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EVALUATION OF USER INTERFACE IMPLEMENTATION OF SAYANG ANAK APPLICATION BASED ON HEURISTIC EVALUATION METHOD

***Harsono[1], Hargianti Dini Iswandarir[2], Rinayati[3]**

[1,3]Universitas Widya Husada Semarang
[2]Universitas Ngudi Waluyo Ungaran

Email Korespondensi : harsono@uwhs.ac.id

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ABSTRACT

Sayang Anak application is an application designed and developed by the Semarang City Health Office with the aim of monitoring the development and growth of children and toddlers, which is used as one of the efforts to reduce stunting rates in Semarang City. This study aims to evaluate the implementation of user interface of Sayang Anak application based on heuristics evaluation method. This type of research is a descriptive quantitative qualitative research using a crossectional research design with a sample of 33 health workers of health centers within the Semarang City Health Office who are in charge of operating the application. The sampling technique was purposive sampling and the research instrument used was a questionnaire on the implementation of the user interface of the application sayang anak in the form of a google form and interview guidelines. The results of the research on evaluating the implementation of the user interface of the Semarang city health office's baby application based on heuristic evaluation based on the results of data analysis show that the average severity rating value is 1.4, which means that improvements are needed with a medium priority level. The highest severity rating value is in the User Control and Freedom aspect of 2.2, this is according to the user of the application, which states that the navigation button that makes it easy for users to return to the previous page if the user accidentally enters an unwanted menu has not been accommodated.

Keyword : Evaluation; User Interface; Sayang Anak Application; Heuristic Evaluation Method

INTRODUCTION

The health of infants and toddlers is very important to pay attention to because at this time their physical and mental growth and development is very fast. Infant and toddler health efforts include management and referral, nutrition, growth and development monitoring, immunization, rehabilitation and long-term care for chronic/rare diseases, parenting and developmental stimulation, and provision of a healthy and safe environment(Kementerian Kesehatan Republik Indonesia, 2024). One thing that needs attention related to the health of infants and toddlers is nutrition, because children who are malnourished will experience stunting. Stunting is a chronic nutritional problem that is multifactorial and intergenerational in nature(Ristek, 2020)

The number of stunting cases in Semarang city in February 2023 was recorded at 1,340 cases, the number dropped to 1,297 cases in March 2023, but in May 2023 it increased to 1278 cases(Fajlin, 2023). Various efforts have been made by the Semarang city government to reduce the number of stunting cases to zero cases, one of which is through the sayang anak application designed by the Semarang city Health Office for monitoring the development and growth of children and toddlers, which is used as one of the efforts to reduce the stunting rate in Semarang City. The Sayang Anak application began to be published (introduced) on the website https://sayanganak.semarangkota.go.id/ in early 2023, where users who can register are currently still focused on parents of their children who are registered in daycare in the Sayang Anak application and in the future will be expanded to users at the posyandu and puskesmas levels.

User Interface is a visual display of a product that connects the system (website, application) with the user(Aprilia, 2022). A good and correct User Interface is user friendly: the application/web can facilitate users when surfing in the application/web without requiring more effort to understand the use of an application. User Interface can help strengthen the brand and product/service image. It can increase users positive perception of the brand and the product/service produced(Alfajry, 2023). One of the methods used to evaluate the user interface is Heuristic Evaluation. Heuristic Evaluation is a method to measure the extent of a software problem in the user interface where the problem identification is in the field of human interaction with the computer(Purnama, Pradnyana and Agustini, 2019). By evaluating the user interface of the Sayang Anak application based on heuristic evaluation, the existing user interface

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problems can be identified so that improvements can be made according to the recommendations of the results of this study.

Based on this background, it is important for the Semarang City Health Office to obtain suggestions and recommendations regarding the implementation of the user interface of the Sayang Anak application in an effort to develop and improve it to the satisfaction of its users. This research aims to provide recommendations for the user interface of the application for children based on the 10 principles of the heuristic evaluation method with the hope that the health department can develop applications based on recommendations and user input.

METHOD

This research is a quantitative-qualitative descriptive study using a crossectional research design. Qualitative methods are used to assist the identification process and in-depth observations at each stage of the method in order to evaluate user satisfaction with the Sayang Anak application. Quantitative methods are used to evaluate and measure the implementation of the user interface of the Sayang Anak application based on 10 principles in the heuristic evaluation method.

Fig.2. User Interface Sayang Anak Application

In research, the stages of research are needed so that the research carried out can be systematic, structured and also logical(Azis, 2023). The research stages in this study are as shown in figure 1

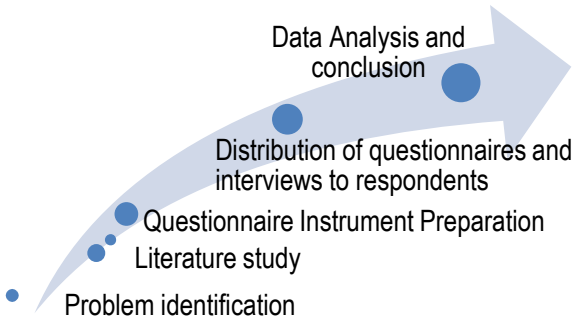

Fig. 1. research stages

A. Problem identification

It is a stage to identify the scope of the problem that occurs and then formulate the problem that is explored based on the results of interviews with users of the application. Interviews were conducted involving the Head of the Public Health Division of the Semarang City Health Office and the program holder of the sayang anak application in the public health section of the Semarang City Health Office. Problem identification is used as initial data obtained through observations and interviews to find out the obstacles and stages that will be carried out in the research(Galih Reksa Lingga Respati and Dana Indra Sensuse, 2022)

B. Literature study

The stages of collecting and reviewing literature (theory) related to analysis and evaluation activities using Heuristic Evaluation. The literature used as reference material to support this research activity is in the form of journals, journals, books, and previous research. The purpose of the literature study is to enrich the author's insight into the research topic being carried out, formulate research problems and determine the theories and methods and research results that are appropriate for use in the research being carried out(Aryana, 2021)

C. Questionnaire Instrument Preparation

The questionnaire is a data collection instrument that is carried out by giving a set of questions or written statements to respondents to answer. The questionnaire contains a list of questions related to the use of the application sayang anak which is arranged in such a way as to pay attention to and refer to the 10 aspects of heuristic evaluation distributed to respondents in this study. The heuristic evaluation method is a method for identifying design problems in user interfaces. The evaluation is done by comparing the design with a set of guidelines (heuristics) that make the system easy to use(*Heuristic Evaluation*, 2023)(Rabila *et al.*, 2022)
This method is useful for identifying glaring problems in user interfaces and can be used on different types of products including prototypes, physical products, games, virtual reality or voice interfaces. The Heuristic Evaluation method was developed by Jacob Nielsen and involves evaluating products based on ten criteria, including visibility of system status, compatibility between the system and the real world, user control and freedom, consistency and standards, recognition rather than recall, flexibility and efficiency of use, aesthetic and minimalist design, helping users recognize, diagnose, and recover from errors, and help and documentation.(Purnama, Pradnyana and Agustini, 2019). Nielsen's heuristics are general principles, meaning that they do not specify specific usability rules(Ramadhan, 2021). Instead they are general rules that you can follow to help create more accessible, user-friendly and intuitive digital products(Aela, 2022)
Here are Nielsen's 10 heuristics :

1. Visibility of System Status
   The system should always keep the user informed of what is what is happening, through appropriate feedback in a reasonable amount of time.
2. Match Between System and The Real World
   The system should speak the user's language, using words, phrases and concepts familiar to the user, not system-oriented terms. Follow real-world conventions that make information appear natural and logical.
3. User Control and Freedom
   Users often select functions in the system unintentionally and will need a clear "emergency exit", to be able to leave the unwanted condition, without going through a long process. Emergency exits include undo and redo features
4. Consistency and Standard
   The system has a standard in presenting consistent elements, codes, words/terms on each page. This way, users do not have to question whether different words, situations or actions have the same meaning.
5. Error Prevention
   The design of the Sayang Anak app prevents users from making mistakes by eliminating error-prone conditions and providing confirmation options to users before they perform an action
6. Recognition Rather Than Recall
   Minimize the memory load on the user by making objects, actions and options visible to the user. Users should not have to remember information from one part of the dialog to another. Instructions for using the system should be visible and easily accessible whenever needed by the user
7. Flexibility and Efficiency of Use
   The system provides flexibility by providing alternative actions that accommodate both novice and expert users. accommodates both novice and expert users. Give allow each category of users to choose how to work.
   For example: expert users will work faster by using the Ctrl + S shortcut to save a file in an application because it speeds up the
   speed up their work, while novice users can choose the formal steps of choosing the File menu, then Save
8. Aesthetic and Minimalist Design
   The system should not contain information that is irrelevant or rarely needed. The existence of irrelevant information will compete with and interfere with important information and the visibility of necessary information for users.
9. Help Users Recognize, Diagnosa and Recover from Errors

Error messages should be expressed in simple language without complex code, pinpointing the problem and suggesting solutions constructively

10. Help and Documentation
The system has relevant documentation and good "help" features, so users can learn everything related to the system

D. Distribution of questionnaires and interviews to respondents

The stage where the questionnaire is distributed to respondents to test (measure) the extent to which the implementation of the user interface of the application users is based on heuristic evaluation variables. The study involved 33 pediatric health center workers in the Semarang City Health Office area who used the sayang anak application as respondents. The data collection method used questionnaires and direct interviews with respondents. Interview is a data collection method conducted through face-to-face and direct question and answer between researchers and respondents. Interviews were conducted to identify related user interface enhancements and improvements needed by referring to the 10 aspects of heuristic evaluation that were rated high based on the results of quantitative data analysis.

E. Data Analysis and conclusion

Data analysis in this study was carried out through :

1. Content analysis
Content analysis is used to analyze qualitative data derived from in-depth interviews and observations related to the application of sayang anak. Content analysis is a method for drawing conclusions through efforts to find message characteristics and is carried out objectively and systematically. Content analysis begins with the use of qualitative data in the form of text, creating a design in accordance with the analysis of the researcher's thoughts(Rozali, 2022)
2. Quantitative Analysis
Quantitative analysis aims to get an average of the aspects of the questionnaire where these aspects are taken from research variables that refer to the Heuristic Evaluation method. To get the average results for each aspect using the equation(Darmawan, 2020)

$$SR = \frac{0(X1) + 1(X2)2(X3) + 3(X4).}{N}$$

Description:
SR = Average of each aspect
X1 = Scale frequency 0
X2 = Frequency of scale 1
X3 = Frequency of scale 2
X4 = Frequency of scale 3
N = Total respondents

The results of the quantitative analysis based on the 10 heuristic evaluation principles were graded (evaluated) based on their severity. The severity rating can determine the amount of resources needed to fix the identified problem and provide an initial estimate of the usefulness of the principles that need to be added (Zekben and Ghina, 2023). Severity rating needs to be determined in the evaluation to find out how severe the user interface problems found(Imana and Nugroho, 2023).

To determine the severity rating in this study using a method based on Jakob Nielsen's theory as listed in table 1(J Nielsen, 1994)

Table 1. Severity Rating Jakob Nielsen

Rating	Explanation
0	No need for improvement
1	Problems found but no need for improvement
2	Improvement needed with low priority level
3	Improvements needed with a high priority level
4	Repairs are mandatory

Like the research that has been done before(Imana and Nugroho, 2023) this research will only use the range 0,1,3,4. while for range 2 is not used because the goal is to get the user interface problem of the application sayang anak with high priority and no problem so that for user interface problems with low priority is not needed (not listed).

The research conclusion is the final part of a research report that summarizes the results, discussion, and implications of the research. The conclusion should answer the research question, show the contribution of the research, and provide suggestions for future research(*Cara Membuat Kesimpulan Penelitian yang Menarik, Jelas, dan Bermakna*, 2023).

The conclusion of the research results is stated based on the results of quantitative and qualitative analysis that has been carried out.

RESULT AND DISCUSSION

The results of quantitative data analysis from data collection through distributing questionnaires to 33 respondents based on the heuristic evaluation method are shown in table 2

Table 2. Data analysis results

Heuristic Evaluation Method	Respondent assessment frequency				SR $\frac{0(X1)+1(X2)+2(X3)+3(X4)}{N}$					
	0	1	2	3	x1	x2	x3	x4	Amount	SR
Visibility of System Status	68	14	16	3	0	14	32	9	55	1,7
Match Between System and The Real World	79	6	7	7	0	6	14	21	41	1,2
User Control and Freedom	60	12	20	7	0	12	40	21	73	2,2
Consistency and Standard	82	6	8	3	0	6	16	9	31	0,9
Error Prevention	74	5	19	1	0	5	38	3	46	1,4
Recognition Rather Than Recall	74	10	12	3	0	10	24	9	43	1,3
Flexibility and Efficiency of Use	80	10	6	3	0	10	12	9	31	0,9
Aesthetic and Minimalist Design	74	14	11	0	0	14	22	0	36	1,1
Help Users Recognize, Diagnosa and Recover from Errors	67	13	17	2	0	13	34	6	53	1,6
Help and Documentation	62	13	21	3	0	13	42	9	64	1,9
Total									**47,3**	**1,4**

Based on the presentation of the research results data presented in table 2, it visualizes the level of user interface problems of the Sayang Anak application based on the value of the severity rating. Table 2 shows that the total average severity rating of the results of data analysis from distributing questionnaires based on 10 heuristic evaluation principles is 1.4, which means that improvements are needed with a medium priority level. This is in line with research conducted by Diah Putri Utami et al which states that measuring system usability in the M-Syariah mobile banking application using the HE method results in an average severity value of 1, namely the severity level is at the Cosmetic Problem level or cosmetic problems where the problem does not have too much impact on user comfort and repairs are not too important to do if you have limited time(Utami *et al.*, 2023). The same thing was also stated by Andi Nur Rahman in his research which states that the results of measuring the usability level of the SIMAK UNSIL website using the WEBUSE and Heuristic Evaluation methods obtained a description of the usability level at the "Good" level or said to be good. However, there are still many indicators that have low scores, indicating that the usability of the SIMAK website is still not fully realized. usability of the SIMAK website is still not fully achieved, the problems found are many in terms of in terms of user-interface, website navigation, and help to overcome errors that appear. to resolve errors that arise(Rachman *et al.*, 2022). The visualization of the severity rating display of the data analysis results is presented in the form of a radar chart shown in Figure 2

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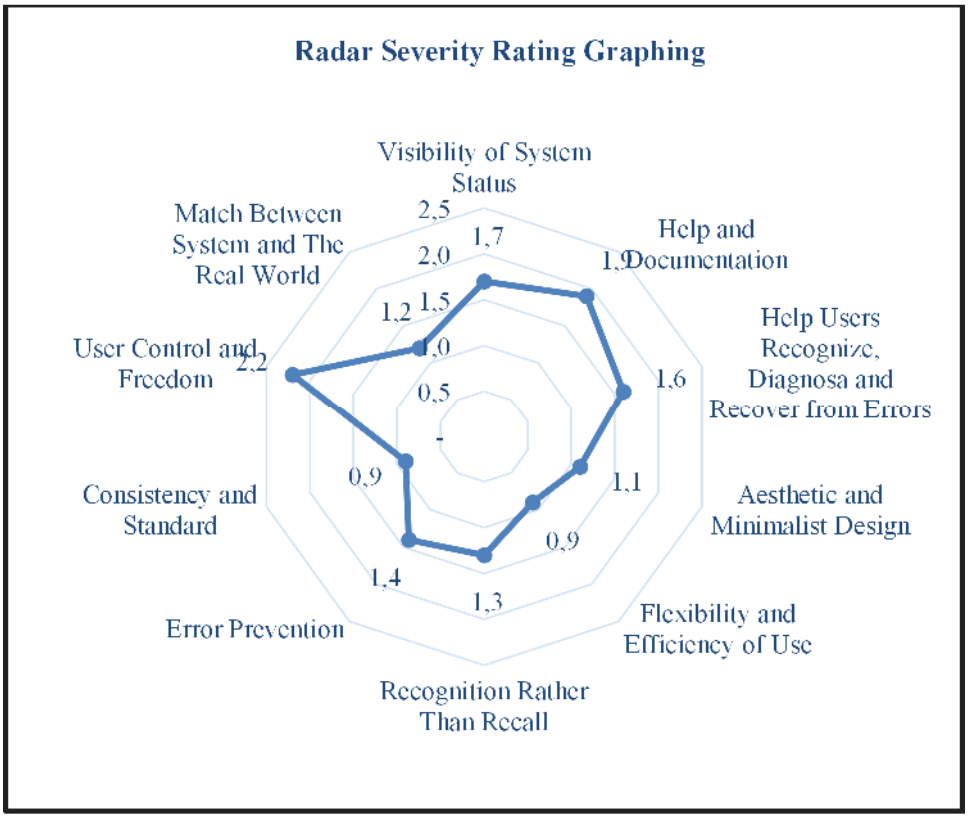

Fig. 2. severity rating of data analysis results

The results of the data analysis displayed in figure 2 show that the highest severity rating value is in the User Control and Freedom aspect of 2.2. Users of the application sayang anak state that the navigation button that makes it easy for users to return to the previous page if the user accidentally enters the unwanted menu has not been accommodated. The lowest severtiy rating results from the results of data analysis based on Figure 2 are seen in the aspects of consistency and standards and Flexibility and Efficiency of Use of 0.9. Standards and consistency in the presentation of words, terms, elements and codes in each menu on the application of sayang anak is in accordance with the user (user friendly) so there is no need for improvement. This is in line with research conducted by Kurnianto Tri Nugroho et al on Usability Analysis of the Pacitan State Community Academy Website Using the Heuristic Evaluation Method which states that Consistency and Standards have a percentage of 51.1% in the good category and the display on each page of the http://aknpacitan.ac.id/ website has an appropriate and consistent form and content. has a form and content that is appropriate and consistent(Nugroho *et al.*, 2020).

Flexibility and Efficiency The use of the application according to users is very easy and very suitable for novice users and those who are experts in its operation. This is in line with research conducted by Lesi Melyani et al in their research on Usability Evaluation of Career Information Systems and Tracer Study at Jambi University Using the System Usability Scale (SUS) and Heuristic Evaluation (HE) methods concluded that flexibility and efficiency of use are in the sufficient category meaning that the system already provides convenience and security for new and experienced users experienced(Melyani, Setiawan and Utamo, 2023)

Based on the results of content analysis on qualitative data obtained from interviews with respondents of application users, several inputs were obtained regarding the user interface of the Sayang Anak application. Some important points of user feedback that have been recorded are :

1. Components when inputting intake per ingredient, it would be nice to make it more concise to speed up the work, and the display is made more concise so as not to minimizoom first in order to see all the child's intake in a day
2. Error notification of data input errors in the weight of food consumed, the error notification is not very clear only in the form of code language
3. In the food recall menu, it can be made easier by eliminating the search menu and simply by inputting food, the required food options will automatically appear
4. Input menu of children's food intake that has been equipped with nutritional values can be entered into food choices so that it can facilitate the input process.
5. A help feature is needed to assist in the operation of the application

CONCLUSION AND SUGGESTION

The results of the research on evaluating the implementation of the user interface of the Semarang city health office's baby application based on heuristic evaluation based on the results of data analysis show that the average severity rating value is 1.4, which means that improvements are needed with a medium priority level. The highest severity rating value is in the User Control and Freedom aspect of 2.2, this is according to the user of the application, which states that the navigation button that makes it easy for users to return to the previous page if the user accidentally enters an unwanted menu has not been accommodated. These results can also complement the research that has been done before(Fitri, Juwita and Dharmawan, 2020)(Liastri, 2023)(Utami and Intiha, 2022)

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