

# UX Evaluation Using Firstclick, Performance Measurement, RTA, And Questionnaire On E-Commerce Website

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**Abstract:** E-commerce has made transactions easier for several persons. SKI (Semadi Kwazay Indoland), a company in the real estate market, is one of the numerous organizations that develop e-commerce websites. The company wants the e-commerce website to attract a wider audience. Therefore, an evaluation is necessary to measure the usefulness of the website. Twenty responses were divided into two groups of ten: the advanced group and the novice group. The selected assessment approaches are performance measurement to evaluate the system's efficiency and error rate, first-click usability testing to evaluate the system's effectiveness, and RTA and the SUS questionnaire to evaluate user happiness. The following are the study's findings: This e-commerce website is quite efficient, as there is no significant difference in the time necessary to complete the 10 activities between the two groups of respondents. The mean participant questionnaire score for the e-commerce website was 49.75, which was much lower than the average SUS score of 68. The e-commerce website page is highly effective, as the performance measurement test results suggest a comparatively low error rate across both novice and advanced respondent groups.

**Keywords:** User Experience, Firstclick, Performance Measurement, Retrospective Think Aloud, Questionnaire.

## INTRODUCTION

One company that is currently developing an e-commerce website is SKI (Semadi Kwazay Indoland). SKI is a company engaged in the property sector, which is currently developing a property e-commerce website. The e-commerce website is named rumah58.com, the company wants to increase the reach of public knowledge about the e-commerce website, so a technique is needed to measure users in learning quickly and using existing website features to achieve their goals in using e-commerce websites, one of them in terms of usability user experience (Jain & Purandare, 2021; Ritonummi & Niininen, 2021).

Usability testing has several evaluation techniques, namely the Firstclick technique, Retrospective Think Aloud, Shadowing Method, Coaching Method, Question Asking Protocol, Teaching Method, Performance Measurement, Remote Testing, and Eye Tracker (Fan et al., 2019; Permana, 2019). Of these several techniques, one of them is a technique that can measure the effectiveness of the e-commerce website page, namely Firstclick usability testing. Another technique of usability testing, namely the Performance Measurement technique is used to measure the level of efficiency and also the level of error, the Retrospective Think Aloud (RTA) technique is a technique that allows a respondent to tell what things were done when the test was completed. Meanwhile, to measure customer satisfaction, the method used is inquiry. The inquiry method has several evaluation techniques, namely 0 and Questionnaire (Kumaresh et al., 2021). This technique provides evaluation results in the form of quantitative data so that it is easier to process data. The Questionnaire Technique will be used to measure the level of user satisfaction with the e-commerce website.

Based on the explanation above, research is needed on "User Experience Evaluation on Usability Aspects Using the Fristclick Technique, Performance Measurement, Think Aloud, and Questionnaires on the Rumah58.com E-Commerce Website" aimed at evaluating the website on the usability testing aspect using three techniques which is combined, namely the Firstclick Technique, Performance Measurement, Think Aloud as well as the inquiry aspect using the Questionnaire technique. This research is expected to provide recommendations for system improvement based on the results of the usability evaluation carried out.

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## LITERATURE REVIEW

### Usability Testing

Usability is derived from the word useable, which signifies something may be utilized effectively. Usability is defined as the elimination or minimization of usage failures while providing users with advantages and satisfaction. Usability or "usability" refers to the ease and readability of information as well as a user-friendly navigation experience in the interaction between humans and computers (Saputra et al., 2022). Generally, discussions on user-friendly interfaces are applied to websites and software in order to make them more efficient, simple, and enjoyable to use. Learnability, Efficiency, Memorability, Error Prevention, and Satisfaction are the five conditions that must be addressed in order for a website to achieve the optimal degree of usability (Liu et al., 2019). Technology is the design of instrumental steps to reduce uncertainty regarding causal links when reaching desired outcomes. A product is deemed useful if the user has no aggravation while using it. Users are able to accomplish their desired tasks without impediments, challenges, doubts, or queries. The capacity of the user to complete a series of tests is essential. Several criteria for measuring Usability include (Hasibuan & Putri, 2022; Iqbal & Bahruni, 2019):

1. Success Rate, measures the level of user success when completing all "tasks" on a website.
2. The Time a Task Requires, measures the user's time when completing a "task" on a related website.
3. Error Rate, the rate of user errors when completing "tasks" on related websites.
4. User's Subjective Satisfaction, the level of user satisfaction when completing the entire "task" while interacting on the website.

While the stages in the implementation of usability evaluation include (Wahyuningrum et al., 2020):

1. Preparation  
In the preparation stage, all needs related to the implementation of the test must be provided. All of these materials are clearly stated in the test plan made by the tester.
2. Selection of respondents or direct users  
Divide the respondents into 2 groups of test users, where each group has the same characteristics.
3. Determine and describe the task to be evaluated  
The tasks to be selected for evaluation are usually grouped into tasks that are relevant, important and representative of the way the system will be used.
4. Introduction  
In the familiarization stage, the tester leads the user through the testing by giving a brief explanation and the purpose of the test. The tester then introduces the test procedure.
5. Running the test  
During testing, testers and researchers try to avoid interaction as much as possible and give users freedom in conducting tests.
6. Filling in the questionnaire  
After conducting the test, users are asked to fill out a questionnaire that has been provided subjectively to the system that has been run.
7. Retrospective Think Aloud (RTA)  
In this session the researcher gave the user the opportunity to retell what he experienced or thought when using the system, whether the difficulties faced by users when using the system. The user will be helped to remember when he used the system by watching a video recording together when the exam was taking place. Reviews from users will be put in writing so that the document can be used as input for the system development team for system improvement (Alhadreti & Mayhew, 2016; Liapis et al., 2019).
8. Data collection  
The data collection stage of the test implementation is that the test collects test results from all users, and the tester also writes an organized survey report of the individual user test results.
9. Data processing  
The final stage of the test implementation is to process and analyze the measurement data and questionnaire data that has been obtained.

## METHOD

Evaluation study is comprised of field notes (observation), analysis of documentation, and questionnaires. The objective of the research design is to provide a detailed description of the actual scenario regarding the usability evaluation of the e-commerce website. Research flow diagram can be seen in figure 1.

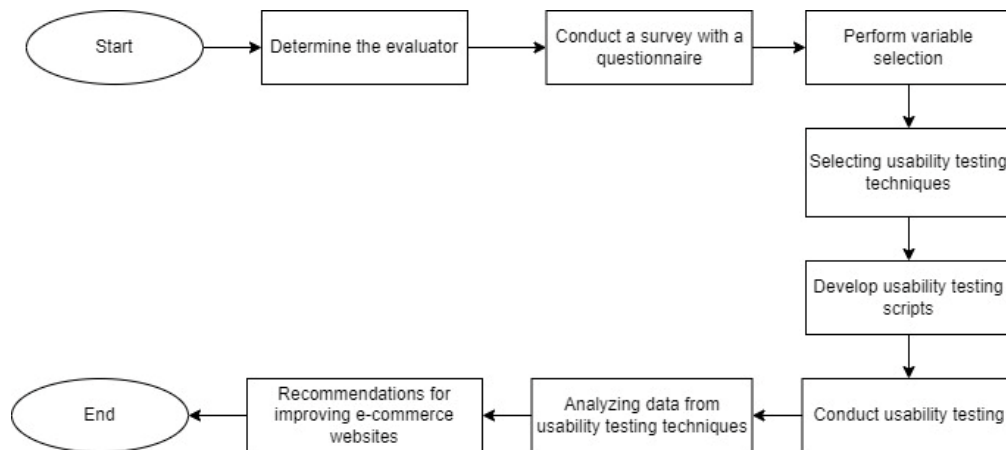


Fig. 1 Research Flow

These are the steps involved at this level of the research:

#### 1. Determining Evaluators In this study

the evaluators of usability testing are novice and advanced users.

#### 2. Conducting a Survey with Questionnaires

Select respondents using surveys and categorize them as novice or advanced users. The sampling technique employed is cluster random sampling, followed by sampling by means of a single-stage cluster, in which the researcher can randomly select the sample group (Utami et al., 2020).

#### 3. Perform Variable Selection

Validity is derived from the word validity, which refers to the degree of accuracy and precision of a measuring instrument (test) in carrying out its measuring function. The validity of a test is high if the measuring instrument is accurate. This indicates that the measurement result is a quantity that precisely reflects the actual facts or conditions of what is being measured. Variables utilized in the study include efficacy, efficiency, error rate, and user satisfaction level. Moreover, dependability is one of the most important qualities or attributes of a quality measuring tool. A test is considered dependable if it consistently produces the same findings when administered to the same group at multiple times or on different occasions (Wang et al., 2019).

#### 4. Conducting Usability Testing Technique Selection

There are two methods for measuring usability: using your own assumptions and using usability metrics (Blattgerste et al., 2022; Soleimani, 2019). The usability metric is employed to get the correct conclusion. Usability metrics can also provide answers to queries such as whether people like the product, whether it is more user-friendly than comparable products, and whether the product's usability can be compared to that of the competition. The four stages of usability testing are as follows:

- Select the questionnaire method.
- Select the population or participants.
- Determine the sample size.
- Process the data and interpret the data based on the test results.

According on the given characteristics, select a number of usability testing approaches. The chosen technique is performance measurement, which measures the system's effectiveness and error rate. Firstclick usability testing technique to measure the system's efficacy, RTA technique and SUS questionnaire to measure user happiness.

#### 5. Scripting Usability Testing

The purpose of evaluating an activity/program is to measure the success of the activity/program and to determine the success of the program, as well as whether it meets current expectations. This research aims to evaluate the benefits, usefulness, contribution, and practicability of a particular unit/program institution's of operations. Through data collection, analysis, and objective evaluation of program execution, this research measures the results of a program or project (the effectiveness of the program) in accordance with its objectives. Then, design and select policies based on the program's positive values and benefits.

Then, determine what information is to be gathered through a survey using the following steps: identifying the respondents who will become the research sample, compiling interview questions or questionnaires, determining the survey method, whether by telephone or in person, collecting data in the field, analyzing the collected data, and writing a report.

#### 6. Conduct Usability Testing

With a total of 50 responders, they are divided into two groups, with 25 people in the advanced group and 25 people in the novice group. Advanced respondents are those who are accustomed to utilizing the Internet and/or

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have previously completed transactions on e-commerce websites. While inexperienced respondents are Internet users who are unfamiliar with conducting transactions on e-commerce sites.

Table 1. Table of Respondent Data for Usability Evaluation Participants

Respondent Code	Gender	Group
PP01	Man	Beginner
PP02	Man	Beginner
PP03	Woman	Beginner
PP04	Man	Beginner
PP05	Man	Beginner
PP06	Woman	Beginner
PP07	Woman	Beginner
PP08	Man	Beginner
PP09	Woman	Beginner
PP10	Man	Beginner
PPM11	Woman	proficient
PPM12	Man	proficient
PPM13	Man	proficient
PPM14	Man	proficient
PPM15	Woman	proficient
PPM16	Woman	proficient
PPM17	Man	proficient
PPM18	Man	proficient
PPM19	Woman	proficient
PPM20	Man	proficient

The usability testing process begins with the completion of the tasks assigned by the researchers. During the completion of these tasks, performance measurement and first-click usability testing procedures are executed. The supplied tasks/instructions are fundamental actions that the user must learn in order to use the e-commerce website page.

Table 2. Usability Evaluation Scenario Task Table

No	Instructions
1	"You are now on the main page of the e-commerce website Rumah58.com, you want to register as a member on the website. What are you going to do?"
2	"You have successfully registered as a member. Please login to the website"
3	"You are already on the main page as a member of the rumah58.com website. You want to post your property on the website"
4.	"Next you want to check whether your post has entered the sale/rent menu"
5	"There are still for sale/rent pages, you want to sort all listings for sale only"
6	"You want to add a new photo to your property posting"
7	"Now go to the forum page, comment on the first forum post you see"
8	"Next to my profile page, you want to add your account profile photo"
9	"Now go to the contact page, please fill in the complete form and in the message section write (I want a property consultation)"
10	"You have explored the e-commerce website Rumah58.com, then you may log out of your account"

Table 3. Participant Respondent Questionnaire

No	Statement
1	I feel comfortable using the e-commerce website rumah58.com

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2	I feel the system is too complex when actually it can be made simple
3	Ecommerce websiterumah58.com is easy to use
4	I need help from other people when using the e-commerce website rumah58.com
5	I found several functions in the rumah58.com e-commerce website well integrated
6	Lots of inconsistent views
7	In my opinion, the rumah58.com e-commerce website will be easy for many people to use.
8	I found the feature difficult to use.
9	I am interested in using the rumah58.com e-commerce website again.
10	I need to learn many things before I use the rumah58.com e-commerce website.

### 7. Analyzing Usability Testing Result Data

Analyzing data obtained from usability testing results.

### 8. Develop Recommendations for Improvement

The results of data analysis with the Firtsclick Technique, Performance Measurement, RTA, and surveys are referred to in the compilation of suggestions for enhancing the e-commerce website (SUS).

## RESULT

In the Firstclick Technique, the accuracy of the participant's clicks when doing each task given by the researcher, so if the respondent correctly clicks the first click, the overall task completion success value is 87%, and if the respondent makes the first click wrong, the overall task completion success value overall by 46%. Most of the respondents who made the first click correctly completed the task well. Even though there were cases of several respondents who still succeeded in carrying out the tasks that had been given even though they were wrong in making the first click and only had a 46% chance of success.

In Performance Measurement data obtained from data on the time it took to complete the task on 20 novice and advanced participants. Meanwhile, T1 to T10 are tasks performed by participants with scenario tasks. The processing time for each task in milliseconds (ms) is based on the analysis of the participants' usability testing video recordings. If an error occurs during the execution of the task, the participant is deemed to have failed to complete the task. The following is a video analysis of the participants' assignments.

Table 4. Table of Performance Measurement Results

Group	Task Number	Number of participants	Number of Errors	Percentage of Number of Errors
Beginner	Tasks1	10	0	0%
	Tasks2	10	0	0%
	Tasks3	10	0	0%
	Tasks4	10	0	0%
	Tasks5	10	3	30%
	Tasks6	10	2	20%
	Tasks7	10	1	10%
	Tasks8	10	0	0%
	Tasks9	10	0	0%
	Tasks10	10	0	0%
Beginner Group Average Percentage				6%
proficient	Tasks1	10	0	0%
	Tasks2	10	0	0%
	Tasks3	10	0	0%
	Tasks4	10	0	0%
	Tasks5	10	1	10%
	Tasks6	10	1	10%

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Tasks7	10	2	20%
Tasks8	10	0	0%
Tasks9	10	0	0%
Tasks10	10	0	0%
Advanced Group Average Percentage			4%

Based on the data from the results of the participant's Performance Measurement error shown in table 4. it shows that there were participants who made errors or failed to complete the task. The percentage of errors or errors that occurred in the novice group respondents in tasks 5, 6, and 7 totaled 30%, 20%, and 10%. Meanwhile, the errors or errors that occurred in the advanced group of respondents, namely tasks 5, 6, and 7, amounted to 10%, 10%, and 20%. Therefore this problem should be solved by trying to find the problems faced by the participants during the task completion process which can be identified through the performance measurement process video for each participant who made a mistake. From the performance measurement data, it is known that participants who made errors were participants with respondent codes PP02, PP03, PP04, and PPM12 on task 5, PP06,

The data obtained from the usability testing process with the RTA technique is data in the form of problems or difficulties when using the Dual Skills Program LMS system as well as suggestions from respondents which can be seen in the following table.

Table 5. RTA Data for Beginner Participants and Advanced Participants

No	Respondent Code	Feature	Difficulties / Problems Experienced
1	PP01, PP06, PP07, PPM12, PPM15, PPM17, PPM18, PPM20	Notifications	Incomplete data change notifications, failed updates, failed logins
2	PP01, PP05, PP07, PPM15, PPM17, PPM18, PPM20	Forms register property	Forms register property is too complex
3	PP02, PP03, PP04, PP06, PP09, PP10, PPM12, PPM13, PPM15, PPM16, PPM17, PPM19	Update data	Often fails to update data such as personal data and property photo updates
4	PP02, PP03, PP04, PP09, PPM11, PPM12, PPM17	Sort property data	Sort the data cannot match what is desired in the property data sorting feature
5	PP02, PPM14	Look for the property register menu	Respondents found it difficult to find the menu to register the property
6	PP04, PP08, PP10, PPM20	Website loading	The loading of the e-commerce website rumah58.com is rather slow
7	PP08, PPM11, PPM13, PPM19	Comment form	Comments on the forum menu can not be accessed

Table 5 shows suggestions of difficulties or problems experienced by participants when using the rumah58.com e-commerce website. the following is a suggestion for concluding the difficulties or problems experienced by participants in table 6.

Table 6. Conclusion of Participants' Suggestions

No	Respondent Code	Suggestion
1	PP01, PP06, PP07, PPM12, PPM15, PPM17, PPM18, PPM20	It is necessary to optimize the notification feature when data changes occur, update fails, login fails and history of activities carried out when using the E-commerce website Rumah58.com.
2	PP01, PP05, PP07, PPM15, PPM17, PPM18, PPM20	Several features need to be simplified again, especially the property registration feature which is the main function of the Rumah58.com E-commerce website..By adding a shortcut that stands out on the main menu or guide that makes it easier for users to access this feature for the first time.
3	PP02, PP03, PP04, PP06, PP09, PP10, PPM12, PPM13, PPM15, PPM16, PPM17, PPM19	Failure to update can be caused by network problems or the files/photos you want to include have too high a resolution. For this reason, it is necessary to provide a recommended resolution and size when uploading data.
4	PP02, PP03, PP04, PP09, PPM11, PPM12, PPM17	The sorting feature needs to be simplified considering that this feature is a measure of the efficiency of a website.
5	PP02, PPM14	It is necessary to provide instructions or tutorials for initial use in carrying out the property registration feature after participants register.
6	PP04, PP08, PP10, PPM20	There are several factors that affect website slowness including servers, networks, devices, web browsers, and the quality of the website itself. The quality of website speed can be improved by using images that are not too large and of low resolution (not too high).
7	PP08, PPM11, PPM13, PPM19	A form of comment symbol that is not generally used on other websites.Replace the symbol with "add comment" to make it easier for users to access the feature

Participants were then given a questionnaire that aims to see user satisfaction. The calculation is done by looking at the answers to each questionnaire.

Table 7. Average Beginner Group Results

Code	Questionnaire Questions										Total	Average
	P1	P2	P3	P4	P5	P6	Q7	Q8	Q9	P10		
PP01	5	5	3	4	3	5	5	3	4	3	40	4
PP02	4	4	3	3	3	4	4	3	3	3	34	3.4
PP03	3	3	4	4	4	3	3	4	4	4	36	3.6
PP04	4	4	5	5	5	4	4	5	5	5	46	4.6
PP05	3	4	3	4	4	3	4	3	4	4	36	3.6
PP06	5	5	5	4	5	5	5	5	4	5	48	4.8

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<b>PP07</b>	4	4	4	3	4	4	4	4	3	4	38	3.8
<b>PP08</b>	3	3	3	3	3	3	3	3	3	3	30	3
<b>PP09</b>	5	4	5	5	5	5	4	5	5	5	48	4.8
<b>PP10</b>	3	3	4	2	4	3	3	4	2	4	32	3.2
<b>Beginner Group Average</b>											38.8	3.88

Table 8. Average Results of the Advanced Group

Code	Questionnaire Questions										Total	Average
	P1	P2	P3	P4	P5	P6	Q7	Q8	Q9	P10		
<b>PPM01</b>	4	4	5	4	5	4	4	5	5	5	45	4.5
<b>PPM02</b>	3	3	4	3	4	3	3	4	3	4	34	3.4
<b>PPM03</b>	4	3	4	4	4	4	3	4	4	4	38	3.8
<b>PPM04</b>	4	4	5	3	5	4	4	5	4	5	43	4.3
<b>PPM05</b>	3	3	4	3	4	3	3	4	3	4	34	3.4
<b>PPM06</b>	4	5	5	4	5	4	5	5	4	5	46	4.6
<b>PPM07</b>	3	4	4	4	4	3	4	4	4	4	38	3.8
<b>PPM08</b>	5	5	5	5	5	5	5	5	5	5	50	5
<b>PPM09</b>	3	3	4	5	4	3	3	4	5	4	38	3.8
<b>PPM10</b>	3	3	3	3	3	3	3	3	3	3	30	3
<b>Advanced Group Average</b>											39.6	3.96

Table 9. Overall Average Results

Code	Questionnaire Questions										Total
	P1	P2	P3	P4	P5	P6	Q7	Q8	Q9	P10	
<b>PP01</b>	10	2.5	5s	2.5	5	0	7.5	5	10	5	52.5
<b>PP02</b>	10	2.5	7.5	2.5	5	0	7.5	5	7.5	5	52.5
<b>PP03</b>	5	5	7.5	0	5	0	7.5	5	10	2.5	47.5
<b>PP04</b>	7.5	5	7.5	0	7.5	2.5	5	5	10	7.5	57.5
<b>PP05</b>	5	5	7.5	0	7.5	0	7.5	5	10	2.5	50
<b>PP06</b>	10	2.5	5	2.5	5	0	7.5	5	10	5	52.5
<b>PP07</b>	10	2.5	5	2.5	7.5	0	7.5	5	7.5	5	52.5
<b>PP08</b>	5	5	7.5	0	5	0	7.5	5	10	2.5	47.5
<b>PP09</b>	7.5	5	7.5	0	7.5	2.5	5	5	10	7.5	57.5
<b>PP10</b>	5	5	7.5	0	7.5	0	7.5	5	10	2.5	50
<b>PM01</b>	7.5	5	7.5	2.5	5	2.5	5	0	5	5	45
<b>PM02</b>	7.5	5	5	2.5	5	0	7.5	0	5	5	42.5
<b>PM03</b>	10	2.5	7.5	0	7.5	0	7.5	0	7.5	5	47.5
<b>PM04</b>	7.5	5	7.5	5	5	2.5	7.5	0	10	5	55
<b>PM05</b>	10	2.5	7.5	0	7.5	0	7.5	0	7.5	5	47.5
<b>PM06</b>	7.5	5	7.5	2.5	5	2.5	5	0	5	5	45
<b>PM07</b>	7.5	5	5	2.5	5	0	7.5	0	5	5	42.5
<b>PM08</b>	10	2.5	7.5	0	7.5	0	7.5	0	7.5	5	47.5
<b>PM09</b>	10	5	7.5	2.5	5	2.5	7.5	0	7.5	5	55
<b>PM10</b>	10	2.5	7.5	0	7.5	0	7.5	0	7.5	5	47.5
<b>Total Average</b>											49.75

The score obtained for the participant questionnaire was 49.75 which can be seen in Table 9. This means that the score is smaller than the standard SUS score, which is 68. So it can be said that respondents are not satisfied using the e-commerce website page. Furthermore, from the results of the respondent's questionnaire that has been made, it can be concluded that the answers to the repair/guideline design are as follows. This improvement plan is the answer to respondents' complaints on the e-commerce website page.

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## DISCUSSIONS

In e-commerce websites, usability is a necessary condition. If the website fails to clearly explain what the company or organization offers and what users can do on the website, users will leave or decrease according to the problems from the data results of respondents who are concerned about usability, thus requiring recommendations for improvement. Checking whether business decisions are appropriate for their use in the real world, makes it possible to see how successful users are with their tasks, and is useful in getting user reactions and feedback regarding their products.

Based on data in terms of effectiveness using Performance Measurement in Table 4 shows that there are participants who make errors or fail to complete their tasks. The percentage of errors or errors occurred to novice group respondents on tasks 5, 6, and 7, namely 28%, 20%, and 12%. As for errors or errors on advanced group respondents, namely tasks 5, 6, and 7 in the amount of 12%, 12%, and 20%.

Meanwhile, in terms of efficiency, statistically from 10 tasks indicates that there is no significant difference in time between the two groups of respondents and shows that e-commerce website page in terms of use is quite efficient. It can be concluded that the e-commerce website in terms of effectiveness experiences a total number of errors with a total of 6% for beginner group respondents and a total of 4% for advanced group respondents from a total of 10 tasks given to 25 respondents in each group. The following is a description of tasks 5,6,7 that experienced errors in each group of respondents.

## CONCLUSION

Based on the results of research conducted on User Experience Evaluation on Usability Aspects Using the Firstclick Technique, Performance Measurement, Retrospective Think Aloud, and Questionnaires on the E-Commerce Website, it can be concluded as follows. (1) Evaluation on the e-commerce website has resulted in display recommendations to optimize its effectiveness and efficiency. (2) The effectiveness of the website shows that there are participants who make errors or fail to complete assignments. The percentage of errors or errors that occurred in the novice group respondents in tasks 5, 6, and 7 totaled 30%, 20%, and 10%. Meanwhile, the errors or errors that occurred in the advanced group of respondents, namely tasks 5, 6, and 7, amounted to 10%, 10%, and 20%. (3) Statistical efficiency of the website from the 10 tasks given, it can be stated that there is no significant difference between the beginner and advanced groups and shows that the e-commerce website page is quite efficient in terms of usage. (4) Recommendations for improvement in this study are focused on changing the layout of the results of error data on users by simplifying menus and consistency of using terms. (5) The Firstclick technique, Performance Measurement, Retrospective Think Aloud, and Questionnaire on the e-commerce website can be applied well.

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