, Ease of Use, Usefulness and User Satisfaction.

6.1 The Respondents' Demographic Information

Analysis of the respondents' demographic information revealed that the largest age range is from 18 to 23 years old with 11 respondents (36.7%). There are 8 respondents (26.7%) and 7 respondents (23.3%) in the age group of 25-30 years and 31 years and above respectively. For age below 18, there is only 1 respondent (3.3%). In terms of gender, there are 10 (33.3%) female respondents and the remaining 20 respondents (66.7%) are male. In terms of the respondent category, there are 11 (36.7%) UUM students, and 8 (26.7%) UUM staffs. The remaining 11 (36.7%) respondents are outsiders. For the role of the respondents, there are 21 (70%) respondents registered as normal users and 9 (30%) respondents registered as administrators.

6.2 Ease of Use of CCRS

There are 4 (43.4%) respondents who agreed and 14 (46.7%) respondents who strongly agreed that the interface is pleasant to use, with no one strongly disagreed and disagreed. However, there are 3 (10%) respondents who voted neutral. The mean value is 4.37. Next, for the arrangement of the interface, there are 15 (50%) respondents who agreed and 15 (50%) respondents who strongly agreed that the interface is neat and clear. The mean value for this statement is 4.50. For the statement "It is simple to use this application", there are 14 (46.7%) and 13 (43.3%) respondents are agreed and strongly agreed respectively. However, 3 (10%) respondents voted neutral. The mean value is 4.33. For the last statement which is: "It is easy to find the information needed", there are 13 (43.3%) and 15 (50%) respondents are agreed and strongly agreed respectively. However, 1 (3.3%) respondent disagreed and 1 (3.3%) respondent was neutral. The mean value for this statement is 4.40. Figure 10 shows the findings for CCRS ease of use evaluation.

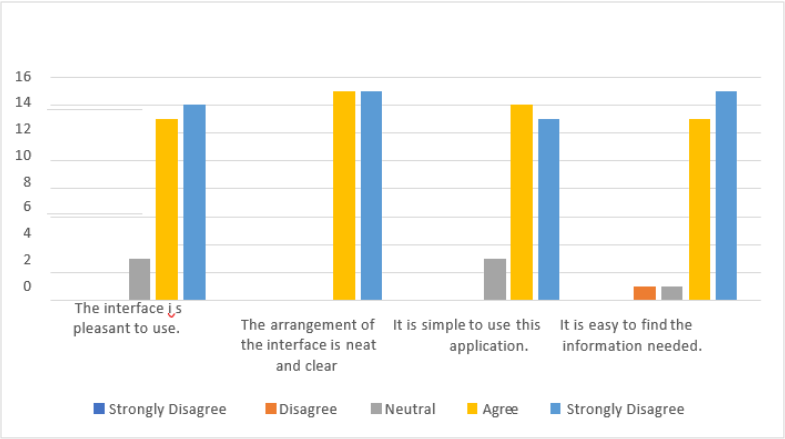

Figure 10: CCRS Ease of Use

6.3 Usefulness of CCRS

There are 12 (40%) respondents who agreed and 16 (53.3%) respondents who strongly agreed this application can let them know which product is worth to buy. At the same time, 2 (6.7%) respondents voted neutral for this statement. The mean value is 4.47 which means that this statement is agreed by most of the respondents. For the next statement which is: "This application makes the things I want to accomplish easier", there are 15 (50%) and 14 (46.7%) respondents agreed and strongly agreed respectively. However, there are 1 respondent who voted neutral. The mean value for this statement is 4.43. Furthermore, there are 14 (46.7%) respondents agreed and 15 (50%) respondents who strongly agreed that the flow and navigation of the application is easy. However, 1 (3.3%) respondent voted neutral for this statement. The mean value is 4.47.

For the next statement: "the information provided by the application is easy to understand", there are 13 (43.3%) and 16 (53.5%) respondents are agreed and strongly agreed with this statement respectively. However, 1 (3.3%) respondent disagreed with this statement. The mean value for this statement is 4.47. Besides that, there are 11 (36.7%) and 17 (56.7%) respondents who agreed and strongly agreed respectively that this application has all the functions and capabilities which the respondents expect it to have. However, 2 (6.7%) respondents voted neutral for this statement. The mean value for this statement is 4.50. Lastly, 12 (40%) respondents agreed and 16 (53.3%) respondents strongly agreed that this application will save their time when they use it. On the other hand, 2 (6.7%) respondents felt neutral for this statement. Figure 11 depicts the results for CCRS usefulness.

6.4 User Satisfaction of CCRS

For the first statement: "This application meets my needs.", there are 12 (40%) respondents who agreed and 17 (56.7%) respondents who strongly agreed with this statement. However, 1 (3.3%) respondent voted neutral. The

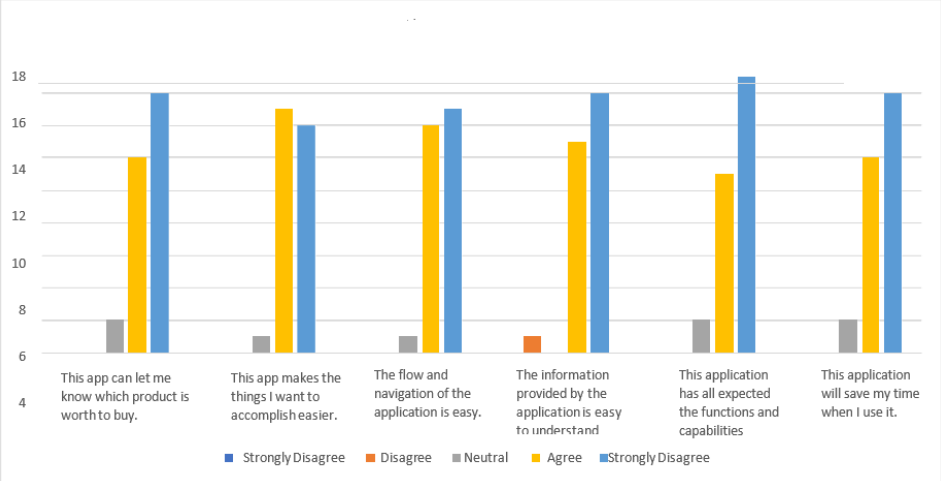

Figure 11: Usefulness of CCRS

mean value for this statement is 4.53. Next, there are 13 (43.4%) respondents who agreed and 16 (53.3%) who strongly agreed that this application is easy to learn to use. On the other hand, 1 respondent voted neutral for this statement. The mean value is 4.50. The next statement is "I feel very confident using the application.". There are 12 (40%) respondents who agreed and 16 (53.3%) respondents who strongly agreed with this statement. But there are 1 (3.3%) respondent who disagreed and 1 (3.3%) respondent who was neutral. The mean value is 4.43. Furthermore, 10 (33.3%) respondents agreed and 20 (66.7%) respondents strongly agreed that they are comfortable when using this application. The mean value for this statement is 4.67. Lastly, there are 14 (46.7%) respondents who were satisfied and 16 (53.3%) respondents who were strongly satisfied with this application. The mean value for the last statement is 4.53. This results of CCRS user satisfaction are shown in Figure 12.

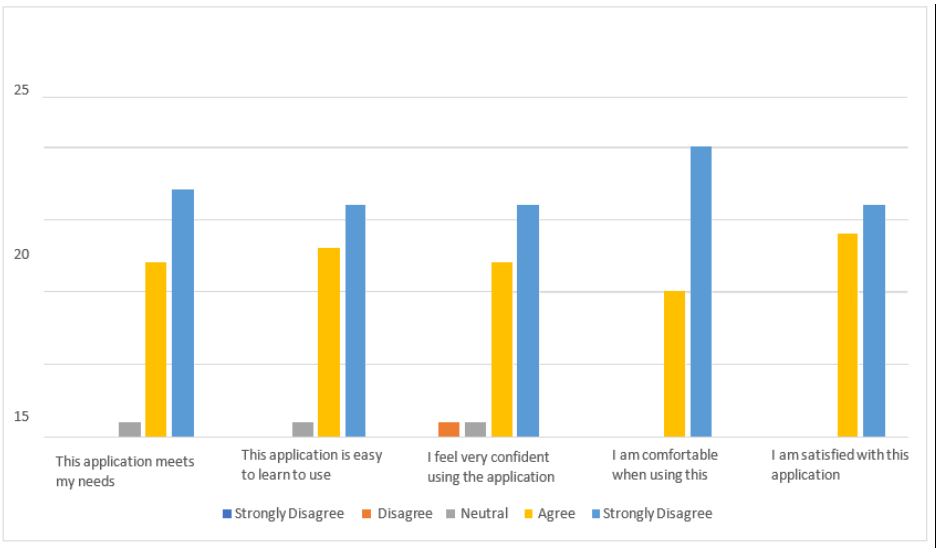

Figure 12: User Satisfaction of CCRS

VII. CONCLUSION AND FUTURE WORK

This paper described the design and development of a mobile application for creating a platform that can be utilized by the crowd to write reviews for any products. This platform can then help potential buyers of products in making the right decision before they actually purchased the products. However, the current version still has several limitations which we intend to improve in the near future. One functionality of the CCRS which can be enhanced is a feature that enables an automatic sorting of the products ratings, from the highest rating to

the lowest rating. Artificial intelligence (AI) can also be integrated to automatically analyze the sentiments of the products based on the reviews posted by the users. Furthermore, we also plan to implement a notification function to the users when someone comment or like on their post, so that they can check the posted status immediately. Besides that, we also plan to implement the "reply to a comment" function, so that the user can provide clarification about a particular comment when viewing the comment. Next, the user interface will be redesigned with a more attractive and colorful interface. We strongly believe that CCRS has an enormous potential to be a great review application in the market in the future.

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