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Development of E-Commerce Applications to Support Digital-Based Marketing

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ABSTRACT

E-commerce is one of the application platforms that support digital-based marketing. The development of e-commerce from year to year is increasing, which is influenced by the development of information technology and the internet. The development of the internet has caused a shift in human activities from offline to online. During the Covid 19 pandemic, the growth of e-commerce has also increased sharply. The Covid 19 pandemic has caused a shift in human habits in purchasing goods from offline to online. This research develops a prototype e-commerce application to support digital-based marketing and conducts usability testing of the developed application using the SUS (System Usability Scale) scale. Based on the analysis and calculation of the SUS scale score, a score of 77.03 is obtained, meaning that the application is functionally good and acceptable to users and shows that using e-commerce applications supports digital-based marketing and affects the increase in marketing and sales.

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1. Introduction

The development of information technology has developed very rapidly over time, including internet technology. It has now penetrated the world of business and commerce. It can facilitate online trade transactions to be accessed by anyone, anytime and anywhere without space and time limits and it helps to increase the product marketing. Electronic-based trade transactions with internet technology are often referred to as E-Commerce. E-commerce is a technology that is a fundamental need for every organization engaged in trade [1]. E-Commerce also grows and develops rapidly in line with the development of the internet. There are some success factors for e-commerce such as online trust [2], word of mouth[3], price [4], promotion [5], website characteristics [6], inventory holdings [7], logistics [8], procurement strategy [9], order of entry [10], firm size and financial performance [11], and environmental factors [12]. E-Commerce is a set of technologies, applications and business processes that connect many different businesses, consumers and communities through electronic transactions. Buyers do not need to spend special time looking for the products they need, they can simply search the internet. E-Commerce is a change in the business world that leads to better customer management, new marketing strategies, product expansion and other more efficient operations [13]. E-Commerce supports international trade [14]. E-Commerce is currently used to support buying and selling functions, marketing of products, services and information via the internet and extranets. E-Commerce is generally divided into two categories: business to business (B2B) and business to consumer (B2C). Recently, a new relationship model called: consumer to consumer (C2C) and consumer to business (C2B).

Many digital-based marketing strategies currently use social media, telephone or customers who come to ask directly about products and hold promotions. If you only rely on marketing strategies by means of consumers having to call first to check product inventory, ask prices or consumers come only to ask directly about conventional and traditional products, sometimes the products you want to order are not always available so that consumers have to wait. This causes customer dissatisfaction with the service and has an impact on decreasing revenue. The development and ownership of enough mobile devices makes e-commerce applications an alternative solution to support digital-based marketing, for example, looking at e-commerce activities that purchases are made by visiting the web or mobile applications. Product ordering is done by selecting product features, marketing can be expanded by sharing information through problem networking sites, search engines and online advertising sites. Product provision does not have to be physical but can still display a digital product catalog. This research is to develop a prototype e-commerce application to provide solutions and facilitate digital-based product marketing developed with smartphone technology so that the latest information is easily obtained by every user anywhere and anytime without space and time constraints, then conduct usability testing of the prototype e-commerce application developed by using the SUS (System Usability Scale) scale to ensure whether the developed e-commerce application prototype is feasible to use functionally and can be accepted by users.

2. Method

The research methodology in software development uses a prototype model with the aim of making it easier to explore the actual needs in the field. The first step is to analyze the needs, in analyzing the needs of e-commerce applications, we conduct literature review surveys, interviews and see directly the conditions in the field. After developing the application prototype, we conducted usability testing of the e-commerce application using the SUS scale [15],[16]. Respondents were taken as many as 37 respondents from approximately 150 e-commerce application users. The questions consist of 10 questionnaire items, according to the respondents' understanding of e-commerce applications. Participants will rate each question from 1 to 5 based on how much they agree with the statement where 5 means strongly agree and 1 means strongly disagree.

3. Results and Discussion

E-commerce applications can run on the web and can also be accessed on smart phone applications. The development of e-commerce applications brings together sellers and buyers. Buyers can access e-commerce applications on desktop, laptop or mobile platforms. It is enough to open a browser and open the e-commerce application site. The e-commerce application specification has a login and logout account module, each user can have an account and login and logout. Sellers can manage products, starting from adding the latest products, viewing product details, changing products, and deleting products. Buyers can view a catalog containing a list of products and put the purchased products into the shopping cart feature whose function is to accommodate a collection of products selected by the buyer, allowing buyers to buy more than one product. Other features are the search function to search for products, product information function to provide information about all products. The design of the e-commerce application prototype uses UML modeling. UML (Unified Modeling Language) is a system or software modeling language with an object-oriented paradigm [17]. The purpose of modeling is to simplify complex problems in a way that makes them easier to understand. The design of e-commerce application prototype modeling using UML can be described as follows:

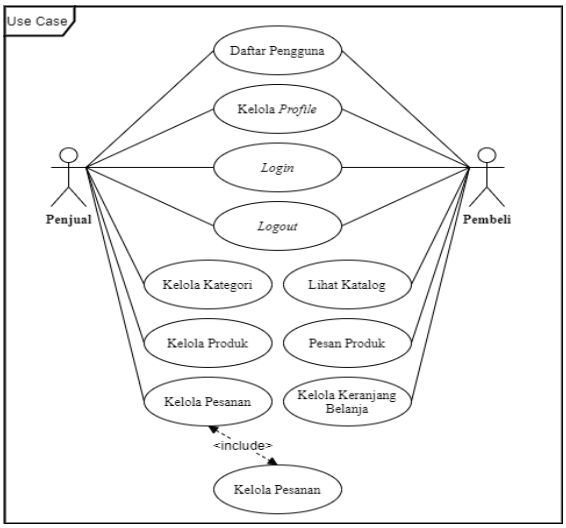

Fig. 1. Use Case Diagram

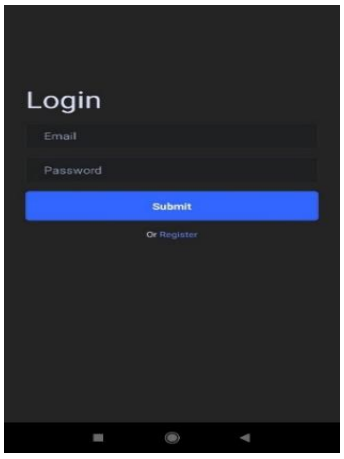

Fig. 2. Login Menu

Sellers and buyers or e-commerce application users must register first, users are asked to enter personal data such as name, address, phone number, email and password as shown in Figure 3 below:

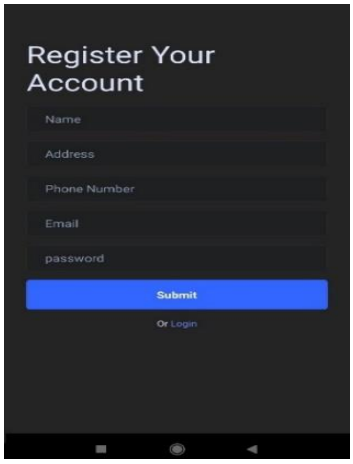

Fig. 3. List Page Display for Buyers

After registering, application users can login to search for products, view product details, or buy products. In addition, users can view product images, purchase products by selecting Add to Cart to add to the shopping cart and selecting Buy Now to purchase products. On the cart page, users can delete ordered products, update the quantity of ordered products and proceed to the payment

process. There is a Delete button to remove items from the shopping cart, an Update Quantity button to change the quantity of items ordered and a Buy Now button to ship the product. On this page there are also To Pay application menu options that can display a list of unpaid orders, Send Proof of Payment menu to allow buyers to send proof of payment images, To Receive application menu that can display a list of orders that are being sent by the seller, Set to Arrive to mark the order has been received, Arrived application menu that can display a list of orders that have been received by the buyer, Cancel Order to cancel the order, and Cancelled which can display a list of orders that have been rejected by the buyer or seller.

Furthermore, testing of the application was carried out where respondents tried the e-commerce application and then filled out the questionnaire that had been prepared. Respondents are e-commerce application users with a total of 37 respondents, with a list of questions according to table 1 below:

Table 1. Result of System Usability Scale (SUS)

No	SUS Question	Likert Scale				
		1	2	3	4	5
1	I think I want to use this app often	0	0	8	10	19
2	I found some of the menus to be uncomplicated	17	10	8	1	1
3	I think the app is easy to use	0	0	7	10	20
4	I think, I need support from a technical person to be able to use this app	15	9	8	3	2
5	I find the various functions is this app well integrated like whatsapp	1	2	8	9	17
6	I think there are too many inconsistences in this application	17	9	10	1	0
7	I imagine that most people will learn to use this application very quickly	0	3	9	10	15
8	I think this application is very complicated to use	18	8	9	2	0
9	I feel very confident using this application	2	3	10	8	14
10	I need to learn a lot of thing before I can use this app	20	6	8	2	1

Table 1 displays the responses of the 37 participants for each item in the SUS questionnaire. As mentioned earlier, scores require between a score of 5 (strongly agree) and a score of 1 (strongly disagree). The question items are positive and negative on odd and even numbers to reduce extreme agreement and response bias.

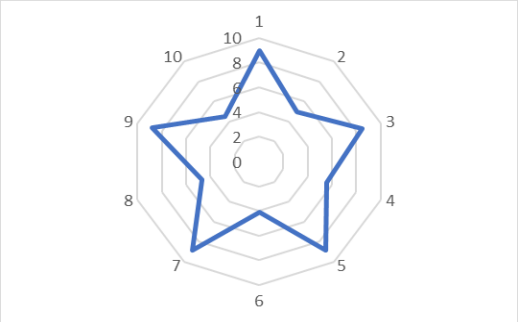

Fig. 4.SUS Question Radar Diagram

Figure 4 shows the radar chart of SUS (System Usability Scale) questions. The responses to positive statements 1,3,5,7 and 9 are at the top, which means it is functionally good and easy to use. However, the responses to negative statements 2, 4, 6, 8 and 10 found that although it is easy to use, some inconsistencies and complications still exist.

The rule for calculating the SUS score on the questionnaire is that each question obtained is subtracted by 1 for odd-numbered questions, and the score is five minus the question score obtained from the user for each even-numbered question. Next, the sum of the scores for each question is multiplied by 2.5. SUS is scored using the following formula (J. Xiong et.al, 2020)

SUS Score = ((Q1 − 1) + (Q3 − 1) + (Q5 − 1) + (Q7 − 1) + (Q9 − 1) + (5 − Q2) + (5 − Q4) + (5 − Q6) + (5 − Q8) + (5 − Q10)) x 2.5 (1)

Table 2. Result of SUS Question

Respondend	Items of Question										Total	SUS Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
Respondent 1	4	4	3	4	2	4	2	4	2	3	32	80
Respondent 2	4	4	2	3	3	4	2	2	2	3	29	73
Respondent 3	4	2	3	4	3	2	4	2	2	4	31	78
Respondent 4	3	3	3	5	4	3	3	3	0	4	30	75
Respondent 5	4	4	4	3	3	4	4	4	3	3	36	90
…	…	…	…	…	…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…	…	…	…	…	…
Respondent 36	3	3	3	0	3	2	4	2	2	4	26	65
Respondent 37	4	4	3	4	1	2	2	4	4	2	30	75
									SUS Score			77,03

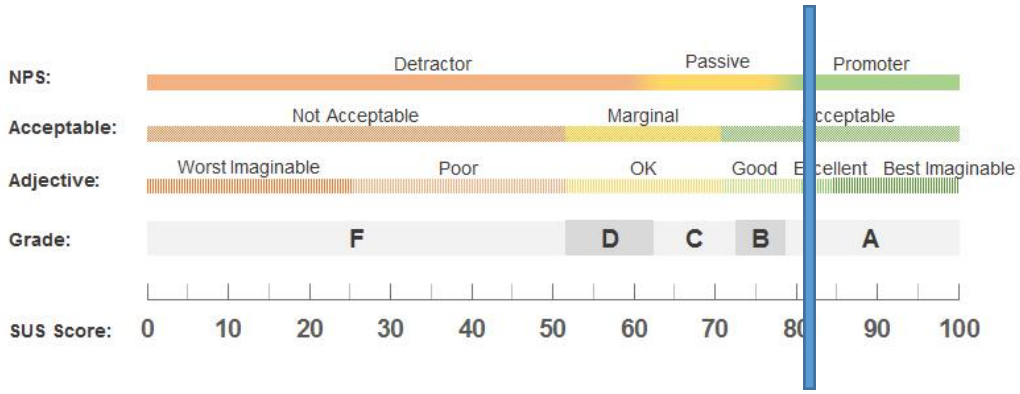

Fig. 5.SUS Score

Table 2 is the calculation of the SUS Question, and Figure 5 is the SUS score. Based on the tabulation of the SUS score using the Likert scale, the result is 77.03 (blue line). This indicates that the e-commerce application is good (grade B) and acceptable to users, which means it is functionally good and easy to use. Users can easily update product information by uploading their latest product photos. It also makes it easier for customers to view and shop from product information available on the web or smartphone. Effectively and efficiently, the application is considered better in distributing and marketing products widely without being limited by time and place. The SUS score is 77.03, indicating that the e-commerce application is functionally good and acceptable to users. This research is motivated by the constraints of the difficulty of selling products and marketing products produced by craftsmen.

4. Conclusion

This research is motivated by marketing constraints and the difficulty of increasing sales. After researching, developing and testing e-commerce applications, it can be concluded that the relationship between the systems made because of the problems found and suggestions given, therefore it can be used as useful input material where the development of e-commerce applications really support and help the application users in conducting digital-based marketing. E-commerce application users can upload their products in e-commerce applications thus product information can be directly distributed or marketed widely through e-commerce applications of the smartphone. Buyers get the latest product information without taking a long time. If interested, they can make transactions using the COD (Cash on Delivery) system. COD payment transactions are made to minimize fraud in trade. The developed e-commerce application is also tested, based on analysis and calculation with SUS scores resulting in a value of 77.03 which indicates that the e-commerce application is functionally good and acceptable to users. Further research could examine the business procedures and security of e-commerce applications.

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