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Usability evaluation on fish auction information system application using system usability scale

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ABSTRACT

One of the impacts of technological developments in the fisheries sector is the development of the Integrated Fish Auction Information System (FAIS). The Integrated Fish Auction Application supports the process of managing fisheries data at the port. The purpose of this study is to evaluate the results of usability in integrated fish auction applications. The research method begins with determining the object of research, collecting data, and using the System Usability Scale method as a scenario determination, respondent selection, data collection, and calculation. The test value displays 60.08 which has a sufficient usability value, with acceptability marginal, grade scale value D, and adjective rating criteria ok. The System Usability Scale (SUS) results conclude that usability testing of the Integrated Fish Auction Application is still acceptable to auction participants and runs well.

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1. INTRODUCTION

The development of digital information technology has brought changes to the capture fisheries sector. One of the impacts on the capture fisheries sector is the use of applications to support a fast and accurate fish auction process at fishing ports. (Adam et al., 2021). The impact will be experienced by bidders with low education to the highest level of education. In general, bidders usually carry out auction activities manually, so a cultural change is needed to carry out the auction process with the help of information technology.

Effective and optimal implementation of fish auctions is needed to support the sustainable management of capture fisheries in fishing ports. To provide accurate data results of the auction of fish catches, an application or information system for fish auction is made. (Gabels et al., 2016). An application or information system that can provide access for users to enter fishing data such as catch weight, type of catch, and the total amount of revenue from the fish auction process directly, making it easier for policymakers to help oversee the fish auction process (Prasadi & Supriyono, 2019).

Muara Angke fishing port in the DKI Jakarta area is one of the fishing ports in Indonesia that implements the fish auction process and records fishery catches data manually (Dinas Kelautan Pertanian dan Ketahanan Pangan Provinsi DKI Jakarta, 2018). With the help of this integrated fish auction application, it is expected to help manage fish auction data at the port.

An integrated fish auction application has been built by Fathiya (2021) and Yudiarto(2021). The application was built to meet the needs of auction participants to obtain auction data effectively and quickly. To find out how effective the use of this integrated fish auction application also needs to be evaluated. Several studies related to the utilization of technology to assist fish auctions have been conducted. Research by Balqis et al. (2019), Amalia et al. (2020) and Ermatita et al. (2019) conducted research that the auction process can be assisted with the help of information technology. Another study describes the process of developing an Android application for the fish market (Seo & Huh, 2020) (Elbatsh et al., 2020) which is a smartphone application that helps to find out the details of the fish market, conduct electronic fish auctions, and perform all calculations regarding the market (P & P, 2019).

Usability research is often done to gauge the usability of new applications. Usability research is conducted to test mobile applications in a smartphone (Baharuddin et al., 2013) (Ahmad & Hussaini, 2021) (Martiniello et al., 2022). In addition, usability research has been conducted to test website appearance benchmarks and web performance (Rachmi &; Nurwahyuni, 2018) (Setyawan & Atapukan, 2018) (Kurniawan et al., 2022)(Jiwa Permana, 2019) (Sensuse & Prayoga, 2012). Research by Muhamat et al.(2021) has developed and tested applications with modified system usability scales (SUS). Until now, SUS remains a usability test method that has proven valid and appropriate even with a minimal number of respondents (Kurniawan et al., 2022). Research conducted by Prasetyo (2018) usability research on Sistem Informasi Kenelayanan applications, (Permana et al., 2016) (Wiyono et al., 2018) that have been implemented in several ports. The integrated fish auction application is a new application such as research conducted by Luh Putri Ari Wedayanti et al. (2019) and usability tests are needed so that it can be more applied in fishing ports in Indonesia. Based on the previous explanation, the purpose of this study is to evaluate the usability of integrated fish auction applications using the SUS method.

2. RESEARCH METHOD

This research uses a descriptive method, where the research conducted aims to explain one phenomenon with another. Figure 1 shows the stages of research starting with the determination of test scenarios, selection of respondents, test process by respondents, and collection of results. The application to be tested and the type of questionnaire is adjusted to the test scenario. Then proceed with the respondent selection process, namely by determining respondents who will assess the Integrated Fish Auction Application. Furthermore, to provide an assessment of the application, a testing process was carried out by respondents. The last method is to recapitulate the results that have been calculated according to the calculation of SUS(Fatmawati, 2021).

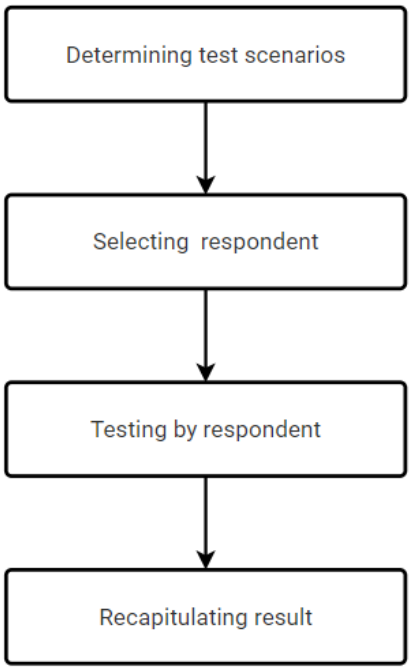

Figure 1. Research stages

This study was carried out at Muara Angke Port with the object of research in the form of an Integrated Fish Auction Application. The app is accessible at http://23.97.52.240:3000/login (Figure 2). This study was conducted in July 2022 and August 2022, using data in the form of usability evaluation data obtained by giving modified SUS questionnaires to members or community groups related to fish auctions.

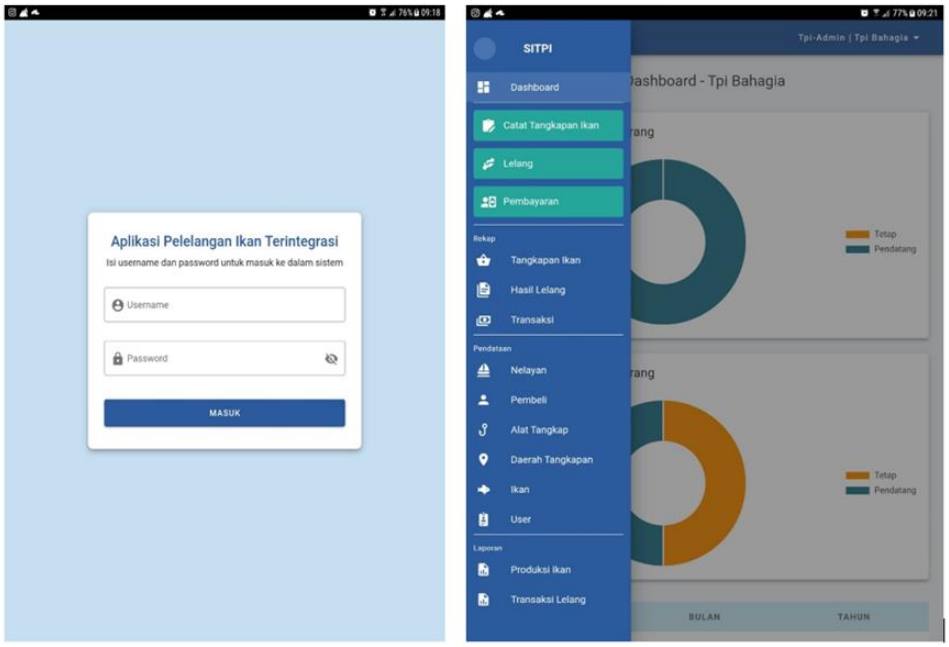

Figure 2. Integrated fish auction application display

Table 1. Modified SUS instruments

Number	Statement	Scale
1	I think I will use this system frequently	1 - 5
2	I find the system too complex (complicated)	1 - 5
3	I think the system is easy to use	1 - 5
4	I feel I need technical assistance to use the system	1 - 5
5	I find the system very impractical.	1 - 5
6	I think auction participants will learn to use the system quickly	1 - 5
7	I find the font size in the app too large	1 - 5
8	I find the size of the buttons in the app too large	1 - 5
9	I am very confident in using this system	1 - 5
10	I think the system is useful for bidders.	1 - 5

Respondents received a Systems Usability Scale (SUS) Questionnaire consisting of ten questions provided (Table 1) as a five-point Likert scale, to assess the technical usability of the application. The answer scale is the numbers 1 to 5. With conditions such as the following table:

Table 2. Questionnaire scale scores

1	2	3	4	5
Strongly Disagree	Disagree	Nervous	Agree	Very Agree

With the provisions of evaluation with SUS, among others:
1) On positive statements, the answer scale is reduced by 1
2) In negative statements, 5 is reduced by the answer scale
3) A value of 4 is the most positive response on a scale of 0 - 4
4) The answer scores are then summed and multiplied by 2.5
5) The average answer score is based on statements.

Figure 3 underlies the final step of usability evaluation with SUS determining the outcome. The three main elements of assessment are acceptability, grade scale, and adjective grade. Acceptance is a criterion used to determine whether a user accepts an application at acceptance levels, including unacceptable, marginal (low and high), and acceptable. Rating scale is a criterion for determining the type of application quality used, the values are A, B, C, D, and E. Although adjective classification is the underlying criterion for whether the application or system is useful or not. Adjective rankings include imagination worst, bad, good, good, wonderful, and best imaginable.

The summary of values in the form of the average cumulative value of the instrument determines the results of the evaluation of the application being piloted. The assessment results are in the form of acceptability, rating scales, and adjective ratings, and are not derived from each assessment device value. The conclusions come from a rating scale based on the average of conditions: $A > 80.3$, $74 < B < 80.3$, $68 < C < 74.3$, $51 < D < 68$, and $F < 51$.

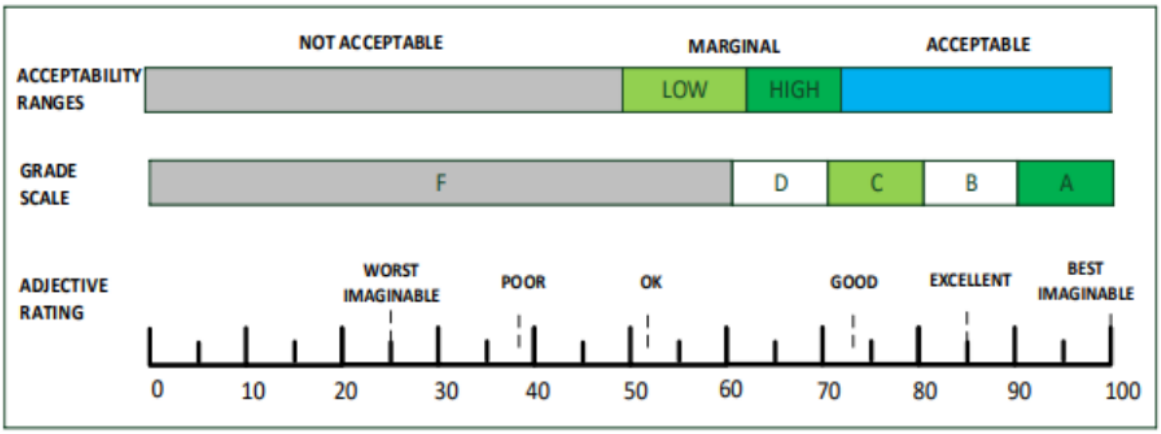

Figure 3. Basic criteria for usability evaluation results with SUS

3. RESULTS AND DISCUSSIONS

3.1 Characteristics of Respondents

The respondents used in this study were bidders at TPI Muara Angke. Respondents consisted of 27 men (90%) and 3 women (10%), with the highest age ranging from 41-50 years (36.7%). Only one respondent completed post-graduate education, while the others completed upper secondary/high school education (66.7%) and tertiary/undergraduate education (30%). The monthly household income for most respondents (50%) is Rp 5,000,000.00 and above. Respondents are aware of fish auction applications 43.3% while 56.7% are not aware of fish auction applications. Of all the respondents tested the majority (100.0%) used a smartphone app. Table 3 shows the sociodemographic characteristics of the examiners in this study.

Table 3. Sociodemographic characteristics of respondents (n=30)

Variable		Frequency	Percentage
Sex			
	Men	27	90
	Women	3	10
Age			
	<20 years	0	0
	21-30 years	4	13.3
	31-40 years	9	30
	41-50 years	11	36.7
	>50 years	6	20
Education			
	No school	0	0
	Primary school	0	0
	Junior high school	0	0
	High school	20	66.7
	Bachelor	9	30
	Graduate	1	3.3
Job			
	TPI Manager	14	46.7
	Fisheries Service	16	53.3
Salary			
	< 1 million	0	0
	1-2 million	0	0
	2-3 million	0	0
	3-4 million	3	10

	4-5 million	12	40
	> 5 million	15	50
Know the fish auction application.	Know	13	43.3
	Do not know	17	56.7

3.2 The Usability Value of Each Statement

The scale of answers given by respondents related to usability evaluation with SUS in Integrated Fish Auction Applications as in Table 4. Furthermore, Table 5 shows the results of the analysis calculation using SUS.

Table 4. Recap of answer from respondent

Number	Answer Scale of Respondent					Number of Respondent
	1	2	3	4	5	
1st Pronouncement	0	1	6	18	5	30
2nd Pronouncement	6	6	9	9	0	30
3rd Pronouncement	0	3	4	16	7	30
4th Pronouncement	0	0	5	20	5	30
5th Pronouncement	3	11	12	2	2	30
6th Pronouncement	1	0	7	18	4	30
7th Pronouncement	2	10	9	8	1	30
8th Pronouncement	1	8	13	6	2	30
9th Pronouncement	1	2	8	17	2	30
10th Pronouncement	0	0	5	18	7	30

Table 5. Average value recapitulation

Number	Answer Scale of SUS Respondent					Sum	Number of Respondent	Average of grades
	1	2	3	4	5			
1st Pronouncement	0	1	12	54	20	87	30	2.90
2nd Pronouncement	24	18	18	9	0	69	30	2.30
3rd Pronouncement	0	3	8	48	28	87	30	2.90
4th Pronouncement	0	0	10	20	0	30	30	1.00
5th Pronouncement	12	33	24	2	0	71	30	2.37
6th Pronouncement	0	0	14	54	16	84	30	2.80
7th Pronouncement	8	30	18	8	0	64	30	2.13
8th Pronouncement	4	24	26	6	0	60	30	2.00
9th Pronouncement	0	2	16	51	8	77	30	2.57
10th Pronouncement	0	0	10	54	28	92	30	3.07

Based on the two tables above, it can be explained how respondents think about the Integrated Fish Auction Application as follows:

1. 1st Statement

This statement is to determine the extent to which respondents use the application regularly. No one was chosen for 1, as many as 1 person, or 3% of respondents gave a value of 2, then 6 people or 20% gave a value of 3, then 18 people, or 60% gave a value of 4, and as many as 5 people or 17%. The description of data filling by respondents is shown in Figure 4. Based on the calculation of the SUS method, an average score of 2.90 from 30 respondents was generated.

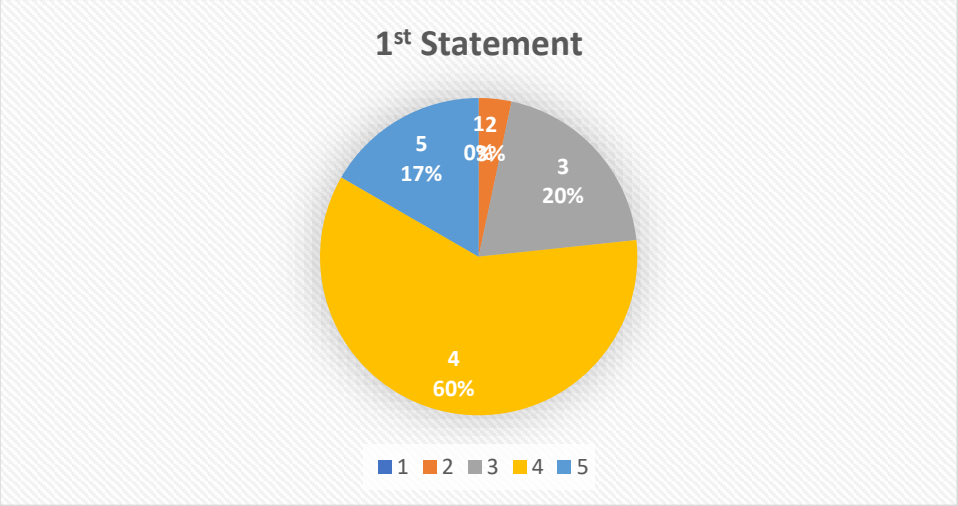

Figure 4. 1st Statement of the SUS variable

2. 2nd Statement

At number 2, small values have a better influence. According to Figure 5, there were 6 people or 20% of respondents gave a value of 1, then 6 people or 20% gave a value of 2, then 9 people, or 30% gave a value of 3, then 9 people or 30% gave a value of 4 and the value 5 was not selected. The description of data filling by respondents is shown in Figure 5. In the calculation of the SUS method, an average score of 2.30 from 30 respondents was generated.

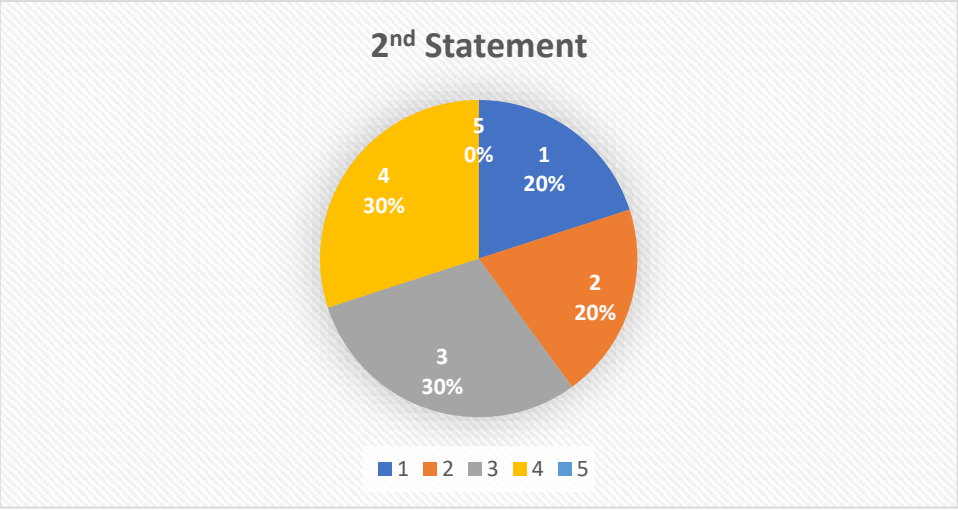

Figure 5. 2nd Statement of the SUS variable

3. 3rd Statement

In number 3, it shows the influence of respondents' values the greater it gets better results. According to Figure 6, no one gave a value of 1, as many as 3 people, or 10% of respondents gave a score of 2, then 4 people, or 13% gave a value of 3, then 16 people, or 54% gave a value of 4 and there were 7 people or 23% gave a value of 5. Figure 6 shows a description of data filling by respondents. The results of the calculation of the SUS method in statement 3 obtained an average score of 2.90 from 30 respondents.

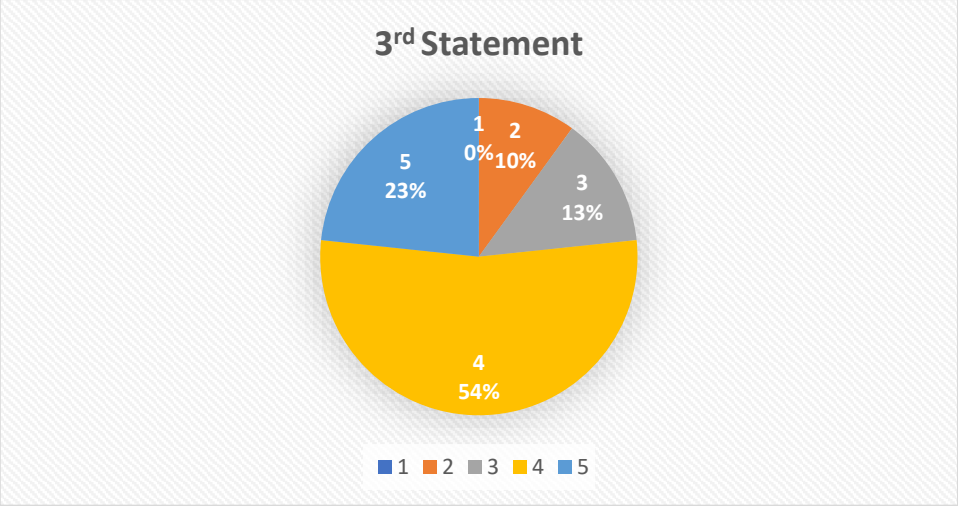

Figure 6. 3rd Statement of the SUS variable

4. 4th Statement

For number 4 applies a small value so it has a good effect. According to Figure 7, no one gave a value of 1 and 2, as many as 5 people, or 16.67% of respondents gave a value of 3, then 20 people, or 66.67% gave a value of 4, and 5 people, or 16.67% gave a value of 5. The distribution of data filling by respondents is shown in Figure 7. The results of the calculation of the SUS method of this statement resulted in an average score of 1 in 30 respondents.

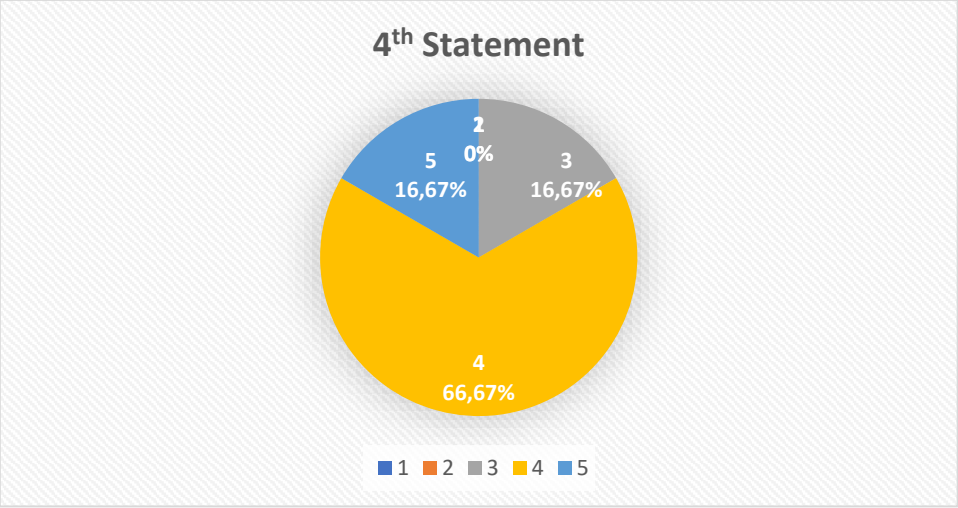

Figure 7. 4th Statement of the SUS variable

5. 5th Statement

In the 5th statement, the smaller the assessment, the better it produces. According to Figure 8, as many as 3 people, or 10% of respondents gave a value of 1, as many as 11 people, or 36% of respondents gave a value of 2, then 12 people, or 40% gave a value of 3, then 2 people or 7% gave a value of 4, and 2 people or 7% gave a value of 5. Figure 8 shows the distribution of data filling by respondents. In the calculation of the SUS method, it resulted in an average score of 2.37 from 30 respondents.

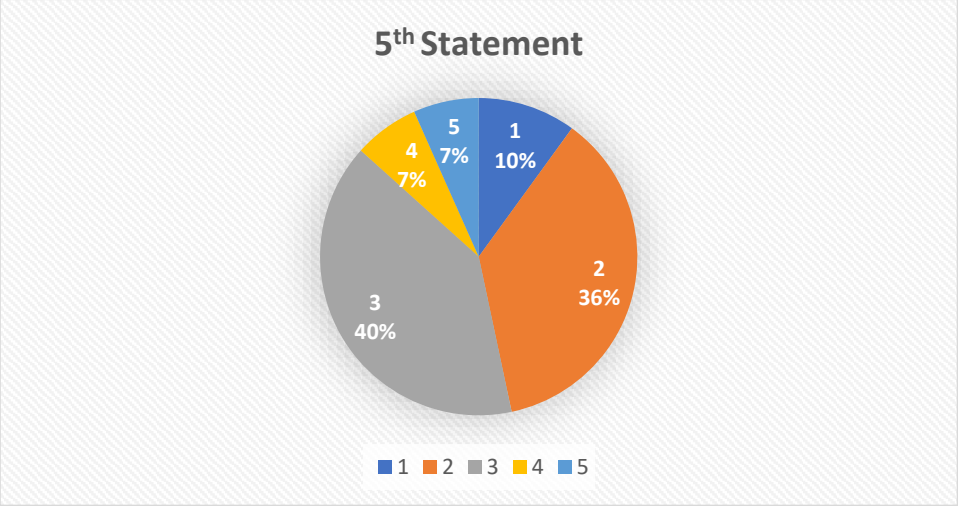

Figure 8. 5th Statement of the SUS variable

6. 6th Statement

In number 6, if the greater the value given by respondents, it will get good results as well. According to Figure 9, as many as 1 people, or 3% of respondents gave a value of 1, no one gave a value of 2, then 7 people, or 23% gave a value of 3, then 18 people, or 60% gave a value of 4 and as many as 4 people or 14% gave a value of 5. The distribution of data filling by respondents is shown in Figure 9. In the calculation of the SUS method, it resulted in an average score of 2.80 from 30 respondents.

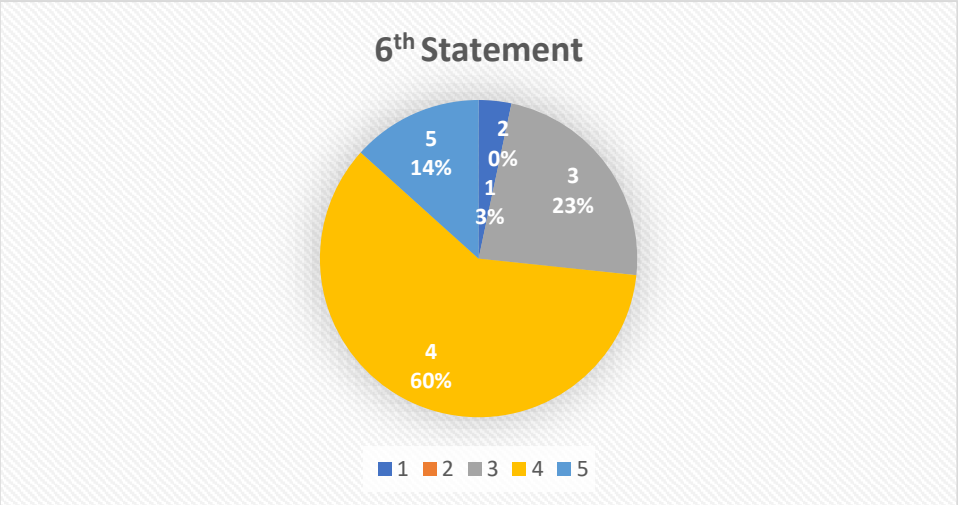

Figure 9. 6th Statement of the SUS variable

7. 7th Statement

This statement applies if the smaller value given by respondents, the better results will be obtained. According to Figure 10, there are 2 people or 7% of respondents give a value of 1, as many as 10 people or 33% of respondents give a value of 2, then 9 people, or 30% give a value of 3, then 8 people or 27% give a value of 4, and 1 person or 3% give a value of 5. The distribution of data filling by respondents is shown in Figure 10. In the

calculation of the SUS method, an average score of 2.13 from 30 respondents was generated.

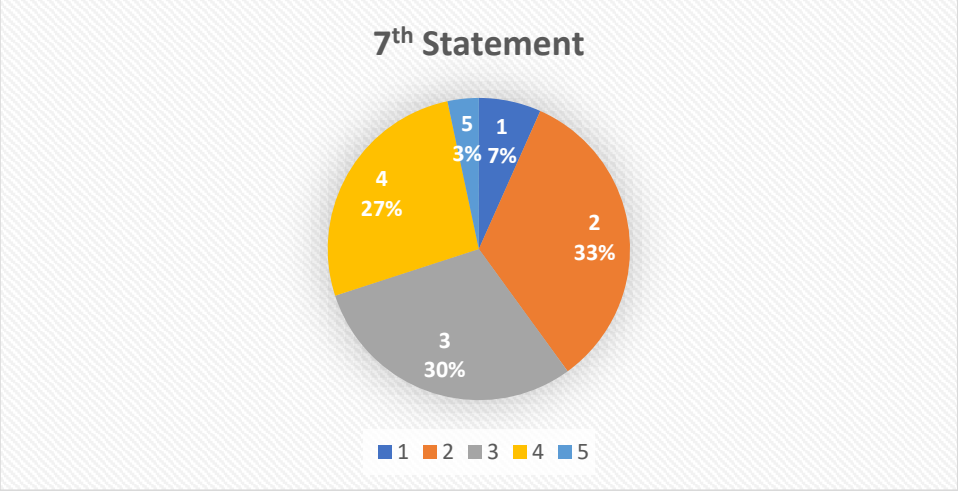

Figure 10. 7th Statement of the SUS variable

8. 8th Statement

In this statement, if respondents choose a smaller value, they get better results. According to Figure 11, there was 1 person or 3% of respondents gave a value of 1, as many as 8 people, or 27% of respondents gave a value of 2, then 13 people, or 43% gave a value of 3, then 6 people or 20% gave a value of 4, and 2 people or 7% gave a value of 5. The distribution of data filling by respondents is shown in Figure 11. In the calculation of the SUS method, this statement produced an average score of 2.00 from 30 respondents.

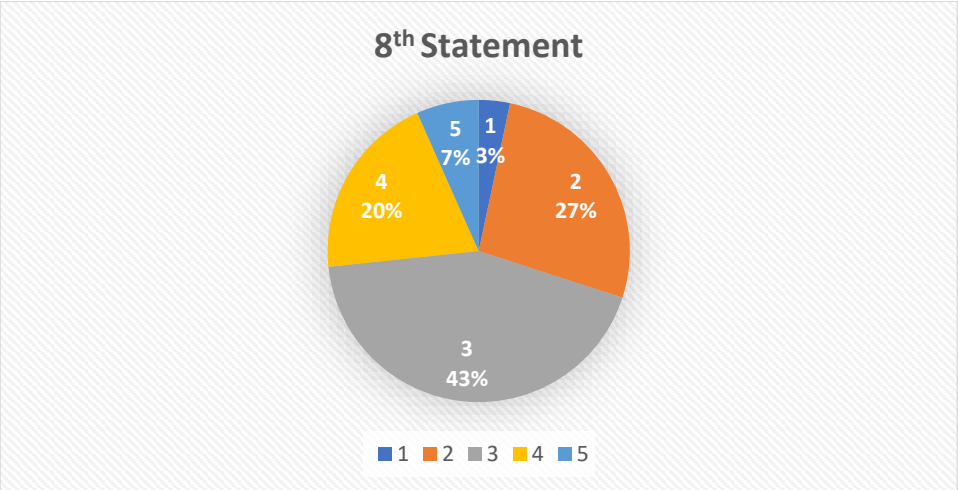

Figure 11. 8th Statement of the SUS variable

9. 9th Statement

In this statement, the influence of respondents choosing the greater the value, the better the results. According to Figure 12, as many as 1 people, or 3% of respondents gave a value of 1, as many as 2 people, or 7% gave a value of 2, then 8 people, or 27% gave a value of 3, then 17 people or 56% gave a value of 4 and as many as 2 people or 7% gave a

value of 5. The distribution of data filling by respondents is shown in Figure 12. In the calculation of the SUS method, an average score of 2.57 from 30 respondents was produced.

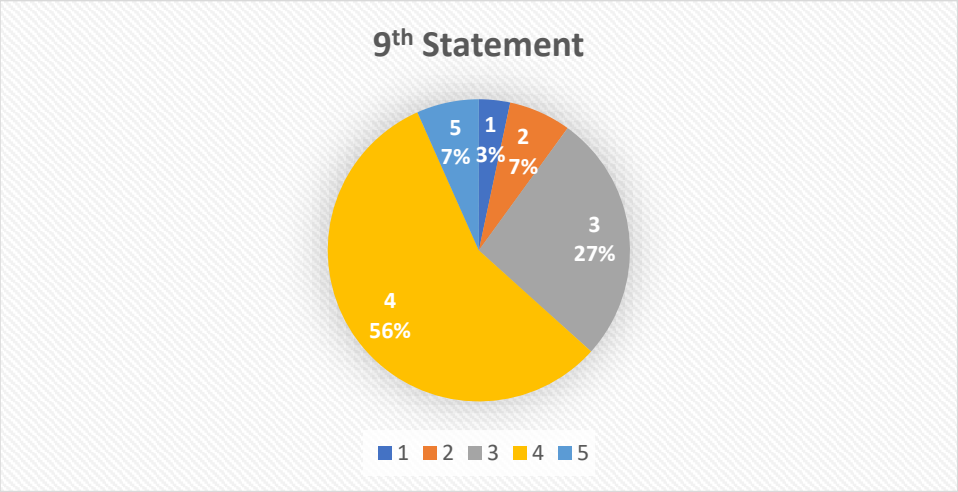

Figure 12. 9th Statement of the SUS variable

10. 10th Statement

In this statement, if the respondent's influence on choosing a value is greater, it gets better results. According to Figure 13, no one gave a score of 1 or 2, as many as 5 people, or 17% of respondents gave a value of 3, as many as 18 people, or 60% gave a value of 4, and as many as 7 people or 23% gave a value of 5. The distribution of data filling by respondents is shown in Figure 13. In the calculation of the SUS method, an average score of 3.07 from 30 respondents was generated.

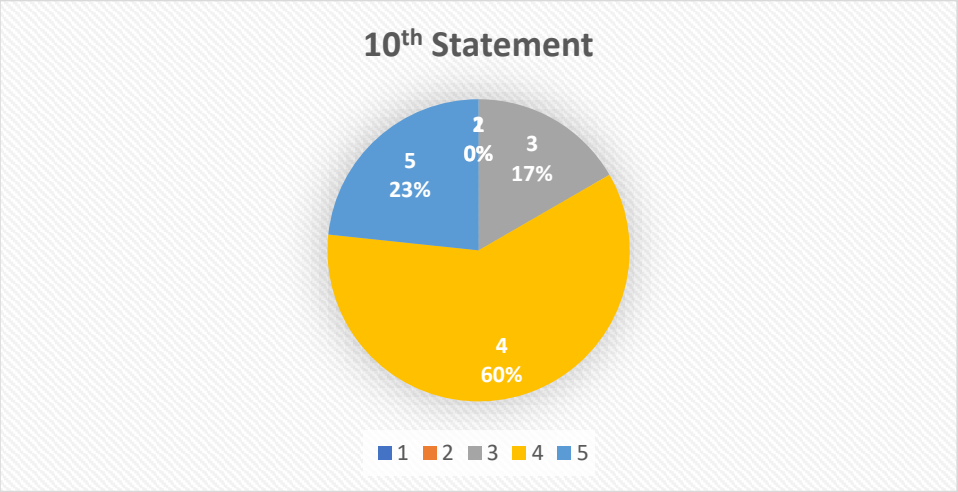

Figure 13. 10th Statement of the SUS variable

According to the average results of statements 1 to 10, there is 1 statement with the lowest average value, namely the 4th statement (technical assistance using the application), and 1 statement with the highest average value, namely in the 10th statement (utilization of auction participants).

3.3 Usability Rate of Integrated Fish Auction Application

Based on the results of the recapitulation above, the usability value of the integrated fish auction application can be calculated at 60.08 (Table 6). The average usability value of the Integrated Fish Auction application is the total sum of the average usability value of each statement multiplied by the value of 2.5. These scores can be described according to the SUS criteria. Application usability has a meaning based on three levels of Acceptability, Grade scale, and Adjective rating. Based on Acceptability, aspects accepted by users of the integrated fish auction application are included in the marginal category. Then the Grade scale aspect assesses from the aspect of the level of application quality. The Integrated Fish Auction Application based on the evaluation is shown to be on the Grade scale D. While the Adjective rating aspect is an aspect that determines the usability rating (usefulness), the Integrated Fish Auction Application is shown by the evaluation results to be included in the ok category.

Table 6. Rekapitulation of the SUS statement

Number	The average value of statements	Sum (Average * 2.5)
1st Pronouncement	2.90	7.25
2nd Pronouncement	2.30	5.75
3rd Pronouncement	2.90	7.25
4th Pronouncement	1.00	2.50
5th Pronouncement	2.37	5.92
6th Pronouncement	2.80	7.00
7th Pronouncement	2.13	5.33
8th Pronouncement	2.00	5.00
9th Pronouncement	2.57	6.42
10th Pronouncement	3.07	7.67
	Total Value	60.08

4. CONCLUSION

The usability testing of integrated fish auction applications has been successful in meeting the usability requirements of an application. Respondents feel that an integrated fish auction application is beneficial for fish auctions. Through this test, a usability value of 60.08 was obtained to obtain the marginal acceptability category, grade scale D, and adjective rating ok. There is a need for further development on both the application side and other tests accompanied by trials in other regions with a larger number of respondents to obtain a better usability value.

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