

Usability Evaluation Satu Sehat Application Using Heuristic Evaluation Method

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Article Information	ABSTRACT
Article History Received : December 31, 2024 Revised : January 26, 2025 Published : January 31, 2025	Digital transformation in the health sector aims to improve efficient, effective, and integrated services. The government has started building mobile-based applications in various fields. Satu Sehat application is one of mobile-based application developed by the Indonesian Ministry of Health. As an integrated health platform in Indonesia, faces challenges in ensuring optimal user experience. User experience is greatly influenced by a good user interface. User interface must have good usability aspect so that users will feel comfortable when using the application. This study aims to evaluate the usability of the application using the Heuristic Evaluation method, by identifying problems based on Nielsen's 10 heuristic principles. Evaluation was conducted by 5 evaluators who have expertise in interaction design, health technology, and usability analysis. The results reveal two problems in error prevention and one problem in help and documentation, which are the basis for recommendations for further development. Recommendations are given on several aspects to improve the user experience.
Keywords: <i>Heuristic Evaluation; Usability Evaluation; User Experience.</i>	

INTRODUCTION

The demand to implement electronic-based government (e-government) is a challenge for all government agencies. Mobile applications are one of the important platforms in providing information and interacting with users because of the great public interest in using smartphones which are considered effective and efficient (Subhan, M., & Indriyanti, A.D., 2021) (Nadhirah, H., et al., 2019). Mobile-based government services have begun to be developed, such as BELA (Beranda Layanan) application launched by the presidential staff office as support for the mobile-based secretariat service dashboard (Respati G.R.L. and Sensuse, D.I., 2021). One of the most important aspects in mobile application development is User Interface (UI), which includes how users interact when using the application. User interface must have good usability aspect so that users will feel comfortable when using the application. Problems with the user interface will affect the user's experience and impression when using the application (Ginting, L.M., et al., 2021). Good user experience will make users feel satisfied and make them more likely to use the application continuously. Thus, user interface discusses about visual element of the system that prioritizes the beauty of the appearance, both in terms of layout and the selection of attractive colors. While user experience discusses about interactions or processes that occur so that user experience is obtained based on research into user characteristics and behavior (Fatkhuri, et al., 2024).

The development of digital technology in the health sector has resulted in various innovations, including mobile applications designed to support digital health data management. Satu Sehat application, launched by the Indonesian Ministry of Health, aims to integrate

individual health data and provide digital-based services to the community (Kementerian Kesehatan Republik Indonesia, 2024). This application connects data, analyzes, and provides services to support integration between applications and health service facilities (Sarimole, F.M. & Kudrat, 2024). However, the success of this application is not only determined by its technical functions but also by its level of usability. Usability is one aspect that affect application quality (Zamroni, G.M. et al., 2023). Usability testing measures how easy an application can be used by users by identifying problems or obstacles that users may experience (Kusuma, H. et al., 2024). The goal of this evaluation is to provide an optimal UI with ease of interaction between users and the application (Subay, N.Y., et al., 2024). Low usability can hinder the adoption of the application by users and reduce the effectiveness of its use in supporting the national health system.

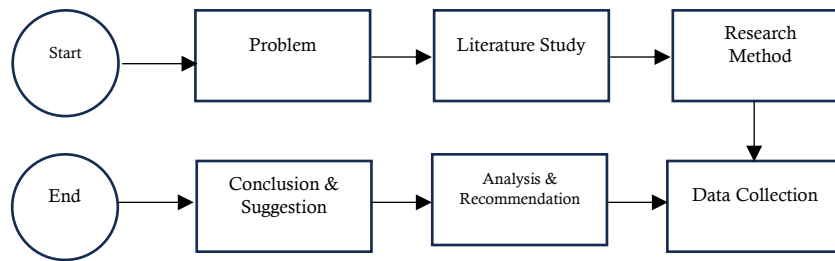
According to (Ginting, L.M., et al., 2021) heuristic evaluation better than other method at finding usability problems. Heuristic evaluation is user interface evaluation method to find usability problems. This method has been widely used in user interface evaluation in various fields of applications or information systems, such as in research (Pangkey, M.E.M., et al., 2024) which evaluate a website, (Wirawan, D.K. and Maria E., 2024) which evaluate e-commerce application, (Nurhaliza et al., 2023) which evaluate new student admission system, (Ginting L.M., et al., 2021) which evaluate a website with by comparing heuristic evaluation and cognitive walkthrough, and (Respati, G.R.L. and Sensuse, D.I., 2021) which evaluate an prototype of an government application. This means that the heuristic evaluation method is effective to apply because it can produce feedback from software design that is more accurate, fast and cheap, so that design problems can be handled more quickly.

The purpose of this research is to apply the 10 heuristic evaluation principles method to the evaluation of the Satu Sehat application user interface. A number of respondents who are experts in this field will participate. The results of the user interface evaluation and recommendations can be used as consideration by the Satu Sehat application development team to make improvements so that they can create a better user experience.

RESEARCH METHODS

The method used in this study is the implementation of the theory of "Heuristic Evaluation" by Jakob Nielsen and Ralf Molich. The Heuristic Evaluation procedure is used as a reference in assessing the user interface design and user experience. Good user experience will have an impact on high user satisfaction which will strengthen the intention to continue using the application service (Wahyuningtyastuti, I., & Candiwan, 2024). This method is fast and cost-effective, although it is limited to findings based on the evaluator's expertise. This research uses data collection methods: literature studies, observation, interviews, and questionnaires. In the literature study step, researchers studied several literatures such as books, research journals and scientific articles that are relevant to the concept of usability. Literature studies are conducted with the aim of finding various theories that are in accordance with the usability problems being studied and used as reference materials in research reports.

Heuristic Evaluation method by Jakob Nielsen and Ralf Molich is an evaluation conducted on a system without involving actual users, but involving 3-5 expert evaluators in the UX field who are asked to conduct observations (Imana, A.G. & Nugroho, Y.S., 2023) (Husin, H., et al., 2024). Evaluator in this research was conducted by 5 evaluators who have expertise in interaction design, health technology, and usability analysis. Based on their backgrounds, it is hoped that evaluators will be able to provide valid usability evaluation results. Then, problems obtained after the evaluator filled out the questionnaire. Respondents' answers are calculated to determine conclusions and suggestions for user interface and user experience design recommendations for Satu Sehat application. The research flow can be seen in Figure 1.

**Figure 1.** Research Flow

Data collection step, data from questionnaire are collected. The questionnaire statements were compiled using 10 heuristic principles (Ginting, L.M., et al., 2021) (These principles can be seen in table 1. Based on 10 aspects contained in the Heuristics Evaluation method will be made into questionnaire statement points with a score of 1-5 where Strongly Agree (SS) score 5, Agree (S) score 4, Neutral (N) score 3, Disagree (TS) score 2, and Strongly Disagree (STS) score 0. The answers “Strongly Agree” and “Agree” mean that the item is “Found” and if the answers “Disagree” and “Strongly Disagree” mean that the item is “not found”. Each item in the question is calculated as a percentage, what percentage is found and what percentage is not found. Based on the results of processing the questionnaire data, for each statement item submitted, the qualification percentage was obtained as in table 2 below. If the result in table 4 is found then successfull. It mean the statement has been implemented on Satu Sehat application. If the result in table 4 not found then not successfull. It mean the statement has not been implemented on Satu Sehat application.

Table 1. Heuristic Evaluation Principle

Code	Heuristic Principle	Definiton
H1	Visibility of system status	The system should always inform the user about what is happening in the system and provides appropriate feedback
H2	Match between system and real world	The system should use a common user language with words, phrases and concepts to interact with users.
H3	User control and freedom	The system can be controlled well by the user and the user can interact with the system freely. Users need an "emergency exit" to get out of an unwanted situation.
H4	Consistency and standarts	The system has a standart design standard so that the appearance looks consistent. Users should not have to wonder whether different words, situations, and actions mean the same thing in a system
H5	Error Prevention	Problem prevention is better than good error messages.
H6	Recognition rather than recall	The system should minimize the user's memory load when performing tasks on a system by providing tasks that are easy for the user to remember.
H7	Flexibility and efficiency of use	The system should be able to serve different types of users, both expert and inexperienced users.
H8	Aesthetic and minimalist design	The system should not contain irrelevant or rarely needed information.

H9	Help users recognize, diagnose, and recover from errors	The system should have error messages that should be expressed in simple language and easy for users to understand.
H10	Help and documentation	The system should have help if users need it

RESULTS AND DISCUSSION

There are 20 research statement based on heuristic evaluation principle will be given to 5 evaluators to evaluate Satu Sehat application. Each statement in the questionnaire is arranged based on the Heuristic Evaluation aspect as can be seen in Table 3.

Table 2. Qualification based on presentage calculation

Score	Qualification	Result
85 – 100%	Very Good	Successfull
65 – 84%	Good	Successfull
55 – 64%	Pretty Good	Not Successfull
0 – 54%	Not Good	Not Successfull

Table 3. The statement based on heuristic principle

No.	Heuristic Evaluation Code	Statement
1	H1	-The app provides clear visual confirmation after the user completes an action (S1). -The system status is easy to understand when the app is loading data or experiencing an error (S2).
2	H2	-The terms and icons used are easy for the average user to understand (S3). -Information is presented in a way that matches user expectations (S4).
3	H3	-Users can easily undo unwanted actions (S5). -Undo and redo buttons are available to correct errors (S6).
4	H4	-The interface design is consistent across all pages of the app (S7). -Icons and buttons follow common health app standards (S8).
5	H5	-The system provides warnings before the user takes a risky action (S9). -Data input validation works well (S10).
6	H6	-Users can easily find the features they need (S11). -The available options are clearly visible without forcing users to remember previous steps (S12).
7	H7	-The application provides shortcuts for experienced users (S13). - The navigation process within the application is efficient (S14).
8	H8	-The application display is clean and not confusing (S15). -The information presented is not excessive (S16).
9	H9	-Error messages are easy to understand (S17). -The solutions offered after an error occurs are clear (S18).
10	H10	-Help documentation is easy to find (S19). -The application usage guide is complete and easy to understand (S20).

Presentage of the statement items

Table 4 shows the percentage of statement items. Based on table 4, it is known that out of 20 statements, 17 statements are included in the Good and Very Good qualifications with a percentage above 65%. Meanwhile, there are 3 items that have the Pretty Good and Not Good

qualifications with a percentage below 65%, namely statements S9, S10 on the error prevention variable and statement S20 on the Help and Documentation variable.

Table 4. Presentage of Statement Items

Heuristic Principle	Statement	Presentage					Result
		5	4	3	2	1	
Visibility of system status (H1)	S1	20%	80%	0%	0%	0%	Found
	S2	20%	80%	0%	0%	0%	Found
Match between system and real world (H2)	S3	20%	60%	20%	0%	0%	Found
	S4	20%	60%	20%	0%	0%	Found
User control and freedom (H3)	S5	0%	60%	40%	0%	0%	Found
	S6	0%	60%	40%	0%	0%	Found
Consistency and standarts (H4)	S7	20%	80%	0%	0%	0%	Found
	S8	20%	80%	0%	0%	0%	Found
Error prevention (H5)	S9	0%	0%	0%	80%	20%	Not Found
	S10	0%	0%	0%	60%	40%	Not Found
Recognition rather than recall (H6)	S11	20%	80%	0%	0%	0%	Found
	S12	20%	80%	0%	0%	0%	Found
Flexibility and efficiency of use (H7)	S13	20%	60%	20%	0%	0%	Found
	S14	20%	60%	20%	0%	0%	Found
Aesthetic and minimalist design (H8)	S15	40%	60%	0%	0%	0%	Found
	S16	40%	60%	0%	0%	0%	Found
Help users recognize, diagnose, and recover from errors (H9)	S17	0%	60%	40%	0%	0%	Found
	S18	0%	60%	40%	0%	0%	Found
Help and documentation (H10)	S19	0%	40%	60%	0%	0%	Found
	S20	0%	0%	0%	80%	20%	Not Found

Reccomendation

Recommendations are obtained based on items that get a percentage below 65% with Pretty Good and Not Good qualifications. Developers can focus on improving error prevention and help & documentation variable. The are two recommendations for error prevention aspect and one recommendation for help and documentation aspect. The recommendations can be seen in table 5 below:

No.	Problem	Recommendation
Error Prevention		
1	S9	Added stricter input validation to forms.
2	S10	Optimized the error message system to be more informative and understandable for novice users.
Help and documentation		
3	S20	Improved the quality of help documentation and made it more accessible.

CONCLUSION

Evaluation of Satu Sehat application interface using the heuristic evaluation method has successfully found several items with the lowest percentages. From the results of the calculations that have been carried out, the percentages with the qualifications of Pretty Good and Not Good are in variables H5 (S9 & S10), and H10 (S20). Based on these findings, improvements should be made to the Satu Sehat application interface, including adding a notification dialog to the input form if, adding a page that explains the menus and features in the application, adding a feature to help use the application module, and adding an admin contact or live chat feature when users experience difficulties. After the improvements are made, it can be continued to the coding

implementation stage. For research on evaluation of usability, the next application can be done with other methods and application users as a respondents, in order to obtain rich evaluation results and as a comparison.

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