



## The Application of Toys E-Marketplace

Nik Marsyahariani Nik Daud<sup>1</sup>, Nurain Syafinaz Kamaranzaman<sup>2</sup>

<sup>1</sup>Universiti Teknologi MARA, Malaysia, nikma944@uitm.edu.my

<sup>2</sup>Universiti Teknologi MARA, Malaysia, nurainsyafinaz77@gmail.com

### ABSTRACT

Toys E-Marketplace Mobile Application connects buyers and sellers in selling and buying toys by using one platform. With numerous e-marketplaces available, it is still difficult for buyers to find e-marketplace that focusing on selling and buying toys. A mobile apps that implements e-marketplace is proposed to solve this issue. Extreme Programming (XP) methodology is chosen as it is more preferable in developing mobile application. The proposed work is categorized as hybrid mobile application, hence this application is developed using IONIC framework. To test the application, questionnaire are distributed to 30 potential users. The application are also tested by two expert user. Both questionnaires are conducted to evaluate the application from functionalities and its usability perspectives. Based on the result, the highest mean is 4.6 and the standard deviation is 0.498 for construct satisfaction. As all constructs are evaluated with means above 4 with standard deviation below 1, this illustrate that the usability of the application is good.

**Key words:** E-marketplaces, hybrid mobile application, Xtreme Programming, Shneiderman's Eight Golden Rules.

### 1. INTRODUCTION

Nowadays, millions of successful businesses have emerged and there are millions more to comes. E-marketplace is considered as an intermediary that allows buyer and seller to form a relationships and enable them to have transactions with one another. E-marketplace consists of trilateral relationships: buyers, sellers, and e-marketplace provider [1]. E-marketplace using mobile application get much attention because they have unlimited availabilities, unlike computers. Majority of the people use mobile device and mobile application instead of desktop for easy task.

For the case studies, two toys companies are selected to represent sellers for the proposed work. Abs Toys Kuala Kangsar and TheAwesomeBabyHouse are companies that sell toys as their business. Abs Toys is a toys company that has two physical stores located in Kuala Kangsar and Ipoh while TheAwesomeBabyHouse is an online business company that solely uses social media as a way to interacts with customer. The business process that is currently implemented by ABS

Toys and TheAwesomeBabyHouse is very similar. Both sellers collect orders and interact with their customer through their social media accounts such as Facebook and Instagram.

From both case studies, issues on dealing with toys purchasing are identified. Both sellers seems to face difficulties in handling placing order process as the process occurs only through message box via their social media or WhatsApp Messenger. This can become problems if the seller receives a high number of new incoming order request from buyers. Confusion is bounds to happen to the seller as they have difficulties to differentiate the customers current process, eg. whether they are ordering new items or waiting for confirmation of order.

Another issue is buyer has difficulties in browsing and searching product's information when using social media especially when they are trying to comparing price or making orders. Customers have to browse and keep track on their searching process which involves many websites or social media accounts in order to make comparison between the products. Lastly, it is difficult for seller to keep track on buyer's payment. Major concerns that occurring to buyers and seller in the context of e-marketplace is trust and satisfaction [1]. Thus the proposed work is suggested in order to solve the identified issues.

### 2. RELATED WORKS

As part of the proposed solution, the mobile application is developed based on guideline given in [2]. This is to allow for a better user interface experience for user while using the application. [2] stated that amongst variety of rules, Shneiderman's Eight Golden Rules, Nielsen's Ten Heuristics are very useful and well-known.

Shneiderman's Golden Rules of Interface Design is considered as being used more frequently as opposed to other guidelines [3]. However, there have been no similar guidelines developed exclusively for the mobile devices [4]. [4] stated that only half of the guidelines apply to mobile devices without explicit changes. Due to the efficiency of mobile application, only half of the theory will be adapted to the proposed work.

The selected rules from the guideline that are applicable to mobile application graphical user interface are 1) enable

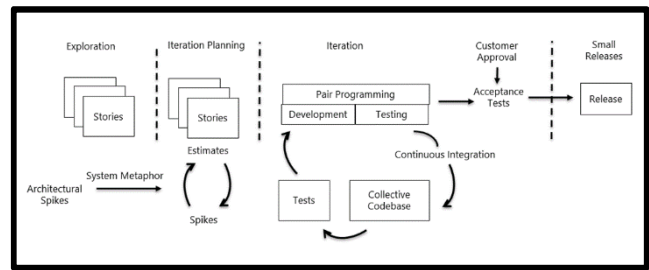
frequent users to use shortcuts, 2) offer informative feedback, 3) design dialog to yield closure and 4) support internal locus of control. The first rule is when design should allow user to use shortcut for any processes. This rule is applicable to mobile application as decreasing number of operation will increase the ease of use [3]. For the second rule, informative feedback, system should provide feedback in certain condition. For example if there are any wrong value being inputted by user, a message should be send to alert user on the error.

The third rule is having a dialog that will yield closure to user. When user entering into sequence of processes, for example, payment process in an e-commerce website, the process should state clear indicator to where the user are currently situated. Giving a summary page or confirmation page is an example of how closure can be given to user. The last rule is to support internal locus of control. This rule indicates that users need to be given control on how to execute their steps instead of being controlled by system[4].

A comparison between similar mobile applications is conducted in order to find similar features that can be applied to the application. There are five e-marketplaces selected for the purpose, Carousell, Mudah, Lazada, Flipkart and Lelong.my. Some features are identified such as e-catalogue, shopping cart, ordering system, customer service and payment gateway. The proposed work also support features available on user’s devices such as camera or photo gallery in order to enhance the usability of the proposed work. In addition, most of the compared mobile application did not provide any control mechanism for seller registration where anyone can register as sellers. This may cause harm to buyers as there are high probability for buyers to be scammed by sellers. proposed work restricted the sellers who can sells on this e-marketplace as sellers need to registered their company before opening account in the application.

**3. METHODOLOGY**

The process of structuring and developing the mobile application is based on agile model. Agile Model is suitable for mobile application because it delivers functioning software faster, it receives user feedback constantly and it gives freedom for the development. Methodology that is chosen in agile model is Extreme Programming (XP). XP is successfully implemented in developing agile application as its focus on customer satisfaction. Figure 1 shows the extreme programming development process. XP development is initialize with planning before iterations begin where there are four phases within each iteration which are designing, implementation, testing and listening [5]. Some of activities occurring during planning is listing scenarios, estimating effort, and assigning priorities of each feature.



**Figure 1:** Extreme Programming Development Process

There are 5 main scenarios which are seller registration and product management, product catalogue, order placement, order management and admin manage sellers and products. The user stories converted into to a numbers of iterations that each will take one to four weeks of implementations and cover a small part of the functionality or features required. There are thirteen iterations executed to develop the fully functional mobile application. Figure 2 shows an example for Product Catalogue scenario.

Product Catalogue
<p>The result from the online survey that been distributed to 30 respondent, it show that the potential buyer for the toys e-marketplaces wish that they can make the products, brands and able to comparing price of the variety product in the market from different seller in Malaysia using mobile application. When user clicks on the mobile apps, it will display 'register as buyer' and 'register as seller'. Next, he must click on 'register as buyer' if he wish to view product from product catalogue. Next, it will display the form that he need to fill in so that all her information can be store on the application database. After finish submitted her information, she automatically directed to home page of the apps. He also can update and view profile. If he click on catalogue button on the navigation bar, the system will display all the image and name of the product from variety of seller. If they he click on one of the displayed product, the system will display the details about product description such as product name, price, description, image and also the shop name. He also can report any harmful product that sells by seller in the application. If he wish to log out from the system, he can click 'Logout' on the navigation bar.</p>

**Figure 2:** Product Catalogue Scenario

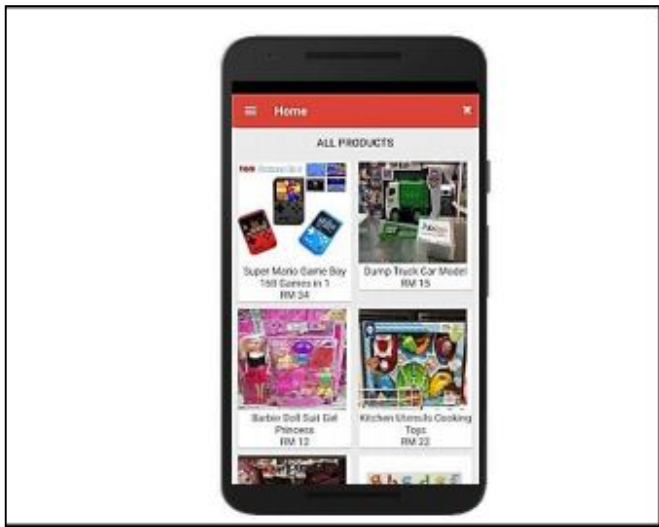
**4. RESULTS**

The section presents the result in two forms: the Application Development result and the evaluation result. The Application Development result is discussed based on the iterations executed during the XP implementation while the result of evaluation is discussed based on the four selected rules of Shneiderman’s Golden Rules of Interface Design.

**4.1 Application Development**

The application is developed using the agile approach where the methodology chosen is Extreme Programming (XP). There are total of 5 scenarios and 13 iterations that been identified. Each of the scenario have different total of iterations. For this paper, the explanation is going to be done based on one selected scenario, the Product Catalogue scenario. The scenario is shown in Figure 2. This scenario consists of 3 iterations. This scenario started from the 3<sup>rd</sup> iteration to the 5<sup>th</sup> iteration.

The 3<sup>rd</sup> iteration is the development of buyer registration, login and logout processes. User is also able to view and edit their profile. User required to create an account in order to use this application. In order to do that, they need to provide personal information such as name, email, password, shipping address, billing address and phone number. Buyers can choose to upload profile picture by camera or from phone gallery. After registered successfully, buyers directly route to the homepage. Figure 3 shows the homepage of the application. The side menu can be obtained by just tapping on the icon button on the top left side or by swiping gestures from the left edge of the screen to the right. The side menu contains categories, my reports, my orders, my profiles and log out button. They also able to view or modify their personal information.



**Figure 3:** Mobile Application Homepage

The 5<sup>th</sup> iteration is the development of view product catalogue and product details. The development allows buyer to browse through all the products displayed and a details page with full image and descriptions are shown after the users clicked for more details at the particular item. For the categories, once users click on one of the categories, the applications will navigate and shows all the products which lay on the same categories. Thus, it will simplify the process of finding products in this application.

In the last iteration, 6<sup>th</sup> iteration, development includes features that allows buyer to make report on products. If buyers found some product are sensitive or not suitable for selling, they can report that particular product by clicking the report button that placed below every products image in products detail.

Once all iterations for a scenario is completed, its performance is evaluated by developer and tester in order to validate its functionality. Table 1 shows the test plan for the 4<sup>th</sup> and 5<sup>th</sup> iteration that are parts of Product Catalogue scenario. Each process that is implemented is checked and validated.

**Table 1:** Test Plan for Product Catalogue Scenario

No.	System Requirements	Date	Developer	Tester	
2.	<b>Scenario: Product Catalogue</b>		✓	✓	
	4 <sup>th</sup> Iteration	2.1 User register as buyer	1/4/2019	✓	✓
		2.2 Buyer can login and logout		✓	✓
		2.3 Buyer view profile		✓	✓
		2.4 Buyer edit profile		✓	✓
	5 <sup>th</sup> Iteration	2.5 Buyer view product catalogue		✓	✓
2.6 Buyer view product details		✓		✓	

**4.2 Evaluation Result**

This subsection discusses on the analysis for data collected from questionnaires. A total of 30 students have been selected to participate as respondents for this evaluation. In order to meet the criteria for participations, the respondents must have previous experience of e marketplace mobile application. The set of questionnaire are divided into 2 parts which are part 1 for demographic information, meanwhile part 2 is user perception and evaluation and consists of total of 6 constructs.

Demographic information consists of information of the respondents such as age, gender, educational level and course. All of the respondents that involved are from UiTMCTKKT. The majority age of the respondents with the total of 25 (83.3%) are 20 to 22 years old, followed by total of 4 (13.3%) respondents age from 23 to 25 years old. Next, majority of the respondent with the total of 28 (93.3%) are female and only 2 (6.7%) are male. In addition, the respondents were also asked about their educational level which resulting in a total of 29 (96.7%) respondents with Degree, only 1 (3.3) are Diploma. When respondents asked regarding their course, the total of 26 (86.7%) respondents from CS244, 3 (10%) respondents from CS247 and only 1 (3.3%) from CS110.

User perception and evaluation consists of total of 6 constructs which are ease of use, design dialogue to yield closure, support internal locus of control, consistency, feedback, satisfaction and enable frequent user to use shortcut. The discussion for this paper will focus on result that reflects the implementation of the four Shneiderman’s Golden Rules of Interface Design as explained in previous section.

The first rule implemented is to enable frequent user to use shortcut. AS can be seen from Table 2, there are 6 items that are asked to respondents where all items are evaluated with mean above 4 out of 5 with SD lower than 1. The data shows that the mean range in between 4 to 4.067 where the highest mean is 4.067 for items G3 and G4 (SD= 0.371) and the lowest mean 4 for item G1 (SD=0.371). A total of 76.7% of the respondents agree that task provided in this application easy to access and the response time for each task is short. In addition, 73.7% of respondent satisfied with how this application help save time while using it. This indicates that all respondents agree that for frequent user the application allows for user to save time by using shortcut.

**Table 2:** Enable Frequent User to Use Shortcut Result

SECTION G: Enable Frequent User to Use Shortcut					
No	Questions	Mode	Median	Mean	SD
G1	This application enables me to access task quickly.	4	4	4	0.371
G2	The task provided is easy to access.	4	4	4.033	0.414
G3	This application provide shortcut that enable to perform the similar task	4	4	4.067	0.583
G4	The response time for each task is short.	4	4	4.067	0.365
G5	The speed of completing each task is fast.	4	4	4.033	0.320
G6	Overall, I am satisfied with how this application help save my time while using it.	4	4	4.033	0.615

Feedback construct consists of six items as can be seen in Table 3. From the construct, the mean is ranged between 4.467 and 4.667. The highest mean is E6 where respondents are satisfied with the feedback given by this application with mean of 4.667 (SD=0.479). After that, the lowest mean is for E1 with the mean 4.467 (SD=0.571). The result shows that a total of 66.7% of the respondents strongly agree that they are satisfied with the feedback that given from this application

**Table 3:** Feedback Result

SECTION E : Feedback					
No	Questions	Mode	Median	Mean	SD
E1	The application provides feedback to user based on user taken actions	5	4.5	4.467	0.571
E2	This application show error message using the human-readable meaningful message.	5	5	4.5	0.572
E3	This application display feedback that are appropriate and readable for every action.	5	5	4.533	0.571
E4	Provide feedback once button is clicked	5	5	4.567	0.504
E5	Feedback given by application is clear and informative	5	5	4.5	0.572
E6	Overall, I am satisfied with the feedback of this system	5	5	4.667	0.479

For design dialogue to yield closure construct, there are 6 items were asked. The data shows that the mean is ranged between 4.4 to 4.567 with the highest mean for item stating that the application give options for user in each steps (SD=0.568) and the lowest mean is for item stating that the application guide user throughout process (SD=0.675). Majority of the respondents however are satisfied that this system do give closure to them as all means are above 4 and standard deviation are less than 1. Table 4 shows result of the construct. A total of 60% of the respondents strongly agree that this application give a well-defined option for each step in the process, all the prompt messages are easy to understand and strongly agree that this application will prompt message when they completed the process.

**Table 4:** Design Dialogue to Yield Closure Result

SECTION B : Design Dialogue to Yield Closure					
No	Questions	Mode	Median	Mean	SD
B1	This application guide me throughout the process	4	4	4.4	0.675
B2	This application give me a well-defined options for each step in the process	5	5	4.567	0.568
B3	This application provides all the information that I need in one place	5	5	4.5	0.572
B4	All the message prompt by the application is easy to understand by me	5	5	4.6	0.498
B5	This application prompt message every time I completed the process	5	5	4.567	0.568
B6	Overall design of this system is satisfactory	5	5	4.533	0.571

There are six items used to evaluate support to internal locus of control construct. The result is shown in Table 5. Based the collected result, the mean is ranged in between 4.533 to 4.633. The highest mean is for item stating that user can control the application easily with mean of 3.633 (SD=0.556), whereas, the lowest mean is for item stating that using menu and button is easy with mean of 4.533 (SD=0.571). Majority of the respondents satisfied with the support internal locus of control that provided in this application where it is proven when all

**Table 5:** Support Internal Locus of Control Result

SECTION C : Support Internal Locus of Control					
No	Questions	Mode	Median	Mean	SD
C1	This application easily navigable.	5	5	4.567	0.504
C2	This application provide me with simple and easy data entry	5	5	4.567	0.563
C3	Using menus and buttons to go to other screens is easy.	5	5	4.533	0.571
C4	I know where I am now and where to go next.	5	5	4.5	0.572
C5	I can control the application action easily.	5	5	4.633	0.556
C6	Overall, I am satisfied with the support and control of this system	5	5	4.6	0.563

mean above 4 and standard deviation less than 1. The result shows that a total of 67% of the respondents strongly agree that they could easily control the action of this application.

#### 4.1 Discussions

The theory that applied are enable frequent users to use shortcuts, offer informative feedback, design dialog to yield closure and support internal locus of control. Based on enable frequent users to use shortcuts construct, 86.70% of the respondents agree that the application enables them to access task quickly whereas 77% also agree that response time for each task is short. Next, based on feedback construct, 66.7% of the respondents strongly agree and 33.30% agree so it means that they satisfied with the feedback given from application. Next, for design dialog to yield closure construct, 56.70% of the respondents strongly agree whereas 40% also

agree that the application give satisfactory closure to user while using it. As for support internal locus of control construct, 63.60% of the respondents strongly agree and 33.30% agree that they satisfied with the support and control provided in application.

## 5. CONCLUSION

In conclusion, all objectives have been achieved along with the process of developing this application. The proposed work is developed to provide a platform that can be used for both seller and buyer that buying and selling toys in the most effective ways. Thus, this application developed based on analysis of current process and all the problems arise within the current process. The proposed work is expected to offer solutions to all the issues identified in the preliminary study. Seller able to manage their products, receive order and receive payment effectively. In additions, buyer also able to view all products from different seller all in one platform and could make the prices, products and brands comparison easily.

## 6. RECOMMENDATIONS

In the future, there are several enhancements that can be implement in the proposed work to improve the efficiency of the application. The enhancement may include to provide sales report for admin and seller that where seller and admin can automatically generate reports of the profit gain every day, months, and year. By using charts, both admin and seller also could easily see which products generate the highest and lowest products sales every month. In addition, for buyer, the application should display most preferred products and provide rating and review for each products. Next, push notification and order tracking can be implemented in the next version of the application. This features will enable customer to track the current status and location of their order easily.

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