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REDESIGN OF IPUSNAS APPLICATION USING USER CENTERED DESIGN METHOD

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Abstract: The National Library of Indonesia (Perpusnas) is one of the libraries that already uses a Digital Library named Ipusnas. Ipusna provides access to literature available at National Library via smartphone. However, the Ipusnas application only gets a rating of 3.5 on the Google Playstore. This rating was obtained because the Ipusnas android application still has deficiencies, which is the User Interface and User Experience are still less modern and confusing in finding information. In this study, a redesign was developed using the User Centered Design method and Tested using A/B Testing. Results of the System Usability Scale Questionnaire From the calculation results using the System Usability Scale formula, the average score for evaluating the Ipusnas android application is 61.2. From the results of this SUS score, the research can be continued so that the Redesign of Ipusnas android application better than old one. Based on the evaluation results using the A/B Testing method, it can be concluded that users prefer the new design with a percentage value of 64% compared to the old design of 36%.
Keywords: Ipusna, Redesign, A/B Testing, User Centered Design.

INTRODUCTION

Technological developments bring rapid changes to the world of education and produce useful products to make it easier to find information in the world of education, one of which is a digital library. With the existence of a digital library, people no longer need to come to the library to borrow books. Only by using a smartphone, the general public can now borrow and read books through an application on a smartphone.

One of the libraries that has used the Digital Library is the National Library of Indonesia (Perpusnas), which is named Ipusnas. Ipusnas is an library application that is equipped with e-books and social media features offered by National Library of Indonesia. [1] The Ipusnas feature which can be accessed using a smartphone, web-based, tab-based hybrid makes it easier for people who live in areas far from libraries to read books through this application. All Ipusnas reading sources are legal and official so as not to harm the author or publisher of the book. It also provides an option for people to leave illegal books and switch to legal books for free.

Even though it has fulfilled the needs of the community in the world of education, the Ipusnas application only gets a rating of 3.5 on the Google Playstore. This rating was obtained because the Ipusnas android application still has deficiencies, one of which is the User Interface and User Experience which are still somewhat less modern and confusing in finding information. Based on this, research was carried out on the Ipusnas android application. In this study the design was carried out using the User Centered Design method and carried out trials using A/B Testing. It is hoped that the results of this research can provide a better experience in finding information so that application users feel satisfied and comfortable when using the Ipusnas android application.

RESEARCH METHODS

Research Methodology has some steps that described the process as shown in figure 3.

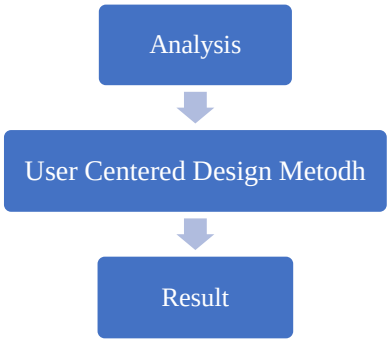

Figure 1. Research Methodology's Step

Analysis

At this analysis stage was carried out to collect data through distributing questionnaires. Questionnaires were distributed to 50 users of the Ipusnas android application with age range of 19-25 years. Usability testing of the System Usability Scale with the aim of knowing one's opinion of the object being studied

User Centered Design Method

The questionnaire was distributed to 50 users of the Ipusnas android application who met the criteria the system usability scale. The following is a questionnaire question 1 of the usability scale system shown in the table 1.

Table 1. Questions Type 1 of system Usability Scale.

No.	Questions	Score
1	I think I will use this system again	1-5
2	I found that this application is not made this complicated	1-5
3	I think this app is easy to use	1-5
4	I think I need the help of a technical person in using this system	1-5
5	I found the various functions of this application well integrated	1-5
6	I think there are too many inconsistencies in this system	1-5
7	I think there are too many inconsistencies in this system	1-5
8	I find this application very impractical	1-5
9	I feel very confident in using this app	1-5
10	I need to learn a lot before using this app	1-5

After distributing the SUS questionnaire, the original data from the questionnaire results was obtained and will be calculated using the SUS score calculation. There are rules for calculating the SUS score, the following are the rules for weighting scores on the original score data from the questionnaire results:

a. For each odd numbered question, the score for each question obtained from the user's score will be reduced by 1.
b. For each even numbered question, the final score is obtained from the value of 5 minus the question score obtained from the user.
c. The SUS score is obtained from the sum of the scores for each question which is then multiplied by 2.5.

The rules for calculating the score applies to 1 respondent. For further calculations, the SUS score of each respondent is sought by the average score by adding up all scores and dividing by the number of respondents. The following formula calculates the average SUS score:

$$x = \frac{\sum x}{n} \quad \ldots\ldots (1)$$

x = Average Scores
$\sum x$ = SUS Total Scores
n = Number of Respondent

Evaluate Against requirements

Evaluate Against requirements is the last step in Redesign of Application. This stage aims to get a response as an evaluation the design. In this step, an assessment is conducted to measure whether the design is already fulfilled the user needs.[9]

At this step, to get an evaluation material response done by interviewing people who are experienced in design. Furthermore, to assess whether the design that has been made is in accordance with user needs is by distributing questionnaires according to the A/B Testing method. Interview questions for 3 mentors can be seen in table 2.

Table 2. Interview questions for 3 mentors

No	Questions
1	What's your Name
2	What's your Job
3	What's your comment and your suggestions about redesign New *Ipusnas* app

RESULT AND DISCUSSION

System Usability Scale Questionnaire Results

Using the Formula of system Usability Scale: an average score for the Ipusnas android application assessment is 61,2. From this SUS score, therefor the research can be can be continued so that the assessment of the Ipusnas android application can be better.

The Observation Results

The Observation Results which aims to find out the usefulness or functionality of each page of the Ipusnas android application. The observation results are in table 3.

Table 3. The Observation Results

No	Menu	Functions
1	Splash Screen	The splash screen page is a program display that appears temporarily at the start of the program before entering the login page.
2	Login	The login page is the initial page when the program is run. In this page the user must enter the username and password to enter into the system.
3	Register	This page works for users if they have not registered in the Ipusnas application. Users can register on this page.
4	Book-collection	The collection page is divided into three, namely the book page, library, and dashboard. The book page functions as the index page or the first page when the user successfully logs in. There are various kinds of books displayed on this page.
5	Collection-Elibrary	The ePustaka page is a collection of agencies or publishers that have collaborated with Ipusnas..
6	Collection-Dashboard	The dashboard page contains information on the latest activity of the application and quick access for creating new posts.
7	Profil	The profile page functions as a page that displays user data.
8	Inbox	*Inbox* is a feature used to have conversations with other users.
9	Bookshelf-borrow	Bookshelf pages are divided into three, namely borrow, queue, and history pages. The borrow page will display books that have been successfully borrowed
10	Bookshelf-Queue	The queue page will display the books currently in the queue

11	Bookshelf-History	The history page will display books that have been borrowed.
12	Notes	The notes page can be used to save notes.
13	Book details	The book details page functions to display book details which contain the book title, synopsis, information and book reviews.
14	E-Reader	The E-Reader page is a page for reading borrowed books.
15	Bookmark-Table of Contents	The Bookmarks page is divided into three parts, namely the table of contents, page bookmarks, and text highlights. The table of contents page displays the table of contents.
16	Bookmark-Page	Page bookmarks will display saved pages.
17	Bookmarks-Text Highlights	The text highlight page will display the saved text
18	Notifications	Notifications are notification information that is private

There are five questions for users of the Ipusnas android application that will be given. The results of interviews with users of the Ipusnas android application can be seen in table 4.

Table 4. The results of interviews with users

Questions	Answers
What is your purpose using the Ipusnas android application?	• Users can search for book references to do assignments • Users can fill spare time • Users can read books anywhere
Why do you use the Ipusnas android application?	• Users can save time and costs • Users do not have to come to the library to borrow books • The Ipusnas application has a feature that can be read directly in one application
What are your problems while using this application?	• Users have difficulty finding and borrowing books. • Users often experience bugs. • Unattractive and confusing appearance.
Do the features in this application meet the needs?	Not yet, There are several features that can be developed to meet the user needs.
What do you think if the Ipusnas android application is redesigned? Give suggestions for the Ipusnas application to make it even better?	Agree. The layout is easy for users to reach so it's not confusing and updates to the display to make it look more user friendly. The available features are more developed to meet needs and bugs don't often occur. The collection of books and copies is multiplied.

User Personal Results

The results of this interview can be used as a reference in redesigning it so that it can meet the needs of Ipusnas android application users. To understand and meet user needs, a user persona is created. This User Persona was made from the results of interviews with ten users of the Ipusnas android application which can be seen in figure 4.

Figure 2. *User* Personal

After getting comments and suggestions from people who are more experienced, the next stage is *to change the* design according to the comments and suggestions that have been given by the mentor. The results of UI/UX improvements can be seen in table 5.

Table 1. Design Results After Evaluation

No	Menu	*User Interface*	Description
1	Profil		On the profile page, the user interface has been redeveloped. On the Profile page, changes are made to the profile photo that has been combined with followers and following. The Inbox and Change Password buttons are placed at the bottom of the followers and following. User's reading history has been added which is placed at the top of the exit button. The notification button is placed at the top right of the profile page. Buka di Google Terje
2	Book-collection		On the book-collection page, content has been added in the form of book recommendations with the categories that users choose the most.

No	Menu	*User Interface*	Description
3	Register		The registration page has been changed to a registration page so that it uses the Indonesian language. The Ipusnas logo has been added to the top of the form. In "Telephone" changed to "Telephone Number" to make it more professional

A/B Testing Questionnaire Results

At this stage an analysis was carried out to collect data through distributing questionnaires. Questionnaires were distributed on 17-23 July 2023 to 50 users of the Ipusnas android application. Usability testing is carried out by means of A/B Testing with the aim of comparing the appearance before and after the redesign.

Participants Testing

In filling out the questionnaire there are several criteria that must be fulfilled. There are some of the criteria that can fill in the questionnaire: aged between 19-25 years and the user familier with the Ipusnas android application.

Questionnaire

At this stage, questionnaires were distributed to 50 people, both users of the Ipusnas android application and non-users. At this stage it is carried out by means of A/B Testing. The results of the A/B Testing questionnaire can be seen in table 6.

Table 2. A/B *Testing* Questionnaire Results

No	Menu	New Design (A)	Old Design (B)	*Winner*
1	Splash Screen	70 %	30 %	A
2	Login	68 %	32 %	A
3	Register	68 %	32 %	A
4	Book-collection	60 %	40 %	A
5	Collection-Elibrary	54 %	46 %	A
6	Collection-Dashboard	60 %	40 %	A
7	Profil	64 %	36 %	A
8	Inbox	60 %	40 %	A
9	Bookshelf-borrow	66 %	34 %	A
10	Bookshelf-Queue	62 %	38 %	A
11	Bookshelf-History	58 %	42 %	A
12	Notes	64 %	36 %	A
13	Book details	66 %	34 %	A
14	E-Reader	62 %	38 %	A
15	Bookmark-Table of Contents	62 %	38 %	A
16	Bookmark-Page	72 %	28 %	A
17	Bookmarks-Text Highlights	66 %	34 %	A

No	Menu	New Design (A)	Old Design (B)	*Winner*
18	Notifications	68 %	32 %	A
	Average	**64%**	**36%**	

Based on the results of the A/B Testing questionnaire conducted, the data results obtained that design A or the new design has a higher percentage than design B or the old design. It can be concluded that design A or the new design is preferable to design B or the old design.

CONCLUSION

Based on the design conducted in the previous stage, it can be concluded that the design of the user interface and user experience of the new Ipusnas android application has been successfully created. By using the User Centered Design method, this design was successfully created in the form of a dummy application. Results of the System Usability Scale Questionnaire From the calculation results using the System Usability Scale formula, the average score for evaluating the Ipusnas android application is 61.2. From the results of this SUS score, the research can be continued so that the Ipusnas android application assessment can be better than before. Based on the evaluation results using the A/B Testing method, it can be concluded that users prefer the new design with a percentage value of 64% compared to the old design of 36%.

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