

Heuristic Evaluation of PAWOON Website Portal Information System

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ABSTRACT

The website portal is a means of information for companies to introduce profiles companies, job vacancies, and their products to the public or their users. Evaluation heuristics (Nielsen 1190) is a research method used to test usability of PAWOON website portal information system. In this heuristic evaluation, there are ten Nielsen principle, namely; Visibility of System Status, Match with The Real World, User Control and Freedom, Consistency and Standards, Error Prevention, Recognition Than Recall, Flexibility and Efficiency of Use, Aesthetic and Minimalist Designs, Help User Recognize, Diagnose and Recover from Errors, and Help and Documentation. This study involved 5 evaluators playing a role as an ideas giver, critics, and evaluators who carried out their role by using 10 aspects of usability as material analysis. The results of the analysis show that there are independent variables that have a dominant influence on the usability of the application, namely: visibility of system variable, recognition rather than recall variable, error prevention variable, flexibility and efficiency of use variable, and help and documentation variable. Furthermore, the results of the questionnaire index value show that the information system of PAWOON website portal has a sufficient severity rating, with a value of 1.19, which fulfills heuristic evaluation criteria.

Keywords

PAWOON, heuristic evaluation, information system

Introduction

Recently, the development of information technology continues to show rapid changes. There is a need for increasingly high availability of software for various fields. Pawoon is a cloud-based point of sales application that can be accessed via Android. It also has a website that can be accessed using the internet network. Pawoon website is used as a forum for companies to provide all information about Pawoon, which can be accessed by all groups. The company has an obligation to provide a platform that can be used by practically all users. Therefore, there needs to be an approach to see the success of the website [1].

User satisfaction is a measure of the success of a website. In other words, a website is successful if it is easily accessed by various users, and vice versa [1]. The approach can be taken to measure the user experience in using the website, in which is by approaching the usability aspect. By using the approach, it can be recorded the measurement of satisfaction the user has towards the website being used. Assessment of a product can be used by certain users to achieve certain goals. It can be an assessment of satisfaction in a particular usage context in terms of effectiveness and efficiency [2].

In the usability aspect, there are 3 aspects to measure the success of a website. The first is effectiveness. It can be seen from the distance measure of the user's success in running the website. The second is user efficiency. It also contains accuracy in running applications. The last one is user satisfaction and comfort in accessing the website [2].

In general, website users come from various groups, therefore, usability testing is necessary in order to determine the success of the website. A successful website is a website that can increase the interaction between the user and the system, which will make the user return to the website again. Unsuccessful websites, on the other hand, will make users bored and uninterested. It will also make users unsatisfied when they visit the website again. However, to meet these needs, there must be a method used in order to find usability problems, and the method is a heuristic evaluation. With heuristic evaluation, it is expected to increase the success of the website in understanding the user experience [3].

The research has a role in the development of the Pawoon website because of few sources that discuss the Pawoon website, as a sale point application service provider website, which has

complete features that can help its users. Through the research, the heuristic evaluation of the Pawoon website is expected to provide an accurate assessment of the feasibility and reliability of a website, by measuring the severity rating scale from 0-4.

Discussion of Relevant Research Results

In order to obtain the hypothesis made to be considered correct, the inclusion of several previous studies was carried out, which if it could be a comparison and reference in a view that was considered accurate about the research being carried out.

- a. The results of research by M. Dede Atmaja, Megawaty and Siti Sauda

Title: Evaluasi Heuristik Desain Interface Aplikasi E-Monev Studi Kasus Kabupaten Banyuasin
Researchers: M. Dede Atmaja, Megawaty, Siti Sauda

In their research, M. Dede et al. focused on the use of heuristic evaluation based on user interface design aspects of application reusability through interviews, questionnaires and observations to users. Literature study is also carried out for problem solving experiments and making decisions quickly and efficiently. Application testing, with heuristic evaluation in this study, uses Nielsen's ten principles, which is visibility of system status, match with the real world, user control and freedom, consistency and standards, error prevention, recognition than recall, flexibility and efficiency of use, aesthetic. and minimalist designs, help users recognize, diagnose, and recover from errors, and help and documentation. Based on the description above, the authors reviewed and tested the EMonev application using the heuristic evaluation method [4].

- b. The results of research by Amir Ali, Edwin Pramana and Suhatati Tjandra

Title: Evaluasi Heuristik Pada Web Based Learning Untuk Meningkatkan Aspek Usability Sistem.

Researchers: Amir Ali, Edwin Pramana dan Suhatati Tjandra

Amir Ali et al. used descriptive as their research method. The interface page is evaluated using a

heuristic evaluation method that uses 10 principles of heuristic rules, which are proposed by Jacob Nielsen and Mack. Furthermore, usability testing was carried out [6] and calculations were carried out using a satisfaction scale and ease of use of applications with a Likert scale, as well as performing a reliability test using Cronbach alpha. Calculation [5].

- c. The results of research by Khairil Ahsyar, Husna, Syaifullah

Title: Evaluasi Usability Sistem Informasi Akademik SIAM Menggunakan Metode Heuristic Evaluation

Researchers: Tengku Khairil Ahsyar, Husna, Syaifullah

In their research, Tengku Khairil Ahsyar et al. used Heuristic Evaluation as an inference method in order to assess the components of learnability, efficiency, memorability, errors, and satisfaction [10]. The data collection used a questionnaire and set a focus. Thus, the random sampling technique was carried out by distributing it to all members of the population randomly without paying attention to the existing strata in the population [9]. The questionnaires in the research were designed based on 10 principles, they are visibility of system status, match between system and real world, user control and freedom, consistency and standards, error prevention, recognition rather than recall, flexibility and efficiency of use, aesthetic and minimalist design, help user recognize and recover from errors, and help and document [8]. The use of these principles is to determine the quality of the system based on the ease and comfort of system users. Validity and reliability testing was carried out to determine the statement proposed in measuring the valid variable. The study uses a Likert 4 rating scale, with a measure of the level of agreement: Strongly Agree, Agree, Disagree, and Strongly Disagree [7].

Literature Review

Usability

Usability is a component to test the extent to which the website is useful for the user. It is done by paying attention to its ease, effectiveness, efficiency and satisfaction. Usability has many

definitions, the following is the statement of some [11]:

- a. According to ISO (Organization for Standardization) (9241-11), usability is: The level of usability of a product that is used by users in order to achieve certain goals, as well as providing satisfaction in a particular usage context. According to ISO, the definition refers to:
- b. Focus on 3 important measures of usability, which are effectiveness, efficiency and satisfaction.
- c. According to Joseph Daumas and Janice Redish, usability is used as a measure of usage level when interacting with system products, for websites, software, mobile phones or others. In general, usability refers to the user's ability to learn about and use a product as an acquisition of its goals as well as their satisfaction with its use.
- d. Jakob Nielsen defines usability as a user experience in interacting with an application or website, to a level where users can operate it easily and quickly.

From several definitions, the research is tested based on five aspects of usability or five attributes proposed by Jacob Nielsen, which are in line with usability, according to ISO 9241: 11, which are [12]:

1. Learnability is defined as the speed at which users use the system, as well as the ease in carrying out a function and the user's wishes can be achieved.
2. Efficiency is defined as the resources spent to achieve the accuracy and completeness of a goal to be achieved.
3. Memorability is defined as the user's ability to retain their knowledge after a certain period of time, as well as the ability to remember, which is obtained from placing a menu that is always fixed.
4. Errors and security (errors) are defined as the number of errors that the user makes, which includes inconsistencies about the user's thinking with what the system presents.
5. Satisfaction is defined as freedom from the discomfort that a user experienced. It also contains positive attitudes towards product use or subjective measures and user feelings about system use.

Heuristic Evaluation

Heuristics are guidelines or rules of thumb that have the function of guiding design decisions and can be used as a critique of decisions that have been made. Heuristic evaluation, developed by Jakob Nielsen and Rolf Molich, is a method of composing a system critique using a relatively simple and general set of heuristics. Heuristic evaluations are carried out on design specifications, with that, they are useful for evaluating initial designs. They can also be used on prototypes, storyboards and fully functional systems. Therefore, the approach is more flexible and relatively inexpensive [13].

The general idea behind heuristic evaluation is that some evaluators independently criticize a system in order to generate potential usability problems. It is important to recognize some evaluators conduct evaluations independently. Nielsen's experience shows that 3 out of 5 evaluators are sufficient, 5 of them usually generate about 75% of the overall usability problems encountered [14].

Website

A website is an entire web page that can be found on a domain that contains information. A website is generally built on interconnected web pages. The relationship between one web page and other web pages is called a hyperlink, while the text that is used as a connecting medium is called hypertext [15].

Domain is a unique name owned by an institution that can be accessed via the internet, for example lintau.com, yahoo.com, google.com, and others [16]; to get a domain in doing the specified registers.

Types of websites, based on their characteristics:

1. Dynamic websites are websites that provide contents that changes from time to time. Dynamic websites can be seen from the types of news websites, such as www.kompas.com, www.detik.com, polinpdg.ac.id, and others.
2. A static website is a website that has content that is rarely changed, for example an organization's web profile and others [16].

Methodology

The research process started from literature study and data collection, followed by analysis to final report preparation. The procedures and stages of this research can be seen in Figure 1.

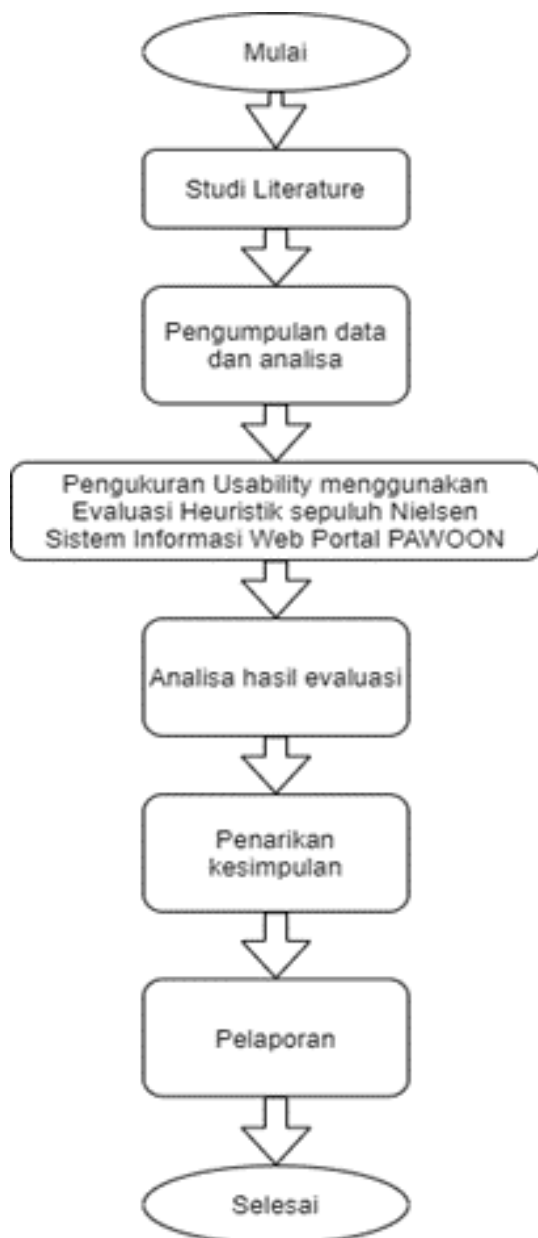


Figure 1. Flow of research

The research begins with a literature study to obtain the data and references needed for relevant and valid results. Then, the research was continued with data collection and analysis treatment to provide an overview of the assessment and method selection. Furthermore, the PAWOON website was measured using Nielsen's ten heuristic evaluation method and that was done by distributing questionnaires. After obtaining the data, the calculation and recapitulation of the average test scores on the PAWOON website were carried out and ended with drawing conclusions.

Based on the analysis of advantages and disadvantages conducted by Nielsen, the recommended number of examiners in the heuristic evaluation process is three to five people. Generally, heuristic is a type of evaluation which is quite difficult to conduct due to individual difficulties in finding all usability problems in an interface design. Surprisingly, despite the difficulties, heuristic evaluation is widely used because the process has a short timeframe and limited funds [17].

The method in the research is divided into two, which are distributing questionnaires to the research object and calculating the results of the PAWOON Web heuristic evaluation. The questionnaire was distributed to 5 respondents, consisting of staff from the PAWOON application development division. The contents of the questionnaire were developed from existing heuristic evaluation methods. Development relates to the Usability dimension and question attributes on the questionnaire. Dimensions and attributes were selected based on the results of previous literature studies, in order to obtain a questionnaire design that aims to capture problems and assess usability more accurately. Usability aspects and the development of usability sub-aspects can be seen in Table 1.

Table 1. Heuristic evaluation aspects table

No.	Usability Aspects	Code
1	Visibility of system status	H ₁
2	Match between system and the real world	H ₂
3	User control and freedom	H ₃
4	Consistency and standards	H ₄
5	Error prevention	H ₅

6	Recognition rather than recall	H ₆
7	Flexibility and efficiency of use	H ₇
8	Aesthetic and minimalist design	H ₈
9	Help users recognize, diagnose, and recover from errors	H ₉
10	Help and documentation	H ₁₀

Data Analysis Method

The results of the questionnaire were calculated and obtained through the average of each attribute in each dimension / principle of usability developed. The heuristic evaluation value is obtained by performing calculations based on Table 1 [17]. Each usability aspect in the heuristic evaluation has a usability sub-aspect, where these sub-aspects contain development points in accordance with the usability aspect [18]. The calculation for the heuristic evaluation uses the equation (1):

$$\sum Hx=(0*x)+(1*x)+(2*x)+(3*x)+(4*x).....(1)$$

With,

$\sum Hx$ = the number of rating scores from the usability sub-aspect in each usability aspect (H1, H2,, H10)
x = usability points, worth 1/0

Furthermore, to produce the severity rating for each usability aspect, the equation used was (2):

$$Sv=\sum \frac{Hx}{n}(2)$$

With,
Sv = the severity rating results in one aspect of usability
n = The number of usability sub-aspects in each usability aspect [18]

Table 2. Severity rating scale

Severity Rating	Description
0	There were no problems or deficiencies in usability found
1	In term of cosmetic problem category, the problem does not need to be fixed unless the project time is still available.
2	The category of minor usability is given a low priority repair.
3	Major usability problem category and main usability problem made important improvements; therefore, it is given high priority.
4	The usability catastrophe category and the problem of repair must be done before the product is launched.

Results and Discussion

The displays of the PAWOON website that were evaluated are in Figure 2-4.

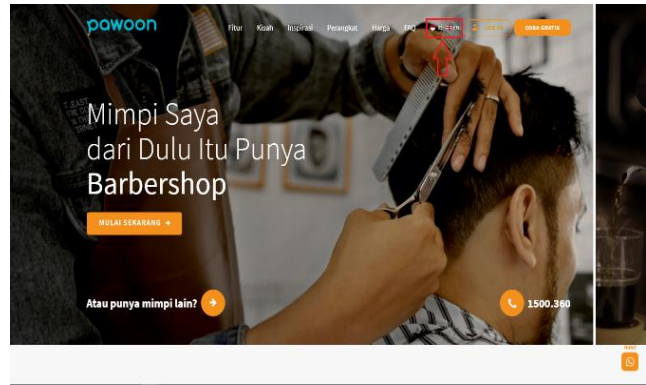


Figure 2. Screenshot of the PAWOON Website homepage

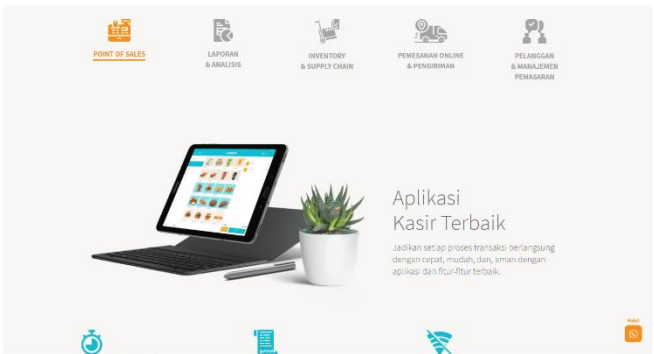


Figure 3. Screenshot of the application menu on the PAWOON Website

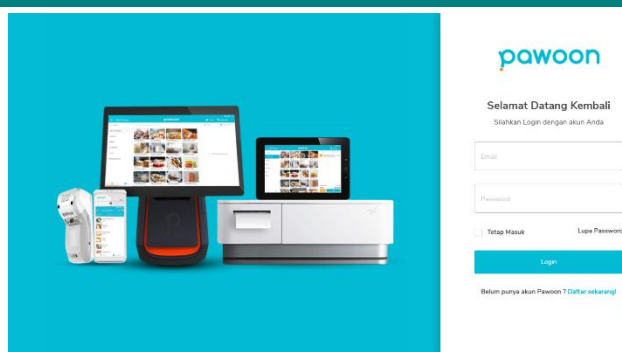


Figure 4. Screenshot of the login menu on the PAWOON Website

Table 3. Usability aspects and sub-aspects used

No.	Usability Aspects	Usability Sub-Aspects
1.	Visibility of system status	<ol style="list-style-type: none"> 1. Each page has a title that describes the contents of the web portal. 2. Each symbol or icon as well as the design on each page is always consistent. 3. Visually different responses appear when pressing or selecting a button. 4. The title of the menu and page matches the contents. 5. Each menu or page display shows difference.
2.	Match between system and the real world	<ol style="list-style-type: none"> 1. Icons, symbols, or thumbnails on general web portal pages can be understood. 2. A choice of language for users on the Pawoon web portal page.
3.	User control and freedom	<ol style="list-style-type: none"> 1. Help button on the Pawoon web portal. 2. Search option on the Pawoon web portal.
4.	Consistency and standards	<ol style="list-style-type: none"> 1. All pages have a title. 2. The information section on each web portal page is consistent and devoted to writing.
5.	Error prevention	<ol style="list-style-type: none"> 1. Notification or pop up if there is wrong input. 2. The navigation is clear and not confusing.
6.	Recognition rather than recall	<ol style="list-style-type: none"> 1. Technical error message appears when failed to access the page (example: display source code). 2. Error message if the user fills in the wrong form (example: telephone number up to 12 digits).
7.	Flexibility and efficiency of use	<ol style="list-style-type: none"> 1. The navigation menu is in line with its classification. 2. The entire navigation menu includes information for the user.
8.	Aesthetic and minimalist design	<ol style="list-style-type: none"> 1. Information display or navigation menu can be easily understood by novice users. 2. The menu layout is familiar to users and they can access it easily. 3. Different colors of the navigation button (example: save button is blue).
9.	Help users recognize, diagnose, and recover from errors	<ol style="list-style-type: none"> 1. The information displayed on each page enables the user to make decisions. 2. The structure of each page is consistent and the same. 3. The title of each page is clear and informative.
10.	Help and documentation	<ol style="list-style-type: none"> 1. Help menu is useful for helping users. 2. A help center contact is available so that users can contact them if they experience problems.

The results of the questionnaire show that there are 10 aspects of the heuristic evaluation method by Nielsen which has a severity rating of 1. This

means that errors or shortcomings can be tolerated by users [19]. In other words, the usability problems found on the PAWOON website do not

create a big impact on users and are considered not to disturb users when accessing the PAWOON website. The highest severity rating can be seen in the match between system and the real world

aspect, with a severity rating of 1.8. A complete heuristic evaluation of the PAWOON website can be seen in Table 2.

Table 4. Recapitulation of PAWOON Website Severity Rating

Usability Aspects	Average value of Severity Rating	Value Rounding Scale 0-4
Visibility of system status	1.02	1
Match between system and the real world	1.6	2
User control and freedom	1.8	2
Consistency and standards	1.1	1
Error prevention	1.06	1
Recognition rather than recall	1.1	1
Flexibility and efficiency of use	1.1	1
Aesthetic and minimalist design	1.12	1
Help users recognize, diagnose, and recover from errors	1	1
Help and documentation	1	1
Average value of Severity Rating	1.19	1

The average results of the questions that represent the sub-aspects of usability, which are written into the questionnaire and given an assessment by the evaluator, are shown in table above. Furthermore, the severity rating is obtained from the results of the data processing.

From several items in the questionnaire, there are questions in several aspects that have a high severity rating. These are the two questions that have the highest severity rating.

1. High severity rating occurs in the sub-aspect of Match between system and the real world, namely the choice of language for users on the Pawoon web portal page. With a severity rating of 1.6, this aspect has a problem that occurs in the language selection icon. However, these options do not work when clicked. In the choice of English, there is no change in language and it is still in Indonesian. So in this case, it can be concluded that there is no language choice.

2. High severity rating occurs in the sub-aspect of User control and freedom of search column options on the Pawoon web portal. With a rating of 1.8 severity, this aspect has problems that occur to users who do not have the freedom to perform searches, so that it is not possible for users to find the information they need.

The test results using the heuristic evaluation can be seen in Table 4. The value of the severity rating

shows the magnitude of the usability problem on the PAWOON website. Based on the results of the heuristic evaluation shown in table 4, it can be concluded that the PAWOON website has a low usability problem, with an average value of 1.19 or a scale of 1. The problem occurs in the cosmetic problem category, but it doesn't need to be fixed unless the project time is still working. available. Furthermore, these problems can be fixed in future system development.

Conclusion

Based on the results of the data processing that has been carried out, the conclusions of the study are as follows:

1. The results of the test show several aspects whose scores are below what they should be, but these aspects are not important for users. Users can still tolerate the problem and they do not disturb their comfort in accessing the website portal.
2. The test value produces a severity rating of 1.19, which means the problem does not have to be fixed directly, but can be fixed when there is further development.
3. The usability level of the information system on the Pawoon website portal uses the heuristic evaluation method, which makes it into the efficient testing category, because of the design of the questionnaire which aims to take problems and assess usability more accurately.

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