

Evaluation Using Black Box Testing and System Usability Scale in the Kidung Sekar Madya Application

Gede Surya Mahendra ^{1)*}, I Kadek Andy Asmarajaya²⁾

¹⁾ Universitas Pendidikan Ganesha, Singaraja, Indonesia, ²⁾ Universitas Hindu Indonesia, Denpasar, Indonesia

¹⁾gmahendra@undiksha.ac.id, ²⁾andyasmarajaya@unhi.ac.id

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Abstract: Hearing about Bali is always synonymous with tourism, beautiful natural tourism potential, unique culture and friendly people and culture. The practice of Hindu religious ceremonies cannot be separated from elements of art and culture. The existence of Kidung Dharma Gita as Balinese culture among the younger generation has begun to fade. The implementation of the Yadnya ceremony in Bali, this song is sung by many parents and it is rare for young people to sing this kidung voluntarily. The purpose of this research is to carry out conservation for the sake of preserving the Kidung Dharma Gita culture, so it is necessary to digitize Balinese culture, especially in the Dharma Gita Sekar Madya song. One of the solutions offered is the creation of an Android-based application for Kidung Dharma Gita Sekar Madya. In the evaluation process using Black Box Testing and System Usability Scale (SUS). Black Box Testing tests the entire page display with 16 test cases that produce good and appropriate results for each test. SUS involved 58 respondents with 10 question instruments. The test results obtained a value of 75,560 in Raw SUS Scores, that can be stated that this application has a passive value in NPS, acceptable value in acceptability, good value in adjective, and reach grade B. It can be seen that this application is good and has uses in cultural preservation applications.

Keywords: Application, Black Box Testing, Evaluation, Kidung Sekar Madya, SUS

INTRODUCTION

Hindu religious ceremonies are closely related elements of art and culture that can almost never be separated. The conditions of implementation and the form of rituals often contain elements of beauty, either directly or indirectly. Most of the beauty is created in the form of symbols, visuals or oral art. A special feature of the implementation of religious ceremonies in Bali apart from the sound of mantras and bells as the main elements, is the sound of gamelan and the chanting of the Dharma Gita (Darmawan, 2020). Kidung Dharma Gita is a religious ceremony which is a sacred song sung by Hindus when carrying out religious ceremonies. However, the Dharma Gita is so beautiful, its existence and existence among the younger generation has begun to fade. Many of the younger generation seem embarrassed to learn the Dharma Gita. It is often observed together that in every yadnya ceremony in Bali, this song is mostly sung by people who are old adults and it is rare for young people to participate in singing this kidung voluntarily.

In conserving the cultural preservation of the Dharma Gita, it is necessary to digitize Balinese culture. The solution offered is the creation of an Android-based application for kidung Dharma Gita. Increased mobility of course focuses on accessibility to information that is not fixed on space and time (Mahendra, 2013). The development of applications on Android smartphones was chosen because applications on Android smartphones are growing very rapidly. Ownership of an Android smartphone is very common because the price range varies and tends to be cheaper than competitors (Arridha, Magfirah, Hayunada, & Astuti, 2022). In addition to the song Dharma Gita, previously there were also several Balinese cultures that had been conserved and implemented in the form of an Android application (Ardani, Dermawan, Arthana, & Putrama, 2020; Astawa, 2018; Putra & Putra, 2021; Saptiawan, Suardika, & Rudita, 2021; Yusa, Pandawana, Putra, & Herawan, 2021).

Based on these problems, this study aims to be able to develop an android-based application, namely the Kidung Sekar Madya Application. This application will be implemented using the Kotlin programming language

*name of corresponding author



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and the database using Firebase. The urgency of this research is in the form of cultural preservation, especially the preservation of the chanting of Dharma Gita so that it is better known and preserved by all circles with a digital approach, and if it is not implemented immediately, it risks the loss of the culture of the chanting of Dharma Gita which is increasingly rarely mastered by the younger generation.

The use of the Kidung Sekar Madya application is expected to have truth values and serviceability in its operations. A system must be able to make user expectations of application services can be realized properly. It is necessary to test the Kidung Sekar Madya application which has the aim of obtaining certainty of the functional correctness of the system and the needs of its users. The tests carried out on the Kidung Sekar Madya application are Black Box Testing using the Equivalence Partitioning and System Usability Scale (SUS) methods. It is hoped that the results of this test can provide an application that is correct and feasible from the process conditions and can be well received by users (Lailiya, Ginantra, & Mahendra, 2022).

LITERATURE REVIEW

Black Box Testing

Black Box Testing is a test that verifies the results of application execution based on the input provided to ensure that the functionality of the application is appropriate with the requirements (Sholeh, Gisfas, Fauzi, & Cahiman, 2020). Black Box Testing is a test that focuses on the interface or appearance and functional testing contained in the application, as well as conformity to the flow of functions required by the user (Mewengkang, Liando, Ngodu, Moningkey, & Wantania, 2019). Black Box Testing does not test based on the source code of the program. Black Box Testing is carried out following the stages starting from making a test case for testing the functions contained in the application, making a test case for testing the suitability of the flow or workflow of a function in the program that matches what is needed and requests from users, to looking for bugs/ error based on the appearance of the application (Nasrullah, Muslim, Wijaya, Pirmantara, & Saifudin, 2020).

In conducting testing, one must choose the right technique, namely a technique that can find errors that have not been detected so that it can improve the quality of the software. In this study, the Equivalence Partitions method was used to perform the test. Equivalence Partitions is a test based on data input in each form (Yulistiyanti, Akhirina, Afrizal, Paramita, & Farkhatin, 2022). The Equivalence Partitions test method divides the input domain from the program into each data class. Equivalence Partitioning is a test based on data entry in each form which breaks down the input domain into valid and invalid groups (Hidayat & Muttaqin, 2018). This test uses several stages, the first stage begins with making test cases of the software to be tested. Then execute each test case created and document the test to analyze its effectiveness. From the tests carried out, it can be seen in the test case table made as a reference for the success or failure of the test.

System Usability Scale (SUS)

The system usability scale (SUS) instrument used for testing with a total of 10 statements, consisting of five positive statements and five negative statements with a scale of 5 (Suryadi, Sufandi, & Nurdiana, 2022). Each statement has a ratio scale where the assessment of strongly disagree has a value of 1, disagree has a value of 2, doubtful has a value of 3, agree has a value of 4, strongly agree has a value of 5. Research instrument items can be seen in table 1.

Table 1. Research Instrument Item

ID	Original Instrument Items	Research Instrument Items
Q1	I think I will use this system again	I think I will use the Kidung Sekar Madya application again
Q2	I feel this system is complicated to use	I feel the Kidung Sekar Madya application is complicated to use
Q3	I feel this system is easy to use	I feel the Kidung Sekar Madya application is easy to use
Q4	I need help from others or technicians in using this system	I need help from others or technicians in using the Kidung Sekar Madya application
Q5	I feel the features of this system are running properly	I feel the features of the Kidung Sekar Madya application running properly
Q6	I feel there are many inconsistent things (not in harmony with this system)	I feel there are many inconsistent things (not in harmony with the Kidung Sekar Madya application)
Q7	I feel other people will understand how to use this system quickly	I feel other people will understand how to use the Kidung Sekar Madya application quickly

*name of corresponding author



ID	Original Instrument Items	Research Instrument Items
Q8	I feel this system is confusing	I feel the Kidung Sekar Madya application is confusing
Q9	I feel there are no obstacles in using this system	I feel there are no obstacles in using the Kidung Sekar Madya application
Q10	I need to get used to myself before using this system	I need to get used to first before using the Kidung Sekar Madya application

After collecting data from respondents, then the data that has been obtained is calculated. As for calculating the score using the rules specified in the SUS method (Ilyas, Wajid, & Muhammad, 2022). For odd number statements from table 1, the score of the statement results obtained is subtracted by the number 1. For even number statements from table 1. the score of the obtained statements is reduced by number 1. Add up all the scores and multiply by 2.5. Then look for the average score of the SUS score of each respondent by adding up all the scores and dividing by the number of respondents. The formula is used to calculate the SUS score can be seen in formula (1) and the formula to obtain the average SUS score can be seen in formula (2).

$$SUS\ Score = [(Q_1 - 1) + (Q_3 - 1) + (Q_5 - 1) + (Q_7 - 1) + (Q_9 - 1) + (5 - Q_2) + (5 - Q_4) + (5 - Q_6) + (5 - Q_8) + (5 - Q_{10})] \times 2,5 \tag{1}$$

$$\tilde{x} = \frac{\sum x}{n} \tag{2}$$

From the calculation results, the average SUS score can be symbolized in the Net Promoter Score (NPS) value category, where the value range between 62-100 gets an acceptability rate as acceptable (high), a value range between 49-61 gets an acceptability rate as acceptable (low) and the value range between 0-50 gets an acceptability rate as not acceptable. How to read the score to find out the range of acceptance of the system and the ranking of the results of the assessment on the system, where a score with a value above 86 gets the best imaginable rating with grade A. Values above 72 to below 86 get an excellent rating with grade B. Values above 52 to below 72 get good rating with grade C. Values above 38 to below 52 get OK/Fair rating with grade D. Values above 25 to below 38 get poor rating with grade E. Values below 25 get worst imaginable rating with grade F. To make it easier to interpret the results of the SUS assessment, grades, adjectives, acceptability, and NPS categories associated with raw SUS scores can be seen in Figure 1.

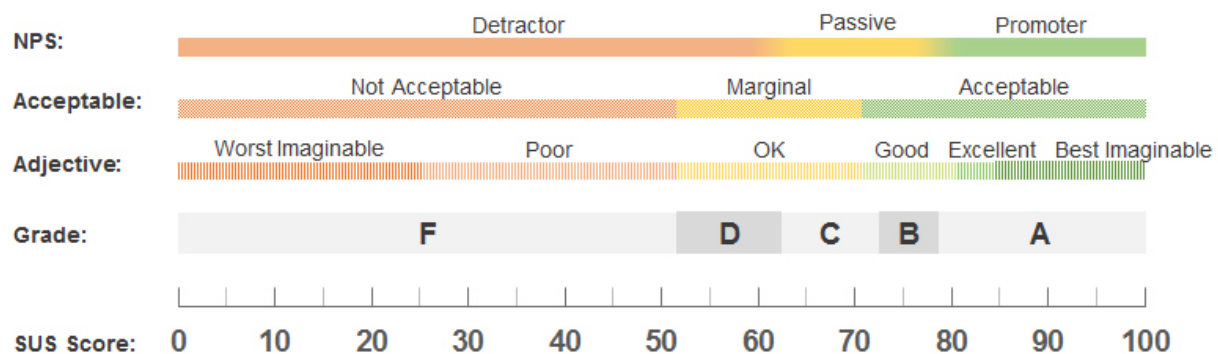
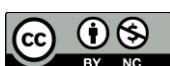


Fig. 1 Grades, Adjectives, Acceptability, and NPS Categories Associated with Raw SUS Scores.

METHOD

The research method carried out in this study will be presented in a research flow chart that includes the stages of research, as shown in Figure 2. The stages carried out in the research start from the observation stage and literature study to conduct direct observations in the field to obtain data and information needed for research, and preparation of reference data collection to be used as a basis for conducting research related to the explanation of theories using the SUS method. The data collection stage is carried out after getting the data and information that has been collected through a literature study, namely by reading, taking notes, studying and reviewing and analyzing material related to the system evaluation review. The instrument preparation stage is to prepare a questionnaire by following a theoretical study that adapts to the usability scale system method to measure usability which consists of 10 statements to measure learning applications, then the questionnaire that has been compiled into an instrument sheet, the next step the questionnaire is distributed to respondents for

*name of corresponding author



testing carried out using The questionnaire that has been designed is given a questionnaire to express a statement about the application.

The test was carried out in Banjar Kutuh, Suwug Village, Sawan District, Buleleng Regency, Bali which has a population of 101 families. Based on the Slovin formula, it can be concluded that the minimum sample that can be taken for an error rate of 10% is 50,248 people. The data analysis stage is carried out after the data has been collected, then data analysis is carried out on the usability level of the application using the calculation of the usability system rating scale, to find problems that occur in the application, it will then be used for recommendations from the results of the usability questionnaire. The evaluation stage is a stage to evaluate the results of the previous stage to obtain conclusions.

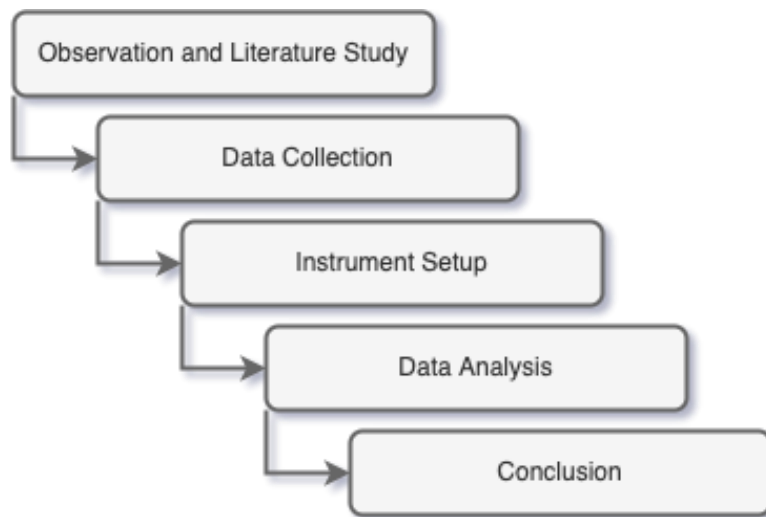


Fig. 2 The Stages of Research

RESULT

Kidung Sekar Madya Application

The results of the development of the Android-based Kidung Sekar Madya application are shown in Figures 3 to 8. The Kidung Sekar Madya application is implemented in Indonesian.



Fig. 3 Implementation of the Main Page

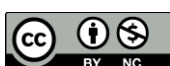


Fig. 4 Implementation of Sidebars View



Fig. 5 Implementation of the Sub Menu Page

*name of corresponding author



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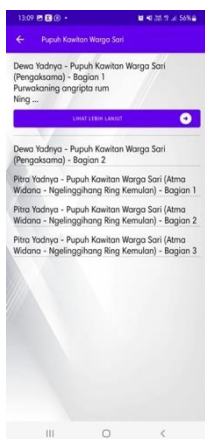


Fig. 6 Implementation of the Sub Menu Page (Extended)

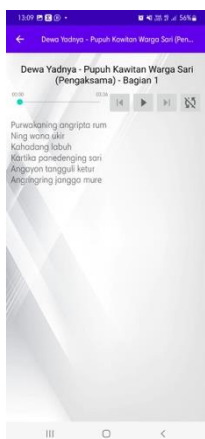


Fig. 7 Implementation of Content Pages



Fig. 8 Implementation of About Applications Pages

Kidung Sekar Madya Black Box Testing

The Kidung Sekar Madya application is an application that only displays kidung data without any specific input, so the test is simpler than the system that has create, read, update and delete (CRUD) operations. Based on Figures 3 and 4, Black Box Testing was carried out which tested the implementation of the Main Page and Sidebars View, resulting in 8 test cases as shown in Table 2. Based on Figures 5 and 6, Black Box Testing was carried out which tested the Implementation of the Sub Menu Page and the extended view, resulted in 3 test cases as shown in table 3. Based on Figure 7, Black Box Testing was carried out which tested the Implementation of Content Pages, resulting in 4 test cases as shown in table 4. Based on Figure 8, Black Box Testing was carried out which tested the Implementation of About Applications Pages, resulting in a test case of 1 test scenario shown in table 5. The total number of test cases tested was 16 scenarios on all pages.

Table 2. Test Case for Implementation of the Main Page and Sidebars View

ID	Test Description	Expected Results
TC-MM-01	Activation of sub-menu pages, by selecting one type of Kidung Sekar Madya displayed	The system is able to direct the main page to the sub-menu page
TC-MM-02	Activation of the sidebar, by pressing the option button in the upper left corner	The system is able to display the sidebar.
TC-MM-03	Font size selection, by suppressing font size navigation, will expand font size navigation, displaying sub-navigation "small", "normal", "large". Suppressing font size navigation, will reduce font size navigation, hiding sub-navigation	The system is able to expand font size navigation. The system is able to reduce font size navigation.
TC-MM-04	Sub-navigation selection "small" font size.	The system is able to display fonts in small sizes
TC-MM-05	Sub-navigation selection "normal" font size.	The system is able to display fonts in normal size
TC-MM-06	"Large" sub-navigation selection.	The system is able to display fonts in large sizes
TC-MM-07	Activation of pages about, by selecting "about the application" on the sidebar.	The system is able to direct the main page to the page about the application
TC-MM-08	"Quit" navigation selection.	The system is able to display confirmation dialogue. If you press "No", the system is able to close the dialogue display. If you press "Yes" then the system is able to close the application.

*name of corresponding author



Table 3. Test Case for Implementation of the Sub Menu Page

ID	Test Description	Expected Results
TC-SM-01	Expansion Section in the Kidung Sekar Madya version to display the Kidung text and button "See more" to be able to go to the content page	The system is able to display the expansion of section in the Kidung Sekar Madya version chosen by the user.
TC-SM-02	Activation of the content page, by pressing the see button further	The system is able to direct the sub-menu pages to the content page
TC-SM-03	Activation of the main page, by selecting the back button in the right corner of the page	The system is able to direct the sub-menu page to the main page.

Table 4. Test Case for Implementation of Content Pages

ID	Test Description	Expected Results
TC-KT-01	Displays only the text of Kidung Sekar Madya if there is no audio link on the database, without error	The system is able to display only Kidung Sekar Madya text if there is no audio link on the database
TC-KT-02	Activation of Audio Players by clicking the Play button	The system is able to play audio
TC-KT-03	Audio player navigation by setting the scroll on the timeline	The system is able to rotate the audio on the desired timeline
TC-KT-04	Activation of sub-menu pages, by selecting the back button in the right corner of the page	The system is able to direct the content page to the sub-menu page.

Table 5. Test Case for Implementation of About Applications Pages

ID	Test Description	Expected Results
TC-TA-01	Activation of the main page, by selecting the back button in the right corner of the page	The system is able to direct the page about the application to the main page.

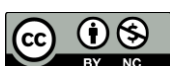
Kidung Sekar Madya System Usability Scale (SUS)

The System Usability Scale is used to determine how much satisfaction level of users of the Kidung Sekar Madya application is. By using a questionnaire consisting of 10 questions and 5 answer choices on a Likert scale ranging from "Strongly Disagree" to "Strongly Agree", there were 58 respondents who gave their responses. The results of the responses that have been obtained using a Likert scale, are transformed using the rules specified in the SUS method, so that the respondents' assessment results can be seen in table 6.

Table 6. Respondents' Assessment Results

No.	Respondents	Questionnaire Results										Sum	SUS Score (Sum * 2,5)
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	Respondent 01	4	3	2	4	4	3	4	3	3	3	33	82,50
2	Respondent 02	3	4	3	3	4	4	4	3	1	3	32	80,00
3	Respondent 03	4	2	3	2	3	4	4	4	3	3	32	80,00
4	Respondent 04	2	3	4	2	4	2	4	4	4	3	32	80,00
5	Respondent 05	2	2	4	3	1	4	4	3	4	3	30	75,00
6	Respondent 06	3	3	2	4	1	4	1	2	4	2	26	65,00
7	Respondent 07	2	4	2	4	4	3	4	4	3	4	34	85,00
8	Respondent 08	4	4	3	3	2	3	3	3	1	4	30	75,00
9	Respondent 09	4	4	4	3	4	3	1	3	4	2	32	80,00
10	Respondent 10	4	3	4	4	3	4	3	4	3	2	34	85,00
11	Respondent 11	3	4	2	3	1	4	4	4	3	4	32	80,00
12	Respondent 12	3	3	4	2	4	2	1	4	3	4	30	75,00
13	Respondent 13	3	3	3	3	1	3	4	3	4	3	30	75,00
14	Respondent 14	3	3	3	2	4	2	1	3	4	3	28	70,00
15	Respondent 15	4	3	4	4	1	3	4	3	4	4	34	85,00
16	Respondent 16	4	2	4	4	3	2	3	4	4	3	33	82,50
17	Respondent 17	2	2	3	2	1	2	4	2	1	4	23	57,50

*name of corresponding author



No.	Respondents	Questionnaire Results										Sum	SUS Score (Sum * 2,5)
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
18	Respondent 18	2	2	3	2	2	4	4	3	3	3	28	70,00
19	Respondent 19	2	4	4	3	3	3	4	3	4	4	34	85,00
20	Respondent 20	4	3	4	3	1	3	4	3	4	3	32	80,00
21	Respondent 21	4	2	3	2	1	2	1	2	4	3	24	60,00
22	Respondent 22	3	4	3	2	2	3	4	3	1	2	27	67,50
23	Respondent 23	4	2	4	4	3	3	2	4	4	4	34	85,00
24	Respondent 24	3	3	3	4	3	4	4	2	3	3	32	80,00
25	Respondent 25	4	4	3	4	3	0	3	3	4	2	30	75,00
26	Respondent 26	4	4	3	4	3	0	1	3	1	3	26	65,00
27	Respondent 27	4	4	4	2	4	2	3	3	4	4	34	85,00
28	Respondent 28	4	3	3	3	4	3	3	2	3	4	32	80,00
29	Respondent 29	2	3	4	4	3	3	1	4	3	4	31	77,50
30	Respondent 30	3	2	4	2	2	3	4	3	3	4	30	75,00
31	Respondent 31	4	4	4	2	3	4	1	4	1	4	31	77,50
32	Respondent 32	4	3	4	0	3	3	4	4	1	2	28	70,00
33	Respondent 33	4	3	0	1	4	4	4	4	3	2	29	72,50
34	Respondent 34	4	3	2	0	3	3	2	4	3	2	26	65,00
35	Respondent 35	3	4	4	3	4	3	2	4	4	2	33	82,50
36	Respondent 36	3	4	0	3	4	3	3	2	4	2	28	70,00
37	Respondent 37	4	3	1	3	4	3	3	3	4	3	31	77,50
38	Respondent 38	3	3	4	3	4	3	4	3	4	3	34	85,00
39	Respondent 39	4	3	4	4	4	2	4	3	4	4	36	90,00
40	Respondent 40	2	4	3	4	2	3	4	2	4	3	31	77,50
41	Respondent 41	3	4	3	2	3	2	3	0	4	2	26	65,00
42	Respondent 42	4	2	3	4	2	3	3	0	4	3	28	70,00
43	Respondent 43	4	2	3	3	1	2	1	4	4	4	28	70,00
44	Respondent 44	4	4	3	3	1	3	1	4	3	2	28	70,00
45	Respondent 45	4	4	2	3	4	0	4	4	4	3	32	80,00
46	Respondent 46	3	4	4	2	1	3	4	0	4	4	29	72,50
47	Respondent 47	2	3	4	4	1	4	4	1	3	4	30	75,00
48	Respondent 48	4	4	4	2	1	1	4	3	4	3	30	75,00
49	Respondent 49	4	3	4	3	1	4	3	2	4	1	29	72,50
50	Respondent 50	4	4	4	4	4	1	4	4	4	4	37	92,50
51	Respondent 51	3	4	4	4	4	3	1	4	3	2	32	80,00
52	Respondent 52	4	2	4	3	1	3	1	1	2	0	21	52,50
53	Respondent 53	0	3	4	2	3	3	2	3	4	4	28	70,00
54	Respondent 54	4	4	4	3	4	3	0	3	4	4	33	82,50
55	Respondent 55	3	1	2	4	4	3	4	4	0	4	29	72,50
56	Respondent 56	2	0	3	3	3	4	4	4	4	4	31	77,50
57	Respondent 57	4	2	4	3	0	4	3	2	4	2	28	70,00
58	Respondent 58	1	0	4	4	4	1	3	3	4	4	28	70,00
Total Final Score												4382,50	
Minimum Score												52,50	
Maximum Score												92,50	

DISCUSSIONS

Black Box Testing Discussions

Based on the test plan that has been prepared previously, the test results can be shown in table 7.

Table 7. Respondents Assessment Results

ID	Expected results	Test result	Conclusion
TC-MM-01	The system is able to direct the main page to the sub-menu page	The system managed to direct the main page to the sub-menu page	Appropriate

*name of corresponding author



ID	Expected results	Test result	Conclusion
TC-MM-02	The system is able to display the sidebar.	The system succeeded in displaying sidebar.	Appropriate
TC-MM-03	The system is able to expand font size navigation. The system is able to reduce font size navigation.	The system succeeded in expanding font size navigation. The system succeeded in reducing font size navigation.	Appropriate
TC-MM-04	The system is able to display fonts in small sizes	The system successfully displayed fonts in small sizes	Appropriate
TC-MM-05	The system is able to display fonts in normal size	The system successfully displayed fonts in normal size	Appropriate
TC-MM-06	The system is able to display fonts in large sizes	The system successfully displayed fonts in large sizes	Appropriate
TC-MM-07	The system is able to direct the main page to the page about the application	The system managed to direct the main page to the page about the application	Appropriate
TC-MM-08	The system is able to display confirmation dialogue. If you press "No", the system is able to close the dialogue display. If you press "Yes" then the system is able to close the application.	The system succeeded in displaying a confirmation dialog. If you press "No", the system successfully closes the dialogue display. If you press "Yes", the system successfully closes the application.	Appropriate
TC-SM-01	The system is able to display the expansion of section in the Kidung Sekar Yadnya version chosen by the user.	The system succeeded in displaying the expansion section in the Kidung Sekar Yadnya version chosen by the user.	Appropriate
TC-SM-02	The system is able to direct the sub-menu pages to the content page	The system managed to direct the sub-menu page to the content page	Appropriate
TC-SM-03	The system is able to direct the sub-menu page to the main page.	The system managed to direct the sub-menu page to the main page.	Appropriate
TC-KT-01	The system is able to display only Kidung Sekar Madya text if there is no audio link on the database	The system succeeded in displaying only the text of Kidung Sekar Madya if there is no audio link on the database	Appropriate
TC-KT-02	The system is able to play audio	The system managed to play the audio	Appropriate
TC-KT-03	The system is able to rotate the audio on the desired timeline	The system managed to play the audio on the desired timeline	Appropriate
TC-KT-04	The system is able to direct the content page to the sub-menu page.	The system managed to direct the content page to the sub-menu page.	Appropriate
TC-TA-01	The system is able to direct the page about the application to the main page.	The system managed to direct the page about the application to the main page.	Appropriate

The number of pages tested is 4 pages. The main page was tested 8 times, the sub-menu page was tested 3 times, the content page was tested 4 times and the application page was tested 1 time. Based on testing using Black Box Testing, it can provide results where all pages have worked well.

System Usability Scale Discussions

Based on table 6 which displays respondents' assessment results data, there is a calculation in the form of a total final score of 4382.50 with an average final score of 75,560 obtained from calculations using formula (2). The maximum score obtained is 92.50 and the minimum score obtained is 52.50. The graph of the SUS score based on respondents can be seen in Figure 9. The graph of the distribution of question answers with SUS can be seen in Figure 10.

*name of corresponding author



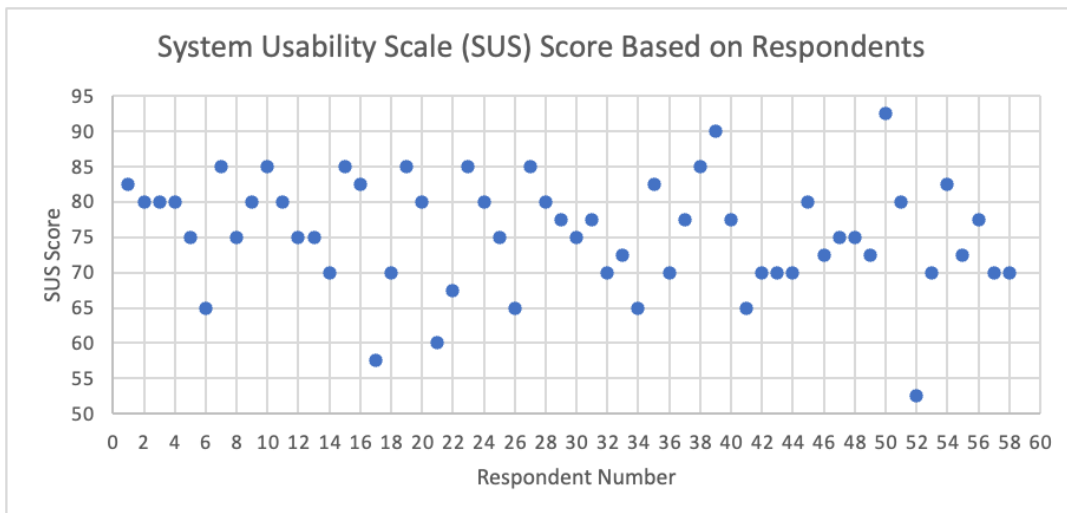


Fig. 9 System Usability Scale (SUS) Score Based on Respondents

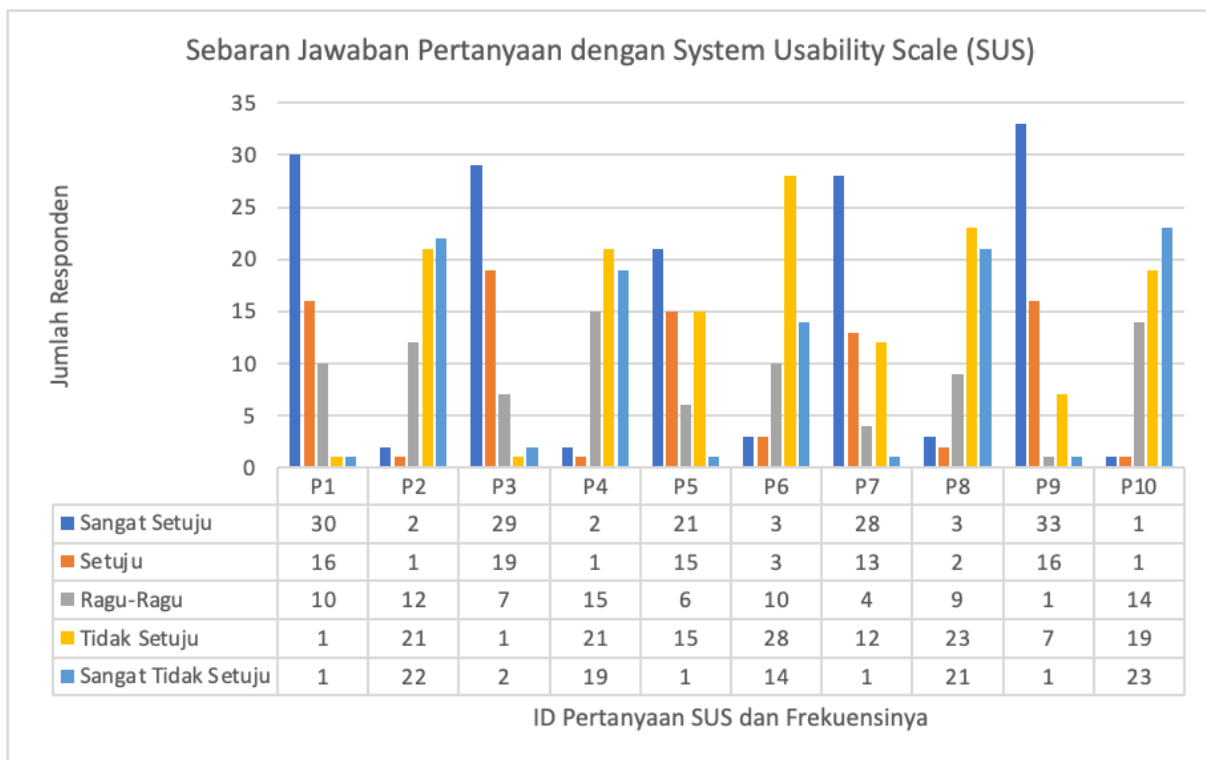


Fig. 10 Distribution of Question Answers with System Usability Scale (SUS)

Figure 11 shows that the SUS score of 75,560 can be represented that the Kidung Sekar Madya application has a Net Promoter Score (NPS) category for a passive value, an acceptability category for an acceptable value, an adjective category for a good value, a grade category for a B value. The Kidung Sekar Madya application is good and has usefulness in a cultural conservation application device.

*name of corresponding author



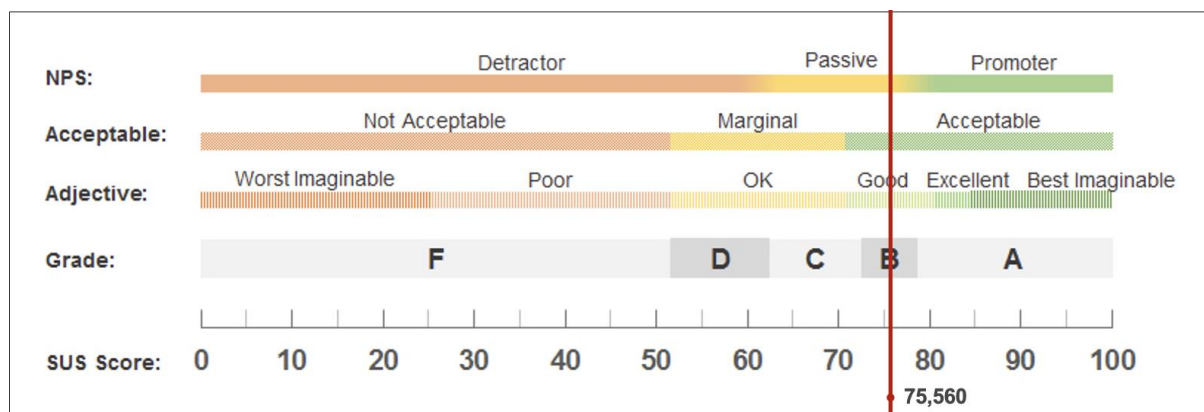


Fig. 11 Kidung Sekar Madya Grades, Adjectives, Acceptability, and NPS Categories

CONCLUSION

The Kidung Sekar Madya conservation in an android-based application using the Successive Approximation Model can be well designed and implemented. Evaluation Using Black Box Testing and System Usability Scale on the Kidung Sekar Madya Application has been successfully implemented. Black Box Testing tests all page views with 16 test cases that produce good and appropriate results for each test. SUS involved 58 respondents with 10 question instruments. The test results obtained a value of 75,560 in Raw SUS Scores, that can be stated that this application has a passive value in NPS, acceptable value in acceptability, good value in adjective, and reach grade B. It can be seen that this application is good and has uses in cultural preservation applications.

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