Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Usability Evaluation of SIDUMAS Badung Using Think Aloud, Heuristic Evaluation and SUS

I Nyoman Gede Ardi Yana Putra[1)*], I Made Candiasa[2)], Luh Joni Erawati Dewi[3)]
[1,2,3)]Program Pascasarja, Universitas Pendidikan Ganesha, Indonesia
[1)]ardy.putra71@yahoo.co.id, [2)]candiasaimade@undiksha.ac.id , [3)]joni.erawati@undiksha.ac.id

Submitted : Dec 19, 2022 | **Accepted** : Jan 3, 2023 | **Published** : Jan 3, 2023

Abstract: This study aims to 1) find out the problems that occur in the Badung Regency community complaint system (SIDUMAS) by conducting a usability evaluation using the think-aloud method, heuristic evaluation and system usability scale, 2) conduct a usability evaluation on the community complaint system can determine the level of application usability and determine recommendations for improvements needed by the Badung community complaint system (SIDUMAS). Respondents who participated in this study were Badung people consisting of 5 usability experts and 30 general public. Determination of respondents in this study based on the criteria of the method used. The data in this study were obtained through usability evaluation results on the public complaint application questionnaires and data from interviews with respondents. The method used to evaluate the public complaint system is a combination of 3 methods, namely think aloud, heuristic evaluation and system usability scale which will produce an assessment to determine the usability and recommendations for improvements to the Badung SIDUMAS system. The results showed that: (1) Using the think-aloud method, it was found that the problems experienced by users of the community complaint system application on average experienced the same problems in the test. The results of research with heuristic evaluation found that there is 1 problem that has the highest severity rating where the problem must be fixed immediately. The results of the calculation of the average system usability scale score on user satisfaction obtained a score of 78 with acceptability ranges in the acceptable category. Furthermore, for the percentile rank score, the value obtained is 78 so it is in the grade B category. (2) Making recommendations for improvement in the study focused on changing the layout on the page and navigation menu on the results of data causing errors experienced by users.

Keywords: Public Service, Application, Public Complaint System, Usability Evaluation.

INTRODUCTION

The development of technology today, especially information technology, is growing very rapidly. Many social aspects of society, including public services, can be accomplished with the aid of information technology media with the help of the internet network. Public services are a form of operationalization of government policies, in the paradigm of public services there has been a shift for the better, namely from the traditional paradigm to the democratic paradigm. The paradigm shift is known as 3 models, namely the traditional public administration model (old public administration / OPA) which then shifts to a new public management model (new public management / NPM), and finally to a new public service model (new public service / NPS). In order to foster public concern for improving the quality of services in the Badung Regency area, the Badung Regency Government has established a community complaint institution called the Badung Regency Community Complaint System (SIDUMAS) through Regent Decree 100/049/HK/2020. SIDUMAS Badung is a web-based information system and has been developed into mobile apps that have been uploaded on the playstore and apps store.

Since the system was created and inaugurated until now the existence of the Community Complaints System (SIDUMAS) has never been evaluated both from the user aspect and system performance so that it cannot be

*I Nyoman Gede Ardi Yana Putra

e-ISSN : 2541-2019
p-ISSN : 2541-044X

known whether this system has been well designed so that it can achieve development goals. In its application in the field, SIDUMAS Badung has not been able to accommodate all complaints from the Badung community, because it has several shortcomings from various sides. Complaints made by the public often still display personal data such as photos of KTP/KK uploaded on the homepage of the SIDUMAS Badung application. This causes a person's personal data to be downloaded by irresponsible people. Another problem encountered is based on reviews from users who comment on the Badung SIDUMAS application via Google Playstore. The results of the 2020 report recapitulation amounted to 73 complaints that entered through the Badung SIDUMAS application. Based on the recapitulation of the complaint report, which amounted to only 73 complaints in one year and based on the population in Badung Regency, there was user dissatisfaction such as low ratings and dissatisfaction comments related to problems when using the Badung SIDUMAS application. It's necessary to evaluate the SIDUMAS Badung application to see how far the system has functioned and to identify problems that occur from the complainant's side. Usability measurement can be done using user opinions about user feelings when using applications or can also be supported and strengthened by the results of expert opinions or experts who are experienced in the multimedia field (Kaya et al., 2019; Weichbroth, 2020).

Usability is an attribute as a measuring tool to determine the quality of a system and determine the extent of ease on the user side of the system to be able to achieve its goals and produce user satisfaction when using the system (Rocha, 2021; Saputra et al., 2022). Usability measurements can use opinions from users about how users feel when using the application. In addition, usability measurements can also be supported and strengthened by involving expert opinions or experts in the field of usability. Research that has been done before related to system evaluation research is as follows. 1) Research conducted by (Rasmila, 2018) with the title "Website Evaluation Using System Usability Scale (SUS) at Private Universities in Palembang". The results of this study found that the results of using the system usability scale (SUS) method were used as an evaluation tool for website assessments that were accurately measured and structured. This research also has several limitations including the use of system testing methods using only one method, namely the system usability scale (SUS) method. 2) Research by (Nioga et al., 2019) with the title "Usability Evaluation of KAI Access Mobile Applications Using the System Usability Scale (SUS) and Discovery Prototyping Methods (Case Study of PT KAI)". The results of this study found that the test obtained on the KAI Access application using the system usability scale (SUS) questionnaire method obtained a result of 60.79% and users were less satisfied with the KAI Access application. 3) Research conducted by (Tantri Fajarini et al., 2020) with the title "Evaluation of Online News Portals on Usability Aspects Using Heurtistic Evaluation and Think Aloud". The results of this study indicate that the analysis of the Heuristic Evaluation method produces an average severity rating value for all aspects of both advanced and novice category respondents of 2 on Tribunnews, 2 on Bali Post and 2 on Jawa Pos. The severity rating value of 2 indicates that there are problems with a minor level with repairs being a low priority. 4) Research conducted by (Prasetyaningtias et al., 2018) entitled "Usability Analysis of the People's Online Aspiration and Complaint Service (LAPOR!) Mobile E-Government Application with Heuristic Evaluation". The results of the recommendations given by the evaluator are user interface improvements, content improvements and flow improvements. The difference in the current research is the usability evaluation of the application using the Think Aloud, Heuristic Evaluation and System Usability Scale (SUS) methods so that the recommendations generated can be a reference for recommendations for improving the SIDUMAS Badung application.

LITERATURE REVIEW

Usability Evaluation

Usability evaluation is used to assess the communication between humans and objects, it is used to distinguish parts of the classification with excellent objectives and can be used to further improve usability development (Hertzum, 2020). The focus on evaluation is completed with a special meeting with users to conduct exercises with specific workplaces and settings. To assess the usability of a particular system, application or product, several procedures are indicated and can be used appropriately and accurately(Hasibuan & Putri, 2022; Mahendra & Asmarajaya, 2022). As indicated by Jacobsen, there are three classes of usability evaluations, which can be called strategic usability evaluation methods (UEMs). The three classes are empirical methods, inspection methods, and inquiry methods (Barnum, 2020).

Think Aloud

Think Aloud is a technique for testing a system including user testing by endlessly verbalizing what the user feels when using the system. Verbalization from users allows observers to decipher parts of the interface that have problems (Fan et al., 2019). Every gesture of the user when expressing will be recorded, with the aim that what the user has thought can be recorded to get a significant focus in helping the analysis process. The use of think-aloud is very appropriate to bring out the user's verbalization feelings when given a task in working on a particular scenario (Trukenbrod et al., 2020). Identifying two basic types of verbal processes, namely concurrent

*I Nyoman Gede Ardi Yana Putra

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

think-aloud (CTA) which is where participants express their thoughts during the execution of certain tasks, then retrospective think-aloud (RTA) where participants will express their thoughts after working on the given task.

Heuristic Evaluation

Heuristic Evaluation is an assessment in which several specialists analyze an interface and rate each component of the interface depending on a list of usability principles heuristically (Kumar & Goundar, 2019). Heuristic evaluation is a usability engineering method that refers to an expert-based method for finding usability problems in user interface design (Acosta-Vargas et al., 2019) . Heuristic evaluation involves a small number of expert evaluators examining the interface and evaluating it using usability principles. The heuristic evaluation method is based on 10 aspects of usability, namely Visibility of system status (H1), Matching between the system and the real world (H2), User control and freedom (H3), Consistency and standards (H4), Error prevention (H5), Recognition rather than recall (H6), Flexibility and usability (H7), Aesthetic and minimalist design (H8), Helping users recognize, diagnose, and recover from users (H9) and Help and documentation (H10) (Jordan, 2020).

The evaluator used in the heuristic evaluation is a usability expert or evaluator who has the expertise and in-depth knowledge of the usability aspects of the system (Sohaib et al., 2019). In research on the proposed number of evaluators in usability testing, expressed his opinion on how many should be used as evaluators (Usability.gov, 2021). In his research, the number of evaluators was 5 expert evaluators.

Severity Rating is a value that refers to the severity of the usability found. Severity rating can also be referred to as an overview of the problems found based on the severity to be repaired before use (Hertzum, 2020). Severity rating will be classified by evaluators according to several categories depending on the severity. The use of severity rating can be useful for prioritizing the most severe problems and determining which problems should be fixed immediately. Table 1 shows the severity rating scale.

Table 1. Severity Rating

Scale	Term	Description
0	No Problem	Not a usability issue
1	Cosmetic Problem	The problem is with the interface of the application, it does not affect user comfort. This problem is not categorized as a priority problem.
2	Minor Problem	There is a potential for users to experience difficulties when using the system, which needs improvement but with low priority.
3	Mayor Problem	Users feel disturbed when using the system, which needs improvement with high priority.
4	Catastrophe	The problems received by users are very large and complex and need mandatory improvements to the system before it is used again by users.

System Usability Scale

System usability scale (SUS) is a simple method of testing the usability of a system with ten questions that provide an overall view of the usability evaluation. The system usability scale uses a 5-point Likert scale by answering the level of agreement and disagreement in a simple and easy-to-do manner. SUS is reliable and used in measuring usability scales globally. The System Usability Scale (SUS) assigns respondents to give a rating on a scale of 1 to 5, starting from a value of 1 for "Strongly Disagree", a value of 2 for "Disagree", a value of 3 for "Neutral", a value of 4 for "Agree" and a value of 5 for "Strongly Agree". If the respondent feels that they do not find the right response scale, they should fill in the midpoint of the test scale (Vlachogianni & Tselios, 2022). In determining the quality of the device that has been tested and to measure the results that have been obtained based on the calculation of SUS scores, it is determined by three points of view, namely acceptability, grade scale and adjective rating. Acceptability has three levels consisting of not acceptable, marginal (low and high), and acceptable. While the grade scale consists of A, B, C, D and F. For adjective rating, there are more levels, namely worst imaginable, poor, ok, good, excellent, and best imaginable (Holden, 2020).

*I Nyoman Gede Ardi Yana Putra

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

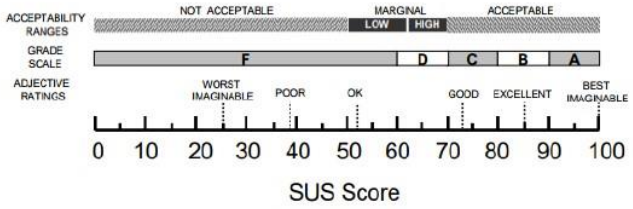

Fig. 1 System Usability Scale Assessment

METHOD

Research Flow

In this study, there is a research flow that makes it easier for researchers to formulate solutions to research problems. The research flow can be seen in Figure 2 below.

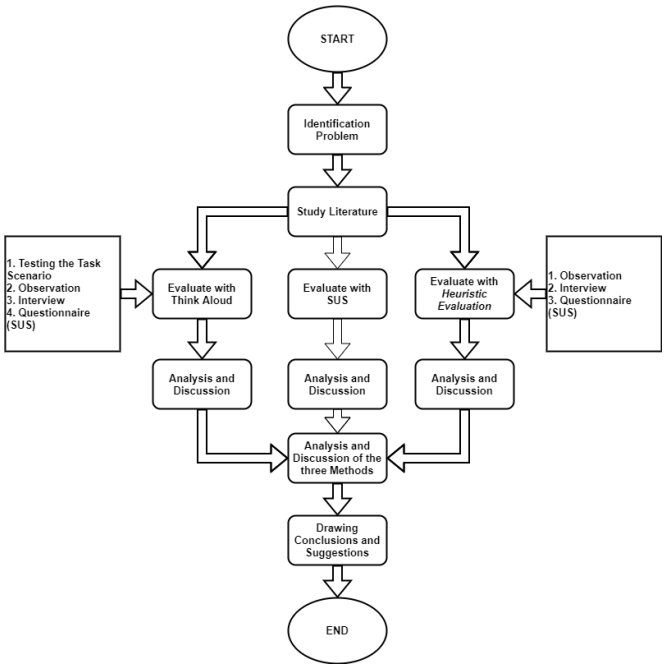

Fig. 2 Research Flow

Problem Identification

The SIDUMAS Badung application is used as the object of this research. The SIDUMAS Badung application itself can be uploaded via the Google Playstore service. At this stage the researcher found that the SIDUMAS Badung application still has problems in terms of usability, this requires evaluation with methods regarding usability to measure the severity of other specific problems. The display of SIDUMAS Badung application can be seen in Figure 3 below.

Fig. 3 SIDUMAS Badung Application

*I Nyoman Gede Ardi Yana Putra

e-ISSN : 2541-2019
p-ISSN : 2541-044X

Literature Study

At the literature study stage, researchers searched for theories that were relevant and could be used as reference material to support research on usability evaluation, heuristic evaluation, think-aloud, and system usability scale. At this stage, researchers began collecting literature data, reading literature, recording important literature, and processing the data. The sources used in the literature study are journals, books and official websites related to the theme of the research being conducted.

Evaluation with Think Aloud

Think aloud is a technique for testing a system including testing users by endlessly expressing what users feel when using the system. In this study, the participants who will be used will be criticized based on what the researcher wants to get when testing(Fan et al., 2019). This aims to make it easier for researchers to obtain optimal and good data for improving the Badung SIDUMAS application. The evaluation carried out is an evaluation of the usability side of the SIDUMAS application on the android platform.

The characteristics of users who will be used as respondents can be seen in Table 2.

Table 2. User Criteria and Requirements

User Characteristics	Terms
Have used similar applications, such as Lapor SP4N	Users have used a compliant application such as SIDUMAS, for example, Lapor SP4N
Users have a mature age to use the SIDUMAS Badung application	The age of users who use the SIDUMAS application is 18 years and over
Can operate and use android applications on smartphones	Users can operate and use android applications properly and understand how to use them in general

Think Aloud Analysis and Discussion

Problems found can arise from the comments and behaviour of respondents when using the Badung SIDUMAS application. Feedback from testing with task scenarios in the form of positive or negative opinions that describe the level of respondent satisfaction with the Badung SIDUMAS application. Opinions that are rated positive can take the form of words, phrases, sentences and expressions or behaviour of respondents who convey their feelings when using the application. In contrast, negatively rated opinions expressed by respondents are words, phrases, sentences, and expressions or behaviours that convey feelings of disappointment, displeasure, surrender and so on that can produce a problem. All data obtained will be recorded and used to proceed with the analysis process. The form data generated through testing with the think-aloud technique is in the form of respondent feedback, problems that arise, the severity rating of each problem found by respondents when evaluating the Badung SIDUMAS application, and the results of interviews with respondents.

Heuristic Evaluation

In this research, the evaluator must be an expert who has specific experience and knowledge about usability or an expert who has already evaluated similar applications. The number of evaluators used to evaluate amounted to 5 people. The selection of expert evaluators to be used in this study can be seen in Table 3.

Table 3. Criteria and Requirements for Expert Evaluators

Evaluator Characteristics	Term
Knowledge of usability	The evaluator should be able to understand the level of user-friendliness in using and interacting with the application
Experience in the field	Evaluator has evaluated or developed an application/system.
Education	The evaluator must have completed at least an undergraduate degree in computer science and software development

*I Nyoman Gede Ardi Yana Putra

e-ISSN : 2541-2019
p-ISSN : 2541-044X

Heuristic Evaluation Analysis and Discussion

The data that has been analyzed will then be associated with usability and severity rating problems. This process aims to find the right solution for problems in the Badung SIDUMAS application. The grouping of data that has been obtained from testing with evaluators will later be arranged according to the principle of heuristic evaluation proposed by Jakob Nielsen. After grouping with the principle of heuristic evaluation, the severity rating will be given to each problem that arises, and then the average value of the severity rating will be sorted according to the principle of heuristic evaluation and given priority to problems that have the worst severity rating value. If expert evaluators find the same problems, the problems will be grouped. Problems that have been grouped will be given a severity rating taken from the average severity rating value of each problem that arises, then will be sorted according to the principles of heuristic evaluation.

Evaluation with System Usability Scale

System usability scale (SUS) is a simple method of testing the usability of a system with ten questions that provide an overall view of the usability evaluation. The system usability scale uses a 5-point Likert scale by answering the level of agreement and disagreement in a simple and easy-to-do manner. SUS is reliable and used in measuring usability scales globally. The System Usability Scale (SUS) assigns respondents to assess the usability of the system.

Analysis and Discussion of System Usability Scale

At this stage, the data that has been collected will be accumulated based on 10 system usability scale (SUS) testing instruments. The calculation of SUS has its own rules, namely, for odd items, the contribution score is reduced by 1 and for questions with an even score, 5 minus the respondent's answer scale. From the amount obtained, the amount is multiplied by 2.5 to get the overall value of SUS. The results of the data that has been analyzed will then be associated with the SUS score.

Analysis and Discussion of the Three Methods

After obtaining the results of the analysis and discussing the evaluation method, the data will be combined. The process of combining data from user perceptions with the think-aloud method and expert perceptions from the heuristic evaluation method and coupled with the system usability scale questionnaire will be described then the results obtained from testing with think-aloud respondents will be combined and strengthened with the results of problems found from testing with experts using the heuristic evaluation method. In addition to strengthening the evaluation results, the results experts can also find new problems such as on the system functionality side.

Drawing Conclusions and Suggestions

Drawing conclusions and suggestions are done after the evaluation process gets the results of the analysis then conclusions and suggestions will be drawn.

RESULT

SIDUMAS User Think Aloud Results Data

Based on the usability results acquired utilizing the think aloud technique, the collected data consists of verbal information obtained through interviews with respondents using voice recording devices. The researcher then re-listens to the respondent's recording data so that the gathered data can be presented in writing. The data acquired from the recordings will be given in three categories: data on think aloud conclusions, challenges or difficulties encountered when using the public complaints system (SIDUMAS), and suggestions from respondents, where TA code refers to the respondent code. Following are statistics regarding the outcomes of think aloud for each type of SIDUMAS users. The outcomes of the think aloud technique for users of the public complaints application (SIDUMAS) are presented in Table 4 below.

Table 4. SIDUMAS User Think Aloud Data Results

Number	Respondent Code	Problems found	Suggestions provided
1	TA01	1. Confusion about finding the latest news in the SIDUMAS application. 2. Difficulty in finding	1. It is necessary to update the latest information related

e-ISSN : 2541-2019
p-ISSN : 2541-044X

			images or videos related to existing complaint types.	to the current conditions and conditions around the Badung district area. 2. It is necessary to add an image or video menu to each community complaint in Badung Regency.
2	TA02	1. There are too many complaint features created by the developer, so users feel confused about choosing a complaint. 2. A long history of processed complaints.	1. It is necessary to categorize the types of complaints to facilitate user access. 2. Admins should check complaints regularly so that complaints are processed quickly so they don't wait long.	
3	TA03	1. Lack of socialization to all residents of Badung Regency regarding this SIDUMAS application.	1. It is necessary to socialize the importance of the information contained in this SIDUMAS application.	
4	TA04	1. There are no problems with the application.	1. Addition of a manual book for new users of the SIDUMAS application.	
5	TA05	1. Difficulty finding the latest complaint information.	1. Update the latest information as soon as possible as needed.	
6	TA06	1. The complaints menu in the SIDUMAS application must be shifted first so that other types of complaints can be seen so that users do not know there are other menus if they are shifted to the left.	1. It is necessary to add a sliding navigation button for complaint types in the SIDUMAS application.	
7	TA07	1. There are no problems, the SIDUMAS application is good.	2. There was no input given by the respondents.	
8	TA08	1. Confusion when filling out the "profile" menu. 2. Users must complete previous account data so that they can be followed up	1. To be able to fill in the help feature when filling in the user identity. 2. Admin to inform users to complete account data	

*I Nyoman Gede Ardi Yana Putra

					because many complaints cannot be processed because the data is incomplete.
9	TA09	1.	When using the application the user is still confused about finding the type of complaint.	1.	There needs to be navigation for each type of complaint.
10	TA010	1.	There are no problems with the application.	1.	When the application is run for the first time, information or application tour features can be added.

The conclusion obtained from Table 4 is that the problems/difficulties experienced by users of the public complaints application (SIDUMAS) on average experience the same problems in their use.

1. In the information feature, respondents experienced confusion in finding the latest news in the SIDUMAS application, respondents also had difficulty in finding images or videos related to existing types of complaints,
2. Lack of socializing with all Badung district residents regarding this SIDUMAS application, respondents still have difficulty finding the latest information.
3. In the navigation feature, there are several problems, namely too many complaint features made by the developer, so users feel confused about choosing complaints, the history of complaints from users that are processed is quite long.
4. The complaint menu in the SIDUMAS application must be shifted first so that other types of complaints are visible so that users do not know there are other menus if they are shifted to the left.
5. Respondents are still confused when filling out the "profile" menu, users must complete the previous account data so that it can be followed up, and when using the application users are still confused about finding the type of complaint.

Results of Heuristic Evaluation of SIDUMAS Users

In this part, the outcomes of the heuristic evaluation will be outlined as guidelines for the implementation of application enhancements. Five assessors conducted the evaluation. Table 5 below displays the outcomes of the heuristic evaluation.

Table 5. Recapitulation of the Number of Problems Found

No.	Nielsen's Heuristic principles	Number of Problems
1	System status visibility	2
2	Match the system and the real world	0
3	User control and freedom	0
4	Consistent and standard	1
5	Error prevention	4
6	Recognizing rather than recalling	1
7	Flexibility and use	2
8	Aesthetic and minimalist design	2
9	Help users recognize, diagnose and recover from users	1
10	Help and documentation	4
Total Problems Found		17

The results of the evaluation found a total of 17 problems with the ten heuristic principles used as guidelines. Based on Table 5 below that many problems with a very high severity rating were found by evaluators. These problems can cause inconvenience or affect the user experience when using the system. On average, evaluators gave a rating of 0-4 for each problem found. The frequency of severity ratings given to evaluators is shown in Figure 4 below.

*I Nyoman Gede Ardi Yana Putra

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

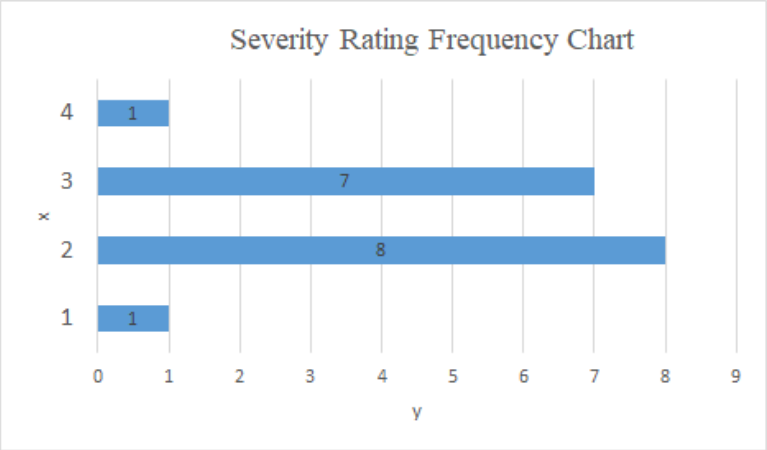

Fig. 4 Servity Rating Frequency Chart on the SIDUMAS application

From Figure 4 it can be seen that there is 1 problem that has the highest severity rating (4) the problem must be fixed immediately. At the debriefing stage, the five evaluators discussed the top problems based on the severity rating.

System Usability Scale (SUS) Evaluation Results

After distributing questionnaires to respondents, the next step is to calculate the score using the system usability scale (SUS) which aims to see user satisfaction from the community complaint system (SIDUMAS), the next step is to recapitulate the results of the assessment conducted by respondents to determine the average value of SIDUMAS users. Variable Q indicates the question code to the respondent. From the results of the recapitulation of the respondent's assessment of SIDUMAS users using the system usability scale (SUS) consisting of 20 system user respondents, the results of the average SUS Scores score are presented in Table 6 as follows.

Table 6. Average SUS Score Results

	SUS Count Result Score										Amount	Mark
No	**Q 1**	**Q 2**	**Q 3**	**Q 4**	**Q 5**	**Q 6**	**Q 7**	**Q 8**	**Q 9**	**Q10**		**(Amount x 2.5)**
1	3	4	2	3	2	4	3	3	2	3	29	73
2	2	3	3	4	4	4	2	4	2	4	32	80
3	4	4	2	4	2	4	2	4	2	4	32	80
4	3	3	4	4	4	4	2	3	4	3	34	85
5	2	3	4	4	2	4	4	3	3	4	33	83
6	2	3	2	3	4	3	3	4	3	4	31	78
7	3	4	3	3	3	4	4	4	2	3	33	83
8	2	4	2	4	3	4	4	4	2	4	33	83
9	2	4	2	4	3	4	3	3	2	3	30	75
10	3	3	2	4	4	4	3	3	2	3	31	78
11	2	3	2	3	3	4	3	3	4	3	30	75
12	2	4	2	4	2	4	3	4	2	4	31	78
13	4	3	2	3	2	4	1	3	2	4	28	70
14	2	3	2	3	4	4	4	4	2	3	31	78
15	2	3	2	3	2	4	4	4	2	4	30	75
16	3	3	4	3	3	4	4	4	3	4	35	88
17	2	4	2	3	4	3	4	4	2	4	32	80
18	2	4	2	4	4	4	3	3	3	3	32	80

*I Nyoman Gede Ardi Yana Putra

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

19	2	4	3	4	2	4	2	4	2	3	30	75
20	1	3	2	4	3	4	2	4	2	4	29	73
Average Score (Final Result)												78

Table 6 shows that the results of the calculation of the average system usability scale (SUS) score on user satisfaction of the public complaints system (SIDUMAS) to respondents, obtained a score of 78 with Acceptability Ranges or user acceptance of SIDUMAS in the Acceptable category because it got a score of 78. Furthermore, for the Percentile Rank score, the value obtained is 78 so it is in the Grade B category. The interpretation of the SUS score is that if the SUS score value is greater than 68, it is said that the usability of the system being evaluated is above average (good), while if it is below 68, it is said that the usability of the system is below average (not good).

Recommendations for Improvement

From the research results obtained in the usability analysis of the community complaint system which is the object of this research, this research will design recommendations for improvements to the SIDUMAS page through the system user interface wireframe using Mockflow. Making recommendations or suggestions for improving the SIDUMAS user page is based on suggestions and input provided by respondents based on the results of the usability evaluation. The following is a description of the results of the recommendations for improvement suggestions from each user page of SIDUMAS.

Fig. 5 Home Page Improvement Recommendations

It is necessary to update the latest information related to the current conditions and conditions around the Badung district area by the application admin (the admin can update complaints every minute if there are complaints from the Badung community). It is necessary to add an image or video menu to every complaint from the people of Badung Regency (the image and video upload feature is very important when making complaints so that the data is real-time and the admin can verify the data to officers in the field, whether the data is true or hoax). For related agencies, it is necessary to socialize the importance of the information contained in this SIDUMAS application, so that the public can send emergency complaints if needed.

*I Nyoman Gede Ardi Yana Putra

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 7, Issue 1, January 2023
DOI : https://doi.org/10.33395/sinkron.v8i1.12034
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Fig. 6 Recommended Improvements to the Complaint Type Page

The developer can update the complaint type feature to make it simpler and easier to use, users still feel confused when choosing a complaint type category in the system. For further development, an understanding of each complaint can be added based on its category so that users understand which complaint to choose. Categorizing types of complaints to facilitate user access. When the application is run for the first time, information or application tour features can be added.

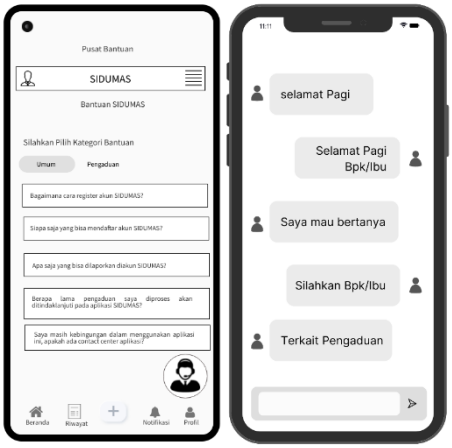

Fig. 7 Recommended Improvements to the Help Center Page

The addition of a manual book for new users of the SIDUMAS application. To fill in the help feature when filling in the user identity. One of the improvements made to the help centre page is the addition of a helpdesk or live chat feature so that when novice users feel confused when filling in their identity data or making a public complaint, they can select this feature to display information related to the contents of their identity or the complaint to be made.

CONCLUSION

From the results of research using the think-aloud method, it was found that the problems/difficulties experienced by users of the community complaint system application (SIDUMAS) on average experienced the same problems in its use. The results of research using the heuristic evaluation method conducted by 5 evaluators can be seen that there is 1 problem that has the highest severity rating (4) the problem must be fixed immediately. At the debriefing stage, the three evaluators discussed the top problems based on the severity rating. With the improvement of these 17 problems, it is expected to improve the performance of SIDUMAS when used by users. The results of the calculation of the average System Usability Scale (SUS) score on user satisfaction of the public complaints system (SIDUMAS) to respondents, obtained a score of 78 with Acceptability Ranges or user acceptance of SIDUMAS in the Acceptable category because it scored 78. Furthermore, for the Percentile Rank score, the value obtained is 78 so it is in the Grade B category. The interpretation of the SUS score is that if the SUS score value is greater than 68, it is said that the usability of the system being evaluated is above average (good), while if it is below 68, it is said that the usability of the system

*I Nyoman Gede Ardi Yana Putra

e-ISSN : 2541-2019
p-ISSN : 2541-044X

is below average (not good). On the basis of the results of the usability evaluation, make recommendations or proposals for enhancing the SIDUMAS user page based on the feedback and recommendations of respondents. In this study, suggestions for improvement will center on modifying the website layout and navigation menu based on the outcomes of data causing user mistakes. In addition, based on the outcomes of user suggestions gathered using the think-aloud technique and heuristic evaluation, the menu has been simplified to make it user-friendly.

REFERENCES

Acosta-Vargas, P., Salvador-Ullauri, L. A., & Luján-Mora, S. (2019). A heuristic method to evaluate web accessibility for users with low vision. *IEEE Access*, *7*, 125634–125648.

Barnum, C. M. (2020). *Usability testing essentials: ready, set... test!* Morgan Kaufmann.

Fan, M., Lin, J., Chung, C., & Truong, K. N. (2019). Concurrent think-aloud verbalizations and usability problems. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *26*(5), 1–35.

Hasibuan, N., & Putri, R. A. (2022). Usability Evaluation of Wedding Administrative Information System using System Usability Scale. *Sinkron: Jurnal Dan Penelitian Teknik Informatika*, *7*(4), 2198–2207.

Hertzum, M. (2020). Usability Testing: A Practitioner's Guide to Evaluating the User Experience. *Synthesis Lectures on Human-Centered Informatics*, *13*(1), i–105.

Holden, R. J. (2020). A simplified system usability scale (SUS) for cognitively impaired and older adults. *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care*, *9*(1), 180–182.

Jordan, P. W. (2020). *An introduction to usability*. CRC Press.

Kaya, A., Ozturk, R., & Altin Gumussoy, C. (2019). Usability measurement of mobile applications with system usability scale (SUS). In *Industrial engineering in the big data era* (pp. 389–400). Springer.

Kumar, B. A., & Goundar, M. S. (2019). Usability heuristics for mobile learning applications. *Education and Information Technologies*, *24*(2), 1819–1833.

Mahendra, G. S., & Asmarajaya, I. K. A. (2022). Evaluation Using Black Box Testing and System Usability Scale in the Kidung Sekar Madya Application. *Sinkron: Jurnal Dan Penelitian Teknik Informatika*, *7*(4), 2292–2302.

Nioga, A., Brata, K. C., & Fanani, L. (2019). Evaluasi Usability Aplikasi Mobile KAI Access Menggunakan Metode System Usability Scale (SUS) Dan Discovery Prototyping (Studi Kasus PT KAI). *J-PTIIK: Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, *3*(2), 1396–1402.

Prasetyaningtias, T., Muslimah Az-Zahra, H., & Hendra Brata, A. (2018). Analisis Usability Pada Aplikasi Mobile E-Government Layanan Aspirasi dan Pengaduan Online Rakyat (LAPOR!) Dengan Heuristic Evaluation. *Analisis Usability Pada Aplikasi Mobile E-Government Layanan Aspirasi Dan Pengaduan Online Rakyat (LAPOR !) Dengan Heuristic Evaluation*, *2*(11), 4647–4653.

Rasmila. (2018). Evaluasi Website Dengan Menggunakan System Usability Scale (SUS) Pada Perguruan Tinggi Swasta Di Palembang. *JUSIFO : Jurnal Sistem Informasi*, *02*(Vol 2 No 1 (2018): JUSIFO), 108–121.

Rocha, N. P. (2021). Heuristic Evaluation of the Usability of Smart Home Applications. *Comprehensible Science: ICCS 2021*, *315*, 483.

Saputra, D., Syah, E. A., & Darnis, F. (2022). Usability Testing on the Simponik Website using the System Usability Scale (SUS). *Sinkron: Jurnal Dan Penelitian Teknik Informatika*, *7*(4), 2584–2592.

Sohaib, O., Solanki, H., Dhaliwa, N., Hussain, W., & Asif, M. (2019). Integrating design thinking into extreme programming. *Journal of Ambient Intelligence and Humanized Computing*, *10*(6), 2485–2492.

Tantri Fajarini, P., Ayu Wirdiani, N. K., & Arya Dharmaadi, I. P. (2020). Evaluasi Portal Berita Online pada Aspek Usability Menggunakan Heurtistic Evaluation dan Think Aloud. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *7*(5), 905. https://doi.org/10.25126/jtiik.2020753587

Trukenbrod, A. K., Backhaus, N., & Thomaschke, R. (2020). Measuring subjectively experienced time in usability and user experience testing scenarios. *International Journal of Human-Computer Studies*, *138*, 102399.

Usability.gov. (2021). Recruiting Usability Test Participants. *Recruiting Usability Test Participants*.

Vlachogianni, P., & Tselios, N. (2022). Perceived usability evaluation of educational technology using the System Usability Scale (SUS): A systematic review. *Journal of Research on Technology in Education*, *54*(3), 392–409.

Weichbroth, P. (2020). Usability of mobile applications: a systematic literature study. *IEEE Access*, *8*, 55563–55577.

*I Nyoman Gede Ardi Yana Putra