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## User interface evaluation of official store for FMCG (fast moving consumer goods) products in e-commerce website using user experience approach

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# User interface evaluation of official store for FMCG (fast moving consumer goods) products in e-commerce website using user experience approach

R A Lestari<sup>1</sup>, E Muslim<sup>1</sup>, B N Moch<sup>1</sup>

<sup>1</sup>Department of Industrial Engineering, Universitas Indonesia

reshintaananda@gmail.com, erlinda@eng.ui.ac.id, boymoch@eng.ui.ac.id

**Abstract.** Currently, digital technology makes people can do online shopping using e-commerce. Sales of FMCG products through e-commerce websites are currently growing rapidly and will continue to improve in the following years. When using a website, user experience becomes more important than any other products or services. However, from previous research, there is still usability problem when a user using the official store for FMCG product in an e-commerce website. This study aims to evaluate the official store's user interface using the user experience approach with performance metrics, self-reported metrics, behavioral metrics, and issue-based metrics that assess performance, perception, behavior, and issue that the user perceives when interacting with the website. Based on the evaluation results, the dimensions of ease of use, interface quality, and satisfaction was not good enough, so that strategy and interface design recommendation are done.

## 1. Introduction

The growing of technology has a significant impact on the direction and pace of human life. This technology has created the internet of things also the growth of online markets. The number of e-commerce that grows and develops certainly makes the e-commerce compete with each other. So, with the growing competition in the online market, websites have gained vital importance for organizations [1]. Products sold through e-commerce are not only electronic products, fashion, and beauty products, but also consumer products such as Fast Moving Consumer Goods (FMCG). Therefore, to improve trust aspect of e-commerce websites for FMCG product categories, the e-commerce organizations collaborates with the FMCG companies to create an official store in e-commerce. Official stores on each e-commerce website have a different interface design that aims to increase user satisfaction. Sales of FMCG products through e-commerce websites are growing rapidly with tremendous growth and will continue the strong growth within upcoming years. It also predicted that by 2025 FMCG online holds a 10% market share [2].

User experience had an effect on users when using e-commerce websites to purchase products. There is an S-O-R model that consists of three components i.e. stimuli, organism, response when humans interact with the website interface to do online shopping [3]. Besides user experience becomes even more important than it is for other kinds of products on the websites [4]. User experience is the experience the product creates for the people who use it in the real world [4]. Besides user experience encompasses all aspects of the end user's interaction with the company, its services, and its products [5]. Factors influencing user experience according to Peter Morville are useful, usable, findable, credible,



accessible, desirable, and valuable [6]. So, a good user experience can offer a positive experience that helps sell a product, give users satisfaction, offer a good corporate image, and become more competitive in the market. However, customers still encountered some problems in the context of usability i.e. navigation, online transactions, delivery, and inadequate information [7]. This study, therefore, aims to get user experience from the use of e-commerce websites to purchase FMCG products at the official store and to evaluate the usability of FMCG products official store in e-commerce websites.

## 2. Methods

This research used usability study as a method to evaluate user experience and user interface of the official store for FMCG products in e-commerce websites. The user interface is a visual part of a computer application or operating system where the user interacts with a computer or software. A good user interface is part of a good user experience as well. UI brings together the concept of interaction design, visual design, and information architecture [8]. Most user interfaces designed with a focus on usability and efficiency. Users should be able to achieve their goals as efficiently as possible, without too much focus on the user interface itself [9]. Furthermore, usability study is a way to evaluate user experience and usability problems. Some people are difficult to distinguish between the terms usability and user experience. Usability is usually considered the ability of the user to use the thing to carry out a task successfully, whereas user experience takes a broader view, looking at the individual's entire interaction with the thing, as well as the thoughts, feelings, and perceptions that result from that interaction [10]. Metrics used in evaluating usability. Moreover, in the process of usability evaluation, observed task success rates, task completion times, post-task satisfaction ratings and feedbacks are taken into consideration [1].

### 2.1. User experience dimensions

Four metrics were used in this research to measure user experience from the use of e-commerce websites to purchase FMCG products at official store i.e. performance metrics, self-reported metrics, issue-based metrics, and behavioural metrics. First, performance metrics were used to measure how much time a respondent takes when doing the tasks, how effectively a user can complete a certain set of tasks, and other measurements related to work performance when accomplishing tasks. Performance metrics must be performed with tasks or scenarios. Five basic types of performance metrics are task success, time on task, errors, efficiency, and learnability [10]. Second, self-reported metrics give the most important information such as users' perception about the system and their interaction with it. Therefore, the data may tell something about how the users feel about the system [10]. Self-reported metrics done with questionnaires. These questionnaires generally use ratings with a rating scale. Post-Study System Usability Questionnaire (PSSUQ) and Questionnaire for User Interaction Satisfaction (QUIS) are some questionnaires used to acquiring self-reported data. By conducting performance metrics and self-reported metrics, the researcher could obtain a quantitative assessment of the use of official stores on each website. This assessment determines which website that has better interface design that is easier to use and more satisfying to users.

Third, issue-based metrics is a qualitative metric used to identify usability issues that user experienced during his or her interaction with the system. Issue-based metrics done in two ways, namely in-person studies and automated studies. One of the most effective in-person study protocols is think-aloud. Through this protocol respondent should report and give comments after interacting with the system, in this case, researchers can also observe the verbal expression of confusion, dissatisfaction, confidence, nonverbal behaviours such as facial expressions, and others [10]. Fourth is behavioural metrics. Things like a verbal expression, eye-tracking, emotional involvement, and stress measured through behavioural and physiological metrics. Measurement with this metric can offer useful insights for the UX evaluation [10]. One measure of behavioural metrics is to use an eye-tracker. Eye-tracking offer new knowledge by observing eye movements when respondents use a product or system. By using eye-tracking, new findings are obtained by showing the truthful respondents see when using a product or system. After determining the metrics, furthermore, the dimensions of UX are determined. The user

experience dimensions used to measure and evaluate user experience usability i.e. task success, time on task, efficiency, error, satisfaction and ease of use, information and interface quality, visual appeal, and usability problem. By conducting issue-based metrics and behavioural metrics, the researcher obtained the user perceived usability problem and the interface elements that attract the attention of the user to further determined the interface design that increases the satisfaction.

## *2.2. Participants*

There are 30 respondents recruited in the urban areas of Indonesia consisting of students and employees. Before the experiment, the respondents have given the usability study procedures. 50% of the respondents are male and female, respectively. Besides 67% of respondents aged 21 to 30 years old and 33% aged 20 years old or younger. All the respondents are the user of the official store in e-commerce websites for FMCG products. Furthermore, 53% of respondents use official store every month to buy FMCG products in the e-commerce website, 27% of respondents use official store every week, and 20% of respondents use official store every six months.

## *2.3. Materials and design*

For data collection in user experience evaluation, the researcher created 7 tasks which used to perform performance measurement. The series of tasks provided are the main activities done by users when purchasing FMCG products through the official store on the e-commerce website. In this study, each respondent was asked to complete as many as seven tasks for each official store website called "Lazada", "Blibli", and "Elevenia". The 7 tasks are log in; go to Unilever's official store via the main page of the website; purchase products using categorization and filter features and after the product is successfully put in the cart, the respondent adds the product quantity, then goes into the check-out page and fill in the address, specify the payment method, then proceed to buy products; purchase products using product search features, sort by menu, and decide which products are sold by the official store; track order; search for how to change or return products through the help feature; and finally use the products description, specification, and review features. Moreover, for data collection also used QUIS (Questionnaire for User Interaction Satisfaction) and PSSUQ (Post-Study System Usability Questionnaire) questionnaires.

## *2.4. Procedures*

The usability study procedure was as follows. First, data collection starts with performance metrics. Respondents start to complete the tasks under given command and every task is done with video recording and time study. Second, each respondent completed the assigned tasks, respondents were asked to complete the QUIS and PSSUQ questionnaires that were part of self-reported metrics. Third, for behavioural metrics, the eye tracker is used. Eyelink II was employed to record respondent's eye movements during the usability study, and data were treated using Eyelink Data Viewer. Unilever official store interface was displayed to respondents to stimulate the real environment for online shopping. Fourth is an issue-based metrics with the retrospective think-aloud method, in which researcher asked respondents to express their perceived usability problems while performing tasks.

## **3. Result and discussion**

SPSS 24. 0 is used to analyse the measurements. First for task success dimension, the value of task success for the 7 tasks on all of the three websites i.e. Lazada, Blibli, and Elevenia are 100%. Task success shows the achievement of completing the goal effectively from each task. This indicates that the entire tasks are successfully completed with effectiveness and not affected by the website used.

Second, time on task and efficiency dimensions. There is different time on task and efficiency data for each task performed. Time on task and efficiency data represent usability as part of the user experience. Time on task and efficiency data obtained from the respondents when completing a series of tasks. Time on task data used to calculate the efficiency by dividing the task success with time on task. ANOVA was used to examine differences between the group means in the three websites. The

efficiency of task 1 from website Lazada, Bilibli and Elevenia are 85%, 92%, and 89%. Moreover, the efficiency of task 2 from website Lazada, Bilibli and Elevenia are 83%, 75%, and 66%. For task 2, significant differences ( $p\text{-value} < 0.05$ ) are found between the three websites. The official store features are easier to find in Lazada website. So Lazada official store's layout increasing more efficiency compared to other websites. In Bilibli website users have to search and scroll down the screen to the middle bottom of the page to reach official store features. Moreover, users have to scroll down the screen to the bottom of the page in Elevenia website.

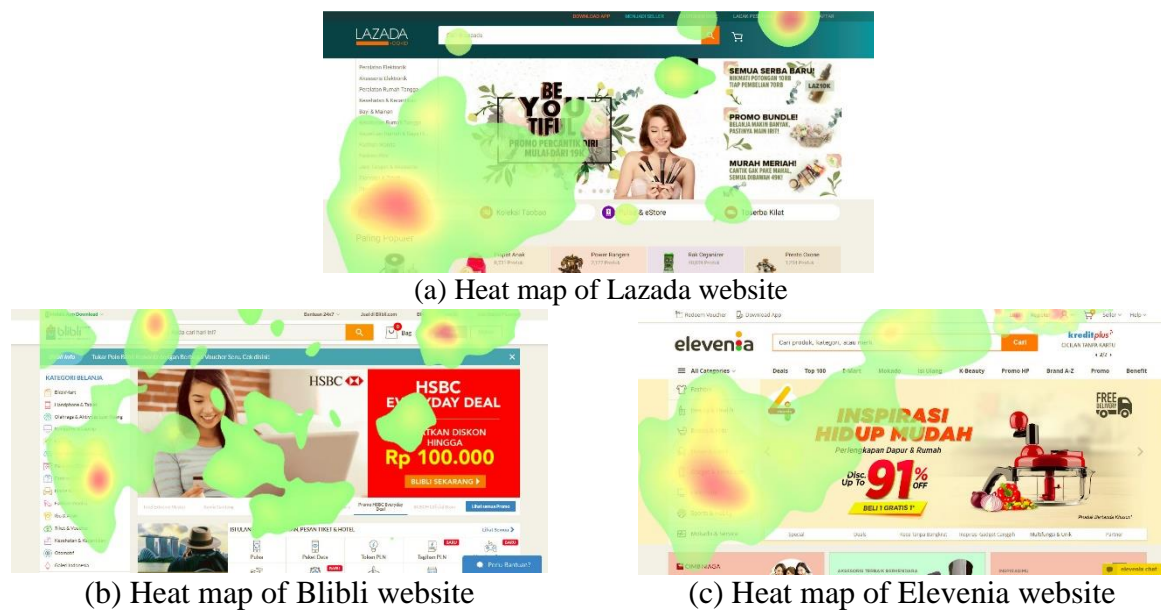
The efficiency of task 3 from website Lazada, Bilibli and Elevenia are 63%, 80%, and 71%. For task 3, significant differences ( $p\text{-value} < 0.05$ ) found between the three websites. In the Lazada website, features to adding quantity for products are hard to find. So, extending time on task and lowering efficiency. Moreover, in the Elevenia website categories feature is also hard to find thus lowering efficiency. Furthermore, the efficiency of task 4 from website Lazada, Bilibli and Elevenia are 94%, 86%, and 92%. For task 4, significant differences ( $p\text{-value} < 0.05$ ) found between website Lazada and Bilibli. There is also mean difference between website Elevenia and Bilibli. That happens because, in the Bilibli website, users are more difficult to find products that sold by official stores. The efficiency of task 5 from website Lazada, Bilibli and Elevenia are 76%, 70%, and 63%. For task 5, significant differences ( $p\text{-value} < 0.05$ ) found between website Lazada and Elevenia. The difference also found between website Bilibli and Elevenia.

The efficiency of task 6 from website Lazada, Bilibli and Elevenia are 83%, 83%, and 69%. For task 6, significant difference ( $p\text{-value} < 0.05$ ) found between website Lazada and Elevenia. There is also a significant difference between website Bilibli and Elevenia. Finally, the efficiency of task 7 from website Lazada, Bilibli and Elevenia are 79%, 89%, and 83%. For task 7, significant differences ( $p\text{-value} < 0.05$ ) found between the three websites. The significant difference occurs because of the product review column. The description column, product specifications and reviews in Lazada website are arranged down. That makes users need more time to scroll down to reach the desired features. Then for Bilibli and Elevenia websites, product review gives less explanation about the product.

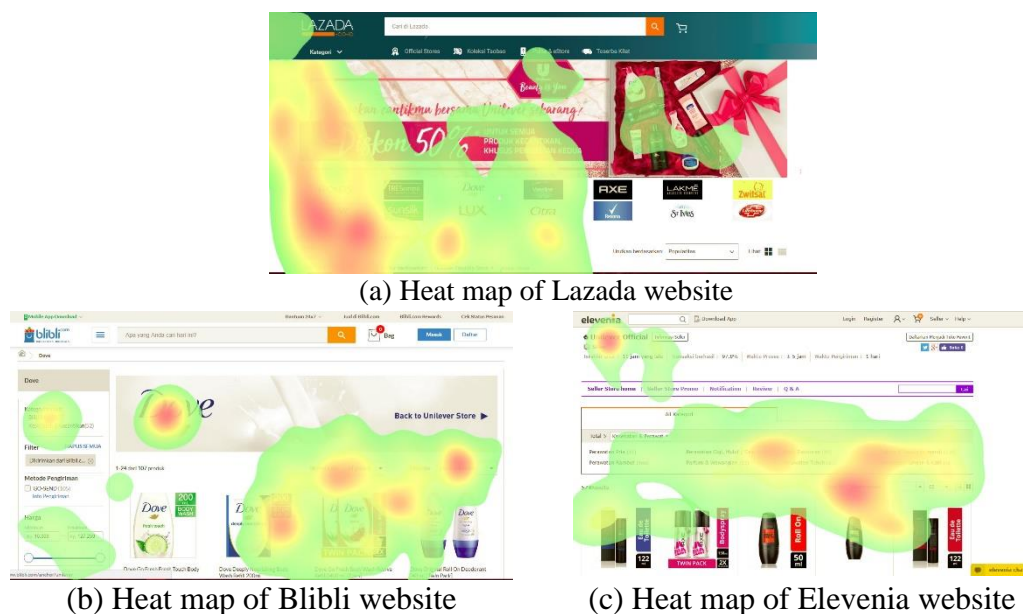
Third for error dimension, there are 4 tasks that still cause errors for the user. The average errors for task 2 are 0 for the Lazada, 0.367 for the Bilibli, and 0.433 for the Elevenia. The average errors for task 3 are 0.533 for the Lazada, 0.033 for the Bilibli, and 0.2 for the Elevenia. Moreover, the average errors for task 4 are 0.033 for the Lazada, 0.133 for the Bilibli, and 0 for the Elevenia site. Furthermore, the average errors for task 6 are 0 for the Lazada, 0 for the Bilibli, and 0.067 for the Elevenia.

Four is for satisfaction and ease of use dimension. QUIS and PSSUQ score obtained to know the level of user's satisfaction. The results of the QUIS score show that the Bilibli website provides a higher (more positive) score. Lazada website gave the second highest average score after Bilibli. Then, Elevenia website has the lowest average scores. Therefore, Bilibli website has better interface design. Also, Bilibli website has better information architecture, colour selection, and better icon layout. The Bilibli website has the highest QUIS score in these parameters i.e. an overall reaction to time, screen, learning, and system capabilities. Then the Lazada website has the highest QUIS score in the terminology and system information parameters.

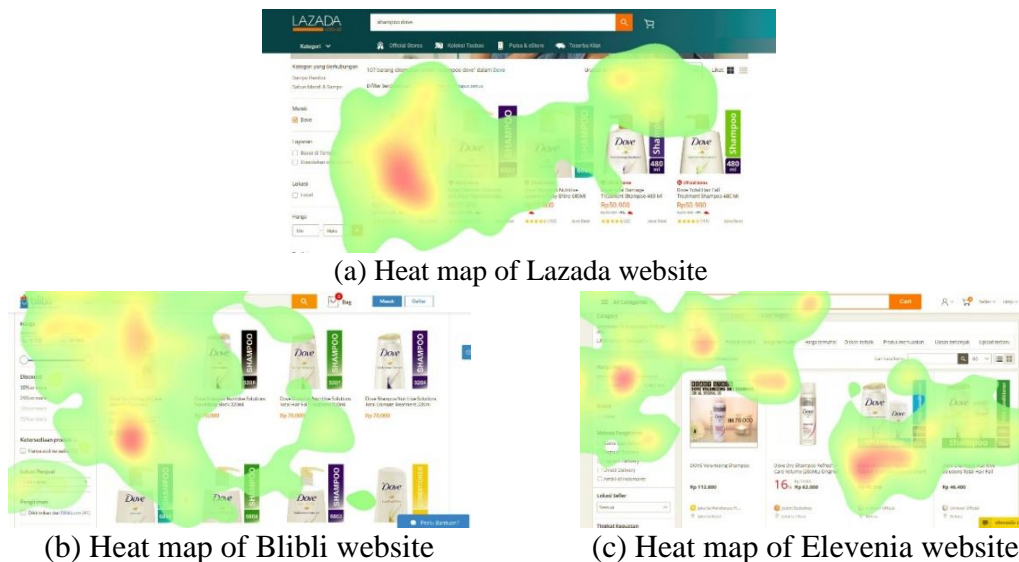
In PSSUQ questionnaire, the higher the score given the more negative the rating. The results of the PSSUQ score show that the Bilibli website provides a better interface quality. Lazada website gives the second better interface quality after Bilibli website. Elevenia is a website with the lowest interface quality compared to Bilibli and Lazada. This indicates that Bilibli website has a better interface and information quality dimension. The Bilibli website has the best PSSUQ score in the system usefulness and interfaces quality categories. Then the Lazada website has the best PSSUQ score in the category of information quality. Furthermore, Friedman test was also used to examine differences between the group means in the three websites. There is a significant difference in the QUIS and PSSUQ overall score between three websites. There are also significant differences in the QUIS and PSSUQ score per parameter between the three websites.

**Figure 1.** Eye-tracking result of task 1 and task 2

Five for the usability problem dimension by using RTA (Retrospective Think-Aloud) method. There are seven main types of problems that need to be improved from the Lazada website, seven major problems from Blibli website, and seven main problems from Elevenia website. These types of issues are divided into three classifications i.e. five problems of visualization, one function problem, and one content problem for the Lazada website. Then for the Blibli, seven type of issues divide into three classifications i.e. four visualization problems, two layout problems, and one content problem. Last for Elevenia website seven types of problems divide into four classifications i.e. four visualizations, one layout, one function, and one content.

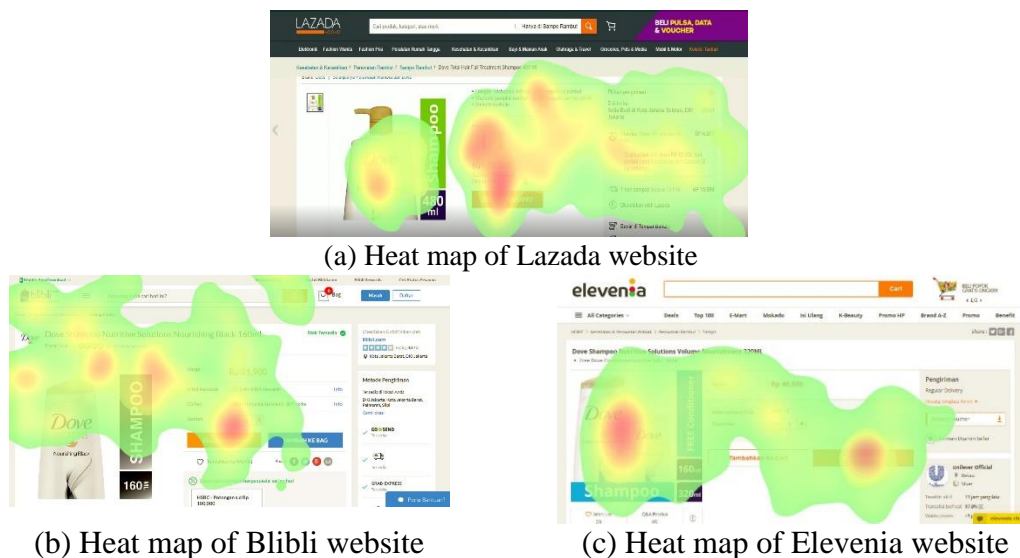
**Figure 2.** Eye-tracking result of task 3

Six for visual appeal dimension, heat maps from eye-tracking were used to measure user's visual attention which consists of eyeball fixation and saccade. Heat maps of these tasks provide an overview of respondents' behaviour when purchasing products through official store. Figure 1 presents the heat map, which is a visualization tool provided by Eyelink Eye-Tracker for task one and two. The process is to know the elements on the visual display that are of interest to the respondent when the respondent sees the product page at the official store. Red colour on the heat maps indicates that respondents see the area with the longest dwell duration, followed by yellow and green.



**Figure 3.** Eye-tracking result of task 4

As shown in figure 1, users give more attention to the log in icon in task 1. Moreover, there are different visual attention between the three websites in task 2. For Lazada website users give more attention in official store icon. Furthermore, for Blibli and Elevenia websites users give more attention in categories feature instead of official store feature. As shown in figure 2 and figure 3, users give more attention to the product categories, product images, and information about the official store.



**Figure 4.** Eye-tracking result of task 5



Moreover, in figure 3 users give attention about a sign indicating that the product is sold by the official store. Furthermore, figure 4 is the heat map for task 5 that shows the product information page and description. The results indicate that the brand image is the main focus because the brand image and product advertisement is an interface design attribute that makes the user interested to pay attention and build the desire to buy the product [11].

#### 4. Conclusion

In this study, the user experience of the official store for FMCG (Fast Moving Consumer Goods) in e-commerce website was evaluated. Usability study methods were conducted with various metrics i.e. performance metrics, self-reported metrics, behavioural metrics, and issue-based metrics. This usability method provides an assessment of the website in a quantitative and qualitative form. So, this method offers new insights and strategies that increase usability and user satisfaction. The greatest contribution of this study was the used of eye-tracker to analyse user's visual attention when viewing the website interface and offer user interface recommendations that are easy to use.

The results of this study summarized as follows. First, there are significant differences between groups of websites i.e. Lazada, Blibli, and Elevenia when users using the official store for FMCG product on performance metrics measurement. This means usability attribute and website's interface design affect the perceived user experience as well as user performance when using the official store. Second, assessment of perceived satisfaction and ease of use based on QUIS (Questionnaire of User Interface Satisfaction) resulted that Blibli website has a higher valuation than Lazada website and the lowest rating on the Elevenia website. Perception of information and interface quality based on PSSUQ questionnaires (Post Study System Usability Questionnaire) also resulted better in Blibli website. Third, based on Retrospective Think-Aloud (RTA) data, it is found that the main problem most often experienced by the respondent mainly is the problem of visualization, function, layout, and content. Fourth, the evaluation of visual appeal with behavioural metrics using eye-tracker gives different heat maps results between the three websites for each task. Therefore, things that are the main menu should be placed centrally with clear information that makes it easier for users. Moreover, the users also focus on the brand image, advertisements, and promos.

The implications of this study from a practical viewpoint are as follows. First, user interface designer for an official store in e-commerce websites should give more focus when designing the user interface primarily on the use of colour, layout, structure, and quality of information. Second, to increase attractiveness, usability, and satisfaction, the designer can add the information content attributes to the product description and specification clearly such as the product content information, the expiry date, and the rating by the expert about the product. Third, for official store features, websites need to catch up more from the Lazada website, especially in terms of placing official store features on the main page of the site. The location of the official store icon should be on the first page of the main page view as on the Lazada website, so the official store feature is easier to find and so improve usability. Then on the page of an official store should be given a search column that makes it easier for users when they are looking for a certain brand of products in an official store.

This study has the following limitations. First, this research uses only eye tracker for behavioural metrics, so that for further research can use other cognitive tools such as electroencephalography (EEG) to measure emotion or changes in the user's brain waves (physiological metrics). So, the EEG can determine the effect of user experience on user emotions. Second, this research only examined the relationship between user experience elements with satisfaction. For further research, the relationship of user experience elements can be examined with other dependent factors such as decision making and purchase intention.

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