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Analyzing of System Usability Scale in User Experience Evaluation of Dana Applications

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ABSTRACT

Objective: *The rapid development of financial technology (FinTech) has transformed how individuals conduct financial transactions, particularly through e-wallets. Dana, one of the leading e-wallet applications in Indonesia, has garnered significant attention due to its widespread usage and user feedback.* ***Method:*** *This study evaluates the user experience (UX) of the Dana application using the System Usability Scale (SUS) that provides a quick and quantitative measure of usability, Data were collected from 153 respondents through a questionnaire.* ***Results:*** *The SUS analysis yielded an average score of 65. According to SUS interpretation scales, this score categorizes Dana as "Marginal" in Acceptability Ranges, "C" on Grade Scale, and "OK" on Adjective Rating, with users classified as "Passive" based on Net Promoter Score (NPS).* ***Novelty:*** *This study emphasizes the importance of systematic UX evaluation in identifying user needs and evaluation for the app, providing actionable recommendations to improve the Dana application. These recommendations aim to enhance usability, user satisfaction, and competitiveness in the FinTech sector.*

INTRODUCTION

The industrial era 4.0 in Indonesia has brought many changes, one of which is in the Fintech industry which shows a change in people's behavior regarding finance which is currently interrelated with technology, people now tend to choose digital-based buying and selling transactions which are considered more effective and efficient.[1]. With the presence of electronic money in the form of cards or stored on servers, it has become a common thing to use to carry out transactions in online and offline stores by the public. [2].

With the presence of electronic money in the form of cards or stored on servers, it has become a common thing to use to carry out transactions in online and offline stores by the public[3]. Many choices of e-wallets are available in Indonesia, one of which is the Dana application. Based on a survey conducted in 2022 by Populix regarding e-wallets, it states that the Dana application is in second place after the Gopay application. With so many users in Indonesia, the Dana application has received many reviews on the App store, both good and bad. Bad reviews tend to discuss complaints about problems faced by users such as problems when making transaction processes, and poor appearance. This review may indicate that other e-wallet applications can rival the Dana Application[4]. With so many choices making competition increase, one of the factors that make users interested in using E-wallet is the service features offered by the application so that it can be considered by customers[5].

The level of customer satisfaction is influenced by the user experience when using the application. In this era, user experience while using the application is one of the things

that need to be considered to achieve the success of an in-app service. By developing a system that can meet the needs, expectations and comfort of users. good user experience not only increases user satisfaction and loyalty, but also has a direct impact on operational efficiency and competitive advantage in the market. Therefore, systematic and accurate measurement of user experience is an important step in technology development.

User experience evaluation plays a strategic role to understand how users interact with applications and identify weaknesses or areas that require improvement. System usability scale is a common method to be used as a medium for identifying the user experience evaluation of an application, with questionnaire-based to quantitatively measure user comfort, ease of use, and satisfaction. The purpose of SUS analysis is to provide a descriptive overview of the overall score.

A frequently used approach in evaluating user experience is the System Usability Scale (SUS) method. SUS has become a popular method due to its simplicity, flexibility, and ability to provide a clear quantitative picture of the usability of a system. With the end result being a score in the range of 0 to 100, SUS is able to provide an easy-to-understand view to evaluate whether an application has met the usability standards expected by users.

The study aims to analyze what is related to the evaluation of the user experience of the Dana application using the System Usability Scale (SUS) method. The study results show that SUS provides efficient and fast usability evaluation results. This study aims to analyze the effectiveness of the user experience evaluation method, namely SUS, to provide strategic recommendations for the development of the Dana application. This approach is important to ensure that the Dana application not only meets the needs of current users but also remains competitive in the future.

RESEARCH METHOD

Instrument Testing

The validity test is used to test an instrument regarding its accuracy or accuracy. Validity instrument testing is divided into two types, namely factor validity testing and item validity testing. The factor validity test is carried out if the instrument is arranged using more than one factor that has something in common. Factor validity is assessed by correlating the factor score, which is the number of items in one factor, with the total score of all factors. Meanwhile, item validity is measured by correlating the score of each item with the total score of the entire factor. Item validity shows the relationship between item scores and total scores.

If the instrument has more than one factor, the item validity test is carried out in two steps: first, correlating the item score with the factor score, then correlating the item score with the total factor score, which is the sum of several factors. The results of this correlation will produce a correlation coefficient which is used to assess the level of validity of an item and determine whether the item is suitable for use. Items are considered valid if they have a significant correlation to the total score. This validity test

is usually carried out using SPSS software with techniques such as Pearson's Bivariate correlation (Pearson's Product Moment) and Corrected Item-Total Correlation.[6]

The reliability test is used to assess whether a study has a reliable measurement instrument. A test is said to be reliable if it consistently gives the same results when applied to the same group, even though it is carried out at different times or occasions. The concept of reliability can be classified into 2 contexts, the concept of reliability in the context of measuring instruments is closely related to measurement error. Errors in measurement can reflect the extent to which the results of a measurement can change or be inconsistent when the measurement is repeated on the same group of subjects. Meanwhile, the concept of reliability classified in the context of measurement results is more related to research sampling errors that describe the inconsistency of measurement results when carried out to groups that are not the same [7]. There are various methods that can be used to test reliability, including the retest method, Flanagan formula, Cronbach's Alpha, Kuder-Richardson (KR)-20 formula, KR-21, and Hoyt's Anova method. In this study, the method used was Cronbach's Alpha.

The reliability test using the Reliability Coefficient (Cronbach's Alpha) is carried out to assess data consistency. The basis for decision making is as follows:

a) If the Alpha value > r table, the data is considered consistent.
b) If the Alpha value < r table, the data is considered inconsistent.

Based on the results of the reliability test, the decision states that all questionnaires have sufficient consistency and reliability.

SUS Testing

The first step that needs to be done in this research is to establish a testing instrument using a System Usability Scale (SUS) based questionnaire. The next stage involves selecting respondents, where the number and characteristics of respondents are important factors to determine the validity of the data to be obtained. After the data is collected, the next step is to calculate the results based on the test method used.

System Usability Scale (SUS) is a method designed to test the usability of computer systems by focusing on the user experience. SUS provides a simple and fast method to measure the level of usability. This method utilizes a questionnaire consisting of 10 questions with an answer scale of 1-5, which ranges from strongly disagree to strongly agree. The SUS method was first developed by John Brooke in 1986 and is used to assess various products and services, such as hardware, mobile applications, software, and other applications. SUS uses 10 questions that have been set as default. The maximum score that can be achieved with this method is 100. Here is a list of questions that are commonly used in the System Usability Scale method:

Table 1. Question list [8].

No	Question
1.	I think I will use this system again
2.	I find the system complicated to use.
3.	I find the system easy to use.

4.	I need help from other people or technicians in using this system.
5.	I feel that the features of this system work properly.
6.	I feel there are many inconsistencies in the system.
7.	I feel others will understand how to use the system quickly.
8.	I feel the system is confusing.
9.	I feel there are no obstacles in using this system.
10.	I need to familiarize myself before using this system.

To interpret SUS scores, there are five approaches that can be used, namely: based on the NPS scale, Acceptable, adjective, grade, and SUS score. Further explanation of this interpretation can be seen through the interpretation scale displayed in Figure 1 below.

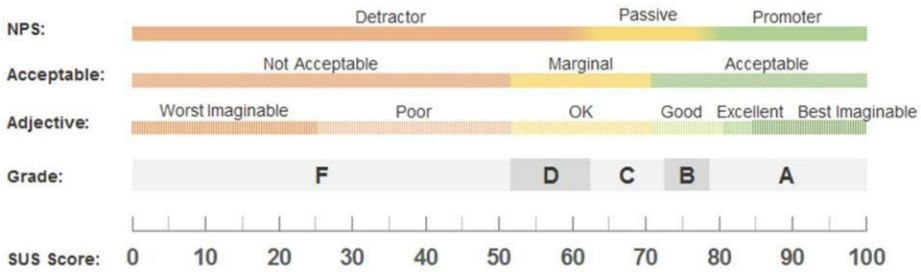

Figure 1. SUS score interpretation scale [9].

The following is an explanation of the SUS score interpretation scale:

1. NPS (Net Promoter Score)

NPS (Net Promoter Score) measures the extent to which users are likely to recommend the product under test. The scale is divided into three categories: detractor, passive, and promoter.

a) Detractors: Users who fall into this category are less likely to recommend the product and even leave negative reviews to others.
b) If classified as passive, users will neither recommend nor leave negative reviews.
c) If classified as promoters, users will recommend the product to others.

2. Acceptable

The acceptable score indicates the extent to which the product is accepted by users.

3. Adjective

The adjective score describes the user's perception of product quality, ranging from worst imaginable, poor, ok, good, excellent, to best imaginable.

4. Grade

The grade score represents the value of the product in letter form, from F to A.

At this stage, data was collected through a questionnaire created using Google Forms. The data collected included:

a) Respondent information, such as name, and age.
b) Information on whether the respondent owns the app.
c) The respondent's opinion regarding the importance of the application.

d) Respondents' answers to questions in the SUS method on a scale of 1-5.

Each statement in this method has a contribution score between 0 and 4. For statements with odd numbers (1, 3, 5, 7, 9), the score is calculated by subtracting 1 from the given score. Meanwhile, for statements with even numbers (2, 4, 6, 8, 10), the score is calculated by subtracting 5 from the given score. Later the accumulated contribution score will be multiplied by 2.5 to obtain the total final result of the usability system. The final score of the SUS method has a range between 0-100. The following illustrates the calculation formula to get the SUS score:[10]

$SUS\ Score = (S_1 - 5) + (5 - S_2)(S_3 - 5) + (5 - S_4) + (S_5 - 5) + (5 - S_6) + (S_7 - 5) + (5 - S_8) + (S_9 - 5) + (5 - S_{10})$ * 2.5.

RESULTS AND DISCUSSION

Research overview

This research takes a population with the criteria of Dana application users and is 17 years old and above. Data was collected by questionnaire via Google form, the questionnaire data resulted in 153 users who became research respondents.

Data processing

1. Validity test

To test the validity or richness of a questionnaire, it is necessary to test its validity. A questionnaire or an instrument will be considered valid if it contains both questions and statements that are able to express what the questionnaire wants to measure / analyze. The following are the results of the validity test in the SPSS application which was carried out using Pearson correlation with a significance level of 5%.

2. Reliability Test

The reliability test aims to measure the extent of the consistency of the measuring instrument. In this study, the reliability test was carried out using the Cronbach's Alpha method. The questionnaire is considered reliable if the Cronbach's Alpha value is more than 0.7. Based on the test results, the Cronbach's Alpha value for the 10 questionnaire items is 0.717, which indicates that the questionnaire is reliable.

The following are the reliability coefficient categories according to Guilford (1956):

1. 0.80 < r11 ≤ 1.00: very high reliability
2. 0.60 < r11 ≤ 0.80: high reliability
3. 0.40 < r11 ≤ 0.60: medium reliability
4. 0.20 < r11 ≤ 0.40: low reliability
5. 0.00< r11 ≤ 0.20: very low reliability

Table 2. Validity test results.

Item	R count	r Table (n-2)	Status
Q1	0,580	0,1577	VALID
Q2	0,461	0,1577	VALID
Q3	0,511	0,1577	VALID
Q4	0,556	0,1577	VALID

Q5	0,515	0,1577	VALID
Q6	0,503	0,1577	VALID
Q7	0,517	0,1577	VALID
Q8	0,507	0,1577	VALID
Q9	0,542	0,1577	VALID
Q10	0,616	0,1577	VALID
Item	R count	r Table (n-2)	Status

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Correlations

		Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	TOTAL
Q01	Pearson Correlation	1	.074	.323**	.191*	.326**	.123	.186*	.161*	.359**	.223**	.580**
	Sig. (2-tailed)		.362	.000	.018	.000	.129	.021	.046	.000	.006	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q02	Pearson Correlation	.074	1	-.062	.413**	.142	.339**	.110	.434**	.018	.226**	.461**
	Sig. (2-tailed)	.362		.446	.000	.080	.000	.177	.000	.830	.005	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q03	Pearson Correlation	.323**	-.062	1	-.037	.408**	.023	.445**	-.082	.355**	.167*	.511**
	Sig. (2-tailed)	.000	.446		.650	.000	.774	.000	.314	.000	.039	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q04	Pearson Correlation	.191*	.413**	-.037	1	.047	.425**	.094	.574**	.062	.346**	.556**
	Sig. (2-tailed)	.018	.000	.650		.562	.000	.248	.000	.448	.000	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q05	Pearson Correlation	.326**	.142	.408**	.047	1	-.106	.408**	-.096	.426**	.119	.515**
	Sig. (2-tailed)	.000	.080	.000	.562		.193	.000	.236	.000	.144	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q06	Pearson Correlation	.123	.339**	.023	.425**	-.106	1	-.054	.523**	.036	.470**	.503**
	Sig. (2-tailed)	.129	.000	.774	.000	.193		.505	.000	.662	.000	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q07	Pearson Correlation	.186*	.110	.445**	.094	.408**	-.054	1	-.069	.355**	.191*	.517**
	Sig. (2-tailed)	.021	.177	.000	.248	.000	.505		.397	.000	.018	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q08	Pearson Correlation	.161*	.434**	-.082	.574**	-.096	.523**	-.069	1	-.007	.432**	.507**
	Sig. (2-tailed)	.046	.000	.314	.000	.236	.000	.397		.932	.000	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q09	Pearson Correlation	.359**	.018	.355**	.062	.426**	.036	.355**	-.007	1	.106	.542**
	Sig. (2-tailed)	.000	.830	.000	.448	.000	.662	.000	.932		.193	.000
	N	153	153	153	153	153	153	153	153	153	153	153
Q10	Pearson Correlation	.223**	.226**	.167*	.346**	.119	.470**	.191*	.432**	.106	1	.616**
	Sig. (2-tailed)	.006	.005	.039	.000	.144	.000	.018	.000	.193		.000
	N	153	153	153	153	153	153	153	153	153	153	153
TOTAL	Pearson Correlation	.580**	.461**	.511**	.556**	.515**	.503**	.517**	.507**	.542**	.616**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	153	153	153	153	153	153	153	153	153	153	153

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 2. SPSS validity test.

Case Processing Summary

		N	%
Cases	Valid	153	100.0
	Excluded[a]	0	.0
	Total	153	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.717	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q01	25.2222	31.279	.419	.687
Q02	26.5556	34.262	.327	.703
Q03	24.7712	32.362	.336	.702
Q04	26.5882	32.494	.417	.689
Q05	24.9935	32.928	.364	.697
Q06	25.9216	32.994	.347	.700
Q07	25.0196	32.611	.357	.698
Q08	26.4444	33.183	.361	.697
Q09	25.2876	31.680	.366	.697
Q10	25.8431	30.844	.467	.679

Figure 3. SPSS reliability test.

Table 3. Questionnaire Reliability Test Results.

Reliability Coefficient	Interpretation
0,717	High Reliability

Table 4. sus method calculation result.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	TOTAL	Total x 2.5
1	4	3	4	4	3	3	3	4	4	1	33	82.5
2	3	3	4	4	3	3	3	3	3	3	32	80
3	4	4	4	4	4	3	4	4	4	3	38	95
4	4	4	4	4	4	4	0	4	4	4	36	90
5	4	3	4	3	4	3	4	3	4	3	35	87.5
6	2	3	3	3	3	3	3	3	3	2	28	70
7	3	3	3	2	3	3	3	3	3	2	28	70
8	3	4	4	2	3	3	3	4	3	1	30	75
9	3	3	3	4	3	2	3	4	3	2	30	75
10	1	3	3	2	3	3	3	3	2	4	27	67.5
...	...	...	...	...	...	...	...	...	...	...	...	...
153	0	3	4	4	1	4	3	4	4	4	31	77.5
						AVERAGE						65.1471

1. System Usability Scale Test

The final results of the System Usability Scale (SUS) calculation from 153 respondents resulted in a total score of 65. Based on Figure 1 which shows the SUS score interpretation scale guidelines, the average results will be correlated with the SUS scale to determine the level of user satisfaction in using the Dana application.

The score of 65 is interpreted based on 4 versions of the assessment as follows:

- Based on NPS, a score of 65 is classified as passive, users will not recommend or give negative reviews.
- Based on acceptability ranges, a score of 74 is included in the marginal category.
- Based on adjective rating, a score of 65 is in the Ok category.
- Based on the grade scale, a score of 65 falls into the C category.

Evaluation

Based on the distribution of the questionnaire, the data generated an overall average value of 2.8 or disagree but towards neutral with the answers per statement given the most values of 2 and 3. To improve the user experience in the Dana application, the following are some evaluations and input recommendations for the Dana application:

1) App Speed and Efficiency

The speed and efficiency of the Dana application is one of the main factors affecting user experience [11], especially in digital transactions that require a quick and accurate response. Based on the evaluation results, some users report slowness in the transaction process and page loading times, which can lead to dissatisfaction.

a) System Optimization

To address this, system optimization needs to be done by increasing server capacity to handle spikes in user traffic and speed up application response time.

b) Navigation Simplification

In addition, navigation simplification is an important step by designing a more intuitive layout and reducing unnecessary steps in the transaction process, such as additional forms or repeated confirmations [12].

c) Enhanced Security Features

In terms of security, enhanced authentication features are also recommended, such as the implementation of two-factor authentication (2FA) and immediate notifications for each transaction, which will increase user confidence in the app [13]. By integrating system optimization, simple navigation, and reliable security features, Dana apps can improve speed, efficiency, and overall user satisfaction.

2) Consistency of Design and Functionality

Consistency of design and functionality is an important aspect of creating a pleasant and efficient user experience in Dana applications [14]. Based on the evaluation, there is a lack of uniformity in design elements such as layout, icons, and colors, which can confuse users and reduce trust in the application. In addition, some features were reported to not run consistently, hindering the smooth transaction process.

a) Improve System Consistency

To improve system consistency, developers need to implement uniform design standards by using a design system that includes visual guidelines, layouts, and functional elements. This will ensure that all parts of the application have a harmonized appearance and way of working.

b) Interface Optimization

Interface optimization is also required by simplifying the design to be more intuitive and easily understood by different types of users {15}, including new users. For example, icons and buttons should be clearly designed according to their functions, and important information should be organized hierarchically for easy access.

By improving system consistency and optimizing the interface, Dana applications can provide a more unified and convenient experience, thereby increasing user satisfaction and loyalty.

CONCLUSION

Fundamental Finding : Based on the results of research and analysis using the System Usability Scale (SUS) on the Dana application, involving 153 respondents, a usability score of 65 was obtained. From the respondents' assessment of even questions (P2, P4, P6, P8, P10), the average score given is 2.24, which indicates "Disagree." This indicates that the majority of respondents agree that the Dana application is quite easy to use and has been well designed and prepared. In the Acceptability Ranges level category, the Dana application is included in the Marginal category. Based on the Grade Scale, this application gets a rating of C. In the Adjective Rating, the application falls into the OK category, and based on the Net Promoter Score (NPS) category, the SUS score of 65 falls into the Passive class. **Implication** : Thus, it can be concluded that the Dana application is quite effective, efficient, and provides adequate satisfaction to users, due to the convenience offered in supporting transactional activities. **Limitation** : The usability score of 65, placement in the Marginal category, Grade C rating, and Passive class on NPS indicate that the Dana application still has room for improvement in overall usability and user experience. **Future Research** : With the evaluation and recommendations, it is hoped that the Dana application developer can improve the system that better adapts to user needs.

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