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Usability Testing Using Prototype Method in Smart Cleaning System Reporting Tegal Parang

Aldi Andres Ardiansah[1], Agung Triayudi[2*], Ben Rahman[3]

Information Systems, Faculty of Communication and Information Technology, National University, Jl. Sawo Manila, Jakarta, 12520, Indonesia

E-mail: aldiandres88@gmail.com[1], agungtriayudi@civitas.unas.ac.id[2], benrahman@civitas.unas.ac.id[3]
Corresponding Author: Agung Triayudi

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ABSTRACT

Garbage includes final waste that is not used by the community, so it can cause disease if it is not handled properly. Garbage that is allowed to accumulate will emit an unpleasant odor. Several reports from the people of Jakarta, especially the South Jakarta area, do not litter. Garbage is often seen piling up on the streets or in public places. So that the development of a system with the concept of smart cleaning was formed, with the aim of reducing scattered waste that was dumped on the roadside and public places. The method used is SDLC in the form of a prototype model. System Design Methods with UML, Class Diagrams and Use Case diagrams. The results of the research are web- and mobile-based smart cleaning systems. The results of usability testing of the smart cleaning system obtained an average result of about 75% of the answers given by the respondents. The highest rating was obtained with a total percentage of 84% stating that the system can be read.

1. Introduction

In today's world of technology, technological developments have increased rapidly. One technology that is experiencing rapid development is the smartphone. Smartphones are smart phones that have various advanced features and technologies, such as computers that can access the internet, GPS or take photos and videos[1]. So that smartphones are not only used as a communication tool, but can be used for various things that you want to find through smartphones, such as news or educational videos via the internet.

Since smartphones were inaugurated in 2007, more and more people are familiar with and even have smartphones [2]. The use of smartphones certainly has a good impact in providing information related to reporting an ongoing activity. One of them is illegal garbage disposal. Garbage is included in the final waste that is not used by the community, so it can cause disease if not handled properly [3].

Garbage that is allowed to accumulate will emit an unpleasant odor. For this reason, environmental awareness is needed in dealing with this. Environmental awareness is the result of a person's actions to preserve the environment [4]. The lack of environmental awareness is certainly caused by various factors, one of which is the increase in population in Indonesia.

Indonesia is a country that has the highest relative population with more than 200 million people and will continue to grow over the next 30 years[5]. If the community is able to maintain cleanliness, it can be categorized as a community with a better quality of life[6]. However, there are several reports from the people of Jakarta, especially the South Jakarta area, who are reluctant to litter. Garbage is often seen piling up on roadsides and in public places. Of course it has a bad impact on residential areas or for pedestrians.

So we need a system to make it easier for the public to report incidents online or online without coming to their destination[7]. For this reason, in this study the author aims to overcome illegal waste disposal around roadsides and public places. So that the development of a web-based reporting system with the concept of smart cleaning was formed. In other words, governance trends follow smart cities [8]. This system

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has a working principle such as E-report or E-complaint. When viewed from the relevance of previous research, namely the title PNCares: Android-based mobile application to manage student complaints[9]. This system aims to prevent the loss of complaint reports. The next relevant research is the title of e-report and the data collection system for firefighters or firefighters (BPK) in the city of Banjarmasin[10] . This system aims to monitor the line of firefighters who are still operating or not. The next relevant research is the title of the prototype design of public complaints services through android-based village offices [11].

The purpose of this system is to facilitate reporting by the public. The next relevant research is entitled Mobile-Based E-Complaint Technology for the Government of Bandar Lampung [12]. This system aims to provide feedback or complaints about the infrastructure. Researchers obtained research results from a number of literature studies presented.

The results of the study were unable to upload videos related to the submitted reports. So this research will be designed using the prototype method. The purpose of using the prototype method is to describe the system obtained, which is then evaluated by the user [13]. With the establishment of usability testing with a prototype method on smart cleaning systems, it is hoped that it will make it easier for the public to report related to illegal waste disposal so that garbage is not scattered on the roadside or in public places.section.

2. Research Methods

A. Research Stages

At this stage using experimental research methods. The experimental method is a method used to find the effect of a variable on other variables in a controlled situation. There are several sequences of steps that must be done to get maximum results [14]. So that the research framework is formed as follows.

Figure 1. Framework

In Figure 1 it can be seen that the stages of the author in conducting research. Within the framework of thinking there are several paths that must be done, ranging from literature study, data collection, prototype development, system evaluation. The following is an explanation of the stages of the framework:

1) Data collection
   Data was collected by conducting interviews with the Tegalwar sub-district as the waste manager. In addition, this research also refers to the literature study of web and mobile-based system development.
2) Analysis
   From the previous process, namely data collection, it was found that waste was reported by the community and had to submit evidence in the form of photos or videos. Then the report is received by the kelurahan which is then submitted or delegated to PPSU. PPSU is appointed according to the place where the report is submitted.
3) Design
   At this stage, the process will be made into a system design according to the data that has been

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obtained. Then the data is translated into an easy-to-understand interface. The system design will determine how the system will be further developed.

4) Implementation
At this stage the system is applied to villages and communities, especially the South Jakarta area. Then the system will be run by the kelurahan with the consideration that if there are errors or additions, changes can be made at the evaluation stage.

5) Evaluation
After the system can run, then provide feedback about the system being run. By providing a google form to determine the level of eligibility.

B. Prototype Method

In the development of the system method using the prototype method. The prototype method is a method that is widely used in system development. The prototype method also functions in helping the development of the system to be more detailed[15].

C. System Planning

Design

The modeling design used in this research is UML (Unified Modeling Language). There are types of diagrams in UML, one of which is use case diagrams and class diagrams [16]. In the design of system modeling, use case diagrams and class diagrams are formed.

1. Use Case Diagram

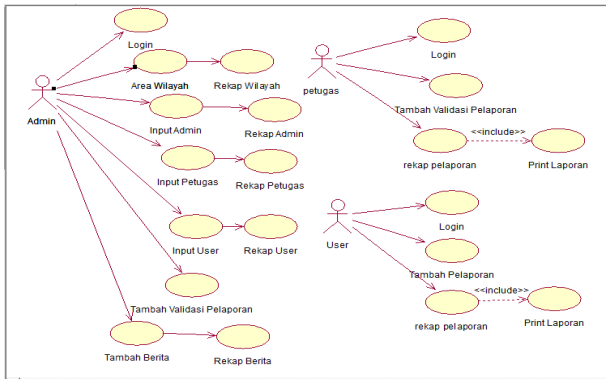

Figure 2. Use Case Diagram

In Figure 2 above, is a use case diagram of the system modeling. After forming a model with a use case diagram, the next step is an activity diagram. There are 3 actors, namely admin, officer and user.

2. Class Diagram

In Figure 3 below is the flow diagram of the intelligent cleaning system:

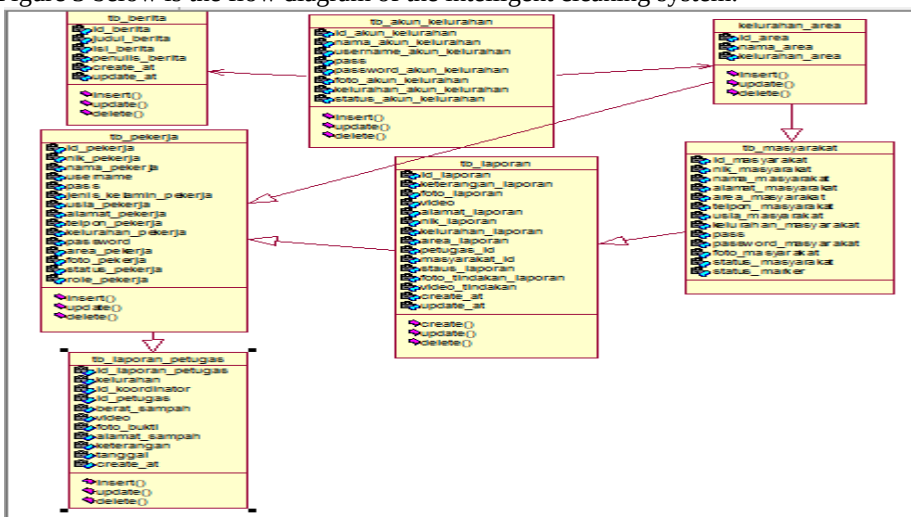

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Figure 3. Class Diagram

D. System Testing

Testing this system using usability testing. Usability testing is useful for measuring the level of usability of a product and the interaction of the system interface [17].

3. Result and Discussion

At This research produces a display on the smart cleaning system which is presented in Figure 4 below.

Figure 4. Home Page

In the smart cleaning home page, it contains several features such as view reports, download system, register and login.

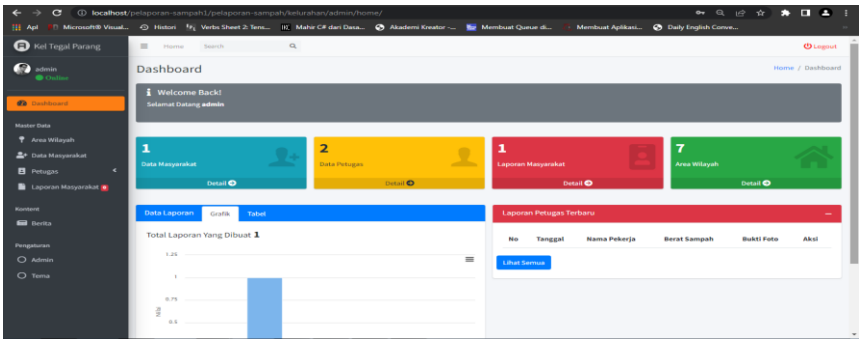

Figure 5. Admin Dashboard

The dashboard page has a number of features such as viewing report data, worker report tables, and total reporting graphs. On this dashboard, you will be directed to the menus that have been created.

Figure 6. Add User Report Page

On the add user reporting page, you can add video evidence to add to the trash reporting. On the screen is the phone version. From the waste reporting menu, the Rw location listed on the register menu will be taken.

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In testing the system obtained the following results

TABLE 1.
MAXIMUM SCORE

No	Jawaban	Skor	Total Responden	Skor Maksimum (Skor * Total Responden)
1	Sangat Setuju	5	50	250
2	Setuju	4	50	200
3	Cukup Setuju	3	50	150
4	Tidak Setuju	2	50	100
5	Sangat tidak Setuju	1	50	50

Table 1 above is a table of maximum score results. The assessment is calculated based on the Likert scale calculation.

TABLE 2.
SCORE CATEGORY

No	Kategori	Keterangan
1	81% - 100%	Sangat Setuju
2	61% - 80%	Setuju
3	41% - 60%	Cukup Setuju
4	21% 40%	Tidak Setuju
5	0% - 20%	Sangat tidak Setuju

The criteria score shows the percentage of the total criteria in the assessment. The questionnaire was distributed by 50 respondents via google form.

TABLE 3.
QUESTIONNAIRE RESULTS QUESTION 1

Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah User Interface sudah optimal?	Sangat Setuju	5	13	65	(181:250)x100= 72,4%
	Setuju	4	16	64	
	Cukup Setuju	3	11	33	
	Tidak Setuju	2	9	18	
	Sangat tidak Setuju	1	1	1	
Total			50	181	

In the first question it can be calculated to be 72.4% of the total answers of respondents who agree that the system interface is optimal.

TABLE 4.
QUESTIONNAIRE RESULTS QUESTION 2

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Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah menu pada sistem mudah digunakan?	Sangat Setuju	5	17	85	(196:250)x100= 78,4%
	Setuju	4	19	76	
	Cukup Setuju	3	8	24	
	Tidak Setuju	2	5	10	
	Sangat tidak Setuju	1	1	1	
Total			50	196	

In the second question, it can be calculated to be 78.4% of the total answers of respondents who agree that the menu on the system is easy to use.

TABLE 5.
QUESTIONNAIRE RESULTS QUESTION 3

Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah simbol gambar mudah dipahami?	Sangat Setuju	5	15	75	(194:250)x100= 77,6%
	Setuju	4	16	64	
	Cukup Setuju	3	18	54	
	Tidak Setuju	2	0	0	
	Sangat tidak Setuju	1	1	1	
Total			50	194	

In the third question, it can be calculated to be 77.6% of the total answers of respondents who agree that the image symbols are easy to understand.

TABLE 6.
QUESTIONNAIRE RESULTS QUESTION 4

Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah download data sudah sesuai?	Sangat Setuju	5	11	55	(178:250)x100= 71,2%
	Setuju	4	18	72	
	Cukup Setuju	3	10	30	
	Tidak Setuju	2	10	20	
	Sangat tidak Setuju	1	1	1	
Total			50	178	

In the fourth question, it can be calculated to be 71.2% of the total answers of respondents who agree that the data download is appropriate.

TABLE 7.
QUESTIONNAIRE RESULTS QUESTION 5

Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah sistem cepat untuk merespon?	Sangat Setuju	5	15	75	(177:250)x100= 70,8%
	Setuju	4	13	52	
	Cukup Setuju	3	8	24	
	Tidak Setuju	2	12	24	
	Sangat tidak Setuju	1	2	2	
Total			50	177	

In the fifth question, it can be calculated to be 70.8% of the total answers of respondents who agree that the system responds quickly.

TABLE 8.
QUESTIONNAIRE RESULTS QUESTION 6

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Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah informasi sistem sudah terpenuhi?	Sangat Setuju	5	14	70	(181:250)x100= 72,4%
	Setuju	4	13	52	
	Cukup Setuju	3	15	45	
	Tidak Setuju	2	6	12	
	Sangat tidak Setuju	1	2	2	
Total			50	181	

In the sixth question it can be calculated to be 72.4% of the total answers of respondents who agree that the system has been fulfilled.

TABLE 9.
QUESTIONNAIRE RESULTS QUESTION 7

Pertanyaan	Jawaban	Skor	Responden	Jumlah Skor	Nilai Persentase
Apakah sistem mudah dibaca?	Sangat Setuju	5	22	110	(181:250)x100= 84%
	Setuju	4	16	64	
	Cukup Setuju	3	12	36	
	Tidak Setuju	2	0	0	
	Sangat tidak Setuju	1	0	0	
Total			50	210	

In the seventh question, it can be calculated to be 84% of the total answers of respondents who stated Strongly agree that this system is easy to read.

TABLE 9.
SCALA PROCESSING RESULTS

No. Pertanyaan	Nilai Persentase	Keterangan
1	72,4%	Setuju
2	78,4%	Setuju
3	77,6%	Setuju
4	71,2%	Setuju
5	70,8%	Setuju
6	72,4%	Setuju
7	84%	Sangat Setuju
Total Persentase	72,4%+78,4%+77,6%+71,2%+70,8%+72,4%+84%=526,8%	Setuju
Rata Rata	526,8%/7=75,26%	

In table 10 several questions are calculated to get the average percentage result. It was found that around 75.26% agreed that the system was suitable for use by the community.

4. Conclusion

Based on the research that has been done, the following results were obtained: The system can be used by the kelurahan. There are no problems when running the system.The results of the system development test are obtained from the total questions answered by the respondents

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