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EVALUATION OF REPOSITORY USABILITY TEST USING NIELSEN'S ATTRIBUTES OF USABILITY (NAU) MODEL IN LIBRARIES

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Abstract
This research amis to evaluate the usability test repository using the Nielsen's Attributes of Usability (NAU) model in the Muhammadiyah University of Riau Library. This type of research is descriptive with a quantitative approach. Data collection techniques were carried out by carrying out observations, distributif questionnaires, interviews and documentation.the sampel in this study amounted to 95 people from the total population. The results of this research found that the learnability indikator (user's ease in learning/understanding smartlib) had an average value of 4,49. Efficiency indikator (user needs can be resolved accurately and completely using smartlib) with an average value of 4,42. Memorability indikator (user's ease in remembering the smartlib system) with an average value of 4,44. The errors indikator (failure in smartlib) has an average value of 4,45, so failures can be found in the system. For this reason, there needs to be improvements in overcoming failure problems that are often found in smartlib, namely access speed, so that access failures can be reduced. Satisfaction indikator (user satisfaction with smartlib) with an average value of 4,42. Thus, it can be concluded that the usability test repository using the Nielsen's Attributes of Usability (NAU) Model in the Smartlib Library of the Muhammadiyah University of Riau isi n the very good category with an average of 4,44 (88,8%).
Keywords: *Evaluation; Library; NAU; Smartlib; Usability Test Repository*

INTRODUCTION

The University of Muhammadiyah Riau (UMRI) library strives to continue to follow developments in information technology that can provide services to users. This is proven by the implementation of an open access institutional repository (OA-IR) which uses open access software Smartlib as software that provides features for storing, preserving and presenting information needed by the Muhammadiyah University of Riau institution which can be accessed by the general public and the community. UMRI Higher Education Academics.

In the last two years, to be precise, in 2020 - 2022, the UMRI library has been intensively promoting the Smartlib Repository via Instagram @lib.umri and banners that have been installed at the entrance to the Muhammadiyah Riau University library. Based on initial

observations made on users who visited the library, it can be seen that there were several users who were unable to find the library materials they wanted to search for (efficiency) and the use of the repository (display) was not in accordance with the users' expectations (satisfaction). Of the 10 users consisting of the classes of 2018, 2019, 2020 and 2021 who are active students from Muhammadiyah University of Riau, only 3 users from the classes of 2018 and 2019 are aware of the existence of the smartlib repository at Muhammadiyah University of Riau.

Therefore, researchers used the Nielsen's Attributes of Usability (NAU) method, where questionnaires are subjective and objective in evaluating the system. Because Nielsen's Attributes of Usability (NAU) involves 5 categories of usability, namely: 1) Learnability, 2) Efficiency, 3) Memorability, 4). Error, and 5) Satisfaction and 2 categories of them are included in the main problems that researchers want to examine.

The aim of this research is that the author wants to know about the usability of Smartlib software for repositories at the Muhammadiyah Riau University library, therefore the author wants to conduct research with the title Evaluation of Repository Usability Tests Using the Nielsen's Attributes Of Usability (NAU) Model at the Riau Muhammadiyah University Library.

According to Albert N. Badre in (Rifqatusa'adah 2017) defines usability testing as "Usability testing has traditionally meant testing for efficiency, ease of learning, and the ability to remember how to perform interactive tasks without difficulty or errors." or usability tests used to measure efficiency, ease of learning, and ability to improve how to interact without difficulty or error. Nielsen 1994 in (Wahyuningrum, 2021 : 23) defines usability as a quality attribute that assesses how easy the interface is to use. The word “usability” also refers to methods to increase ease of use during the design process.

Based on the opinion above, it can be concluded that usability or "usefulness" is the level of quality of a system that is easy to learn, easy to use and encourages users to use the system as a positive tool in completing tasks. In this context, what is meant as a system is the Smartlib software in the UMRI Library. Usability is important to test the usability of a software, whether it is easy to learn, efficient, when the user interacts it is easy to remember procedures or steps without making many mistakes and finally whether the user feels comfortable in operating the system.

Nielsen 1994 in (Wahyuningrum 2021) defines usability as a quality attribute that assesses how easy the interface is to use. The word “usability” also refers to methods to increase ease of use during the design process. According to him, there are five main categories of usability, including:

1. Learnability
   Learnability is the most fundamental dimension in usability because it describes how easy the system is to learn, so that users can easily start work with the repository system. This is measured by looking at how much time and effort is required to understand a repository system. Learnability also refers to the user's ability to operate the navigation mechanism of each menu available in the repository according to Nielsen (Nielsen 1994).
2. Efficiency
   According to Nielsen (Nielsen 1994) Efficiency is the speed at which user goals can be completed accurately and completely. Task completion time is often used to measure efficiency. However, another way to measure efficiency is to look at the amount of effort required to complete a task. Effort in this case is divided into two, namely cognitive and physical. Cognitive effort includes finding the right location to do something, for example

finding a link on a web page. Physical effort includes the physical activity required to perform actions, for example moving a mouse, inputting data, and so on.

3. Memoribility
   When operating a system, users should be able to easily understand and remember how to use the system. This is intended so that users do not have to re-learn to use the system repeatedly or open the manual book again so that the task being carried out takes a long time.
4. Errors
   According to Nielsen (Nielsen 1994) a good system should have a low error rate so that users will not make mistakes when using the system so that it interferes with the tasks being carried out.
5. Satisfaction
   According to Nielsen (Nielsen 1994) the user's pleasure and comfort with a system will influence the intensity of use of the system. The more users feel happy and comfortable with a system, the more often the system will be used.

RESEARCH METHOD

This type of research is descriptive with a quantitative approach. The data collection methods used in this research were observation techniques, questionnaires, interviews and documentation. The population in this study were all Smartlib Repository users at Muhamadiyah Riau University, totaling 1,994 users in May - December 2022. Sampling used purposive sampling using the Slovin formula, so that a sample of 95 users of the Smarlib repository website at Muhamadiyah Riau University were obtained.

RESULT AND DISCUSSION

Research Data Analysis

To get the answer to the problem formula in chapter 1, regarding Evaluation of Usability Test Repositories Using the Nielsen's Attributes Of Usability (NAU) Model. The data collection process is carried out by distributing questionnaires. Data collection starts from April – June 2023. The respondents who are the data source in this research come from students from various majors and semesters. For more details, see table 1.

Table 1 Respondent Identity Based on Department

No.	Department	Frequently (F)	Persentage (%)
1	Automotive Engines	5	4,75
2	Mechanical Engineering	8	8,42
3	Industrial Engineering	5	4,75
4	Nursing	7	7,37
5	Biology	9	9,47
6	Physics	6	6,32
7	Chemistry	4	4,21
8	Pharmacy	3	3,16
9	Midwifery	7	7,37
10	Accountancy	6	6,32
11	Economic development	4	4,21

12	Finance and Banking	2	2,10
13	Management	6	6,32
14	Informatics Engineering	11	1,58
15	Informatics Systems	4	4,21
16	Madrasah Teacher Education	8	8,42
	Total	**95**	**100**

Table 1 data shows that the respondents who were the data source for this research came from all departments at Muhammadiyah University of Riau. From this data, if calculated, the average for each department is 6 people involved in collecting research data. Thus, it is clear that all respondents have generally represented student responses regarding the Muhammadiyah University of Riau library.

Table 2 Respondent Identity Based on Semester Level

No	Semester	Frequently (F)	Persentage (%)
1	VII	31	32,63
2	VIII	22	23,16
3	IX	15	15,79
4	X	27	28,42
Total		**95**	**100**

Table 2 data shows that the research respondents who are also students at the Muhammadiyah University of Riau come from higher levels or semesters, namely 7, 8, 9, and 10. Most of these respondents are final year students, so they need lots of references in working on various final assignments.

Data analysis was carried out based on distributing questionnaires to 95 final semester students at Muhammadiyah University of Riau who were entering semesters 7, 8, 9, 10 and beyond. To find out respondents' responses to distributing the questionnaire, see the following explanation:

Learnibility (Ease of Users in Learning/Understanding Smartlib)

Learnability is the most fundamental dimension in usability because it describes how easy the system is to learn, so that users can easily start work with the repository system. This is measured by looking at how much time and effort is required to understand a repository system. Learnability also refers to the user's ability to operate the navigation mechanism of each menu available in the repository according to Nielsen (Nielsen 1994).

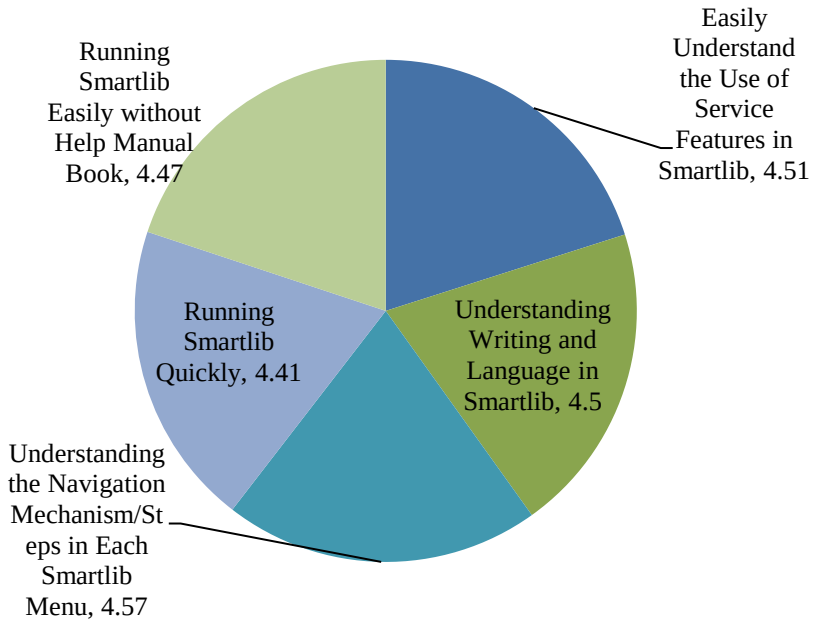
Table 3 Learnability Indicators (Ease of Users in Learning/Understanding Smartlib)

No	Question	Answer Option					Total	Mean	Category
		SS	S	KS	TS	STS			
1	Easily Understand the Use of Service Features in Smartlib	49	46	-	-	-	95	4,51	Very good
		245	184	-	-	-	429		
2	Understanding Writing and	48	47	-	-	-	95	4,50	Very
		240	188				428		good

	Language in Smartlib								
3	Understanding the Navigation Mechanism/Steps in Each Smartlib Menu	54 270	41 164	- -	- -	- -	95 434	4,57	Very good
4	Running Smartlib Quickly	41 205	52 208	2 6	- -	- -	95 419	4,41	Very good
5	Running Smartlib Easily without Manual Book Help	45 225	50 200	- -	- -	- -	95 425	4,47	Very good
Jumlah (N)		**237**	**236**	**2**	**-**	**-**	**475**	**4,49**	**Very good**
Skor		**1185**	**944**	**6**	**-**	**-**	**2135**		

Based on the research results that have been presented in the recapitulation table of Learnability indicators (Ease of Users in Studying/Understanding the Riau Muhammadiyah Library Smartlib), it can be said that the Riau Muhammadiyah Library Smartlib is very good with an average score of 4.49 in making it easy for users to learn /understand and run it.

Figure 2 Graph of Learnability Indicator (Ease of Users in Learning/Understanding Smartlib



Thus, it can be explained that the Muhammadiyah Riau University Library Smartlib is easy to understand, the writing and language used is easy to understand, the operation is easy, the navigation mechanism is clear, and easy to use by anyone without having to use a manual book.

Efficiency (User Needs Can Be Completed Accurately and Completely Using Smartlib)

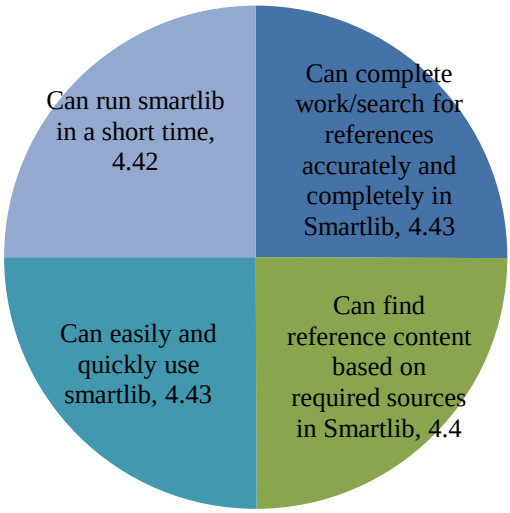
According to Nielsen (Nielsen 1994) Efficiency is the speed at which user goals can be completed accurately and completely. Task completion time is often used to measure efficiency. However, another way to measure efficiency is to look at the amount of effort required to complete a task. Effort in this case is divided into two, namely cognitive and physical. Cognitive effort includes finding the right location to do something, for example finding a link on a web page. Physical effort includes the physical activity required to perform actions, for example moving a mouse, inputting data, and so on.

Table 4 Efficiency Indicators (User Needs Can Be Completed Accurately and Completely Using Smartlib)

No.	Question	Answer Option					Total	Mean	Category
		SS	S	KS	TS	STS			
1	Can complete work/search for references accurately and completely in Smartlib	45	46	4	-	-	95	4,43	Very good
		225	184	12	-	-	421		
2	Can find reference content based on the required sources in Smartlib	43	47	5	-	-	95	4,40	Very good
		215	188	15	-	-	418		
3	Can easily and quickly use smartlib	41	54	-	-	-	95	4,43	Very good
		205	216	-	-	-	421		
4	Can run smartlib in a short time	40	55	-	-	-	95	4,42	Very good
		200	220	-	-	-	420		
	Total (N)	**169**	**202**	**9**	**-**	**-**	**380**	**4,42**	**Very Good**
	Score	**845**	**808**	**27**	**-**	**-**	**1680**		

Based on the research results that have been presented in the recapitulation table of Efficiency indicators (User Needs Can Be Completed Accurately and Completely Using Smartlib), it can be said that the Riau Muhammadiyah Library's Smartlib is very good with an average score of 4.42 in meeting user needs accurately and completely.

Figure 3 Efficiency Indicator Graph (User needs can be resolved accurately and completely using Smartlib)



These results show that the Smartlib service efficiency of the Muhammadiyah Riau University Library can be easily used and operated. The relatively short usage time required to access the Muhammadiyah Riau University Library's Smartlib is easy to find the references provided in this service.

Memorability (Ease of Users Remembering the Smartlib System)

When operating a system, users should be able to easily understand and remember how to use the system. This is intended so that users do not have to learn to use the system again and again or open the manual book again so that the task they do takes a long time.

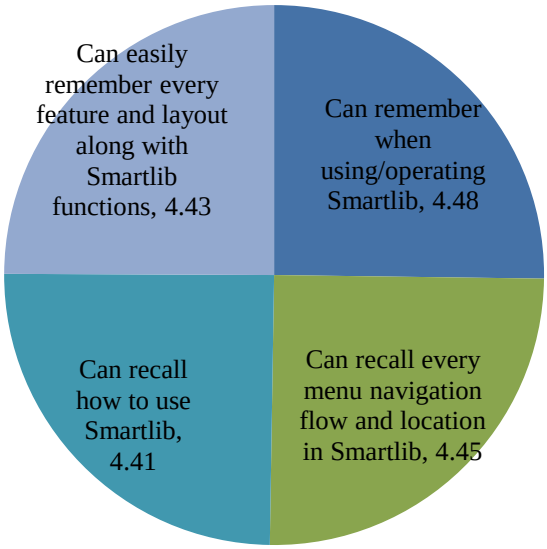
Table 5 Memorability Indicators (Ease of Users Remembering the Smartlib System)

No	Question	Answer Option					Total	Mean	Category
		SS	S	KS	TS	STS			
1	Can remember when using/operating Smartlib	46	49	-	-	-	95	4,48	Very good
		230	196	-	-	-	426		
2	Can recall every menu navigation flow and location in Smartlib	43	52	-	-	-	95	4,45	Very good
		215	208	-	-	-	423		
3	Can remember how to use Smartlib	45	47	3	-	-	95	4,41	Very good
		225	188	6	-	-	419		
4	Can easily remember every	41	54	-	-	-	95	4,43	Very good
		205	216	-	-	-	421		

	feature and layout along with Smartlib functions							
Total (N)	**175**	**202**	**3**	**-**	**-**	**380**	**4,44**	**Very**
Score	**875**	**808**	**6**	**-**	**-**	**1689**		**good**

Based on the research results that have been presented in the recapitulation table of Memorability indicators (Ease of Users in Remembering the Smartlib System), it can be said that the Riau Muhammadiyah Library Smartlib is very good with an average value of 4.44 in providing ease for users in remembering the existing system. smartlib.

Figure 4 Memorability Indicator Graph (Ease of Users Remembering the Smartlab System)



In this way, the Smartlib service of the Muhammadiyah Riau University Library can be easily remembered by its users both in operating it and in navigating through the available features, thereby making it easy for users to browse all the features and content in the Smartlib Library of the Muhammadiyah Riau University Library.

Errors (Failure on Smartlib)

According to Nielsen (Nielsen 1994) a good system should have a low error rate so that users will not make mistakes when using the system so that it interferes with the tasks being carried out.

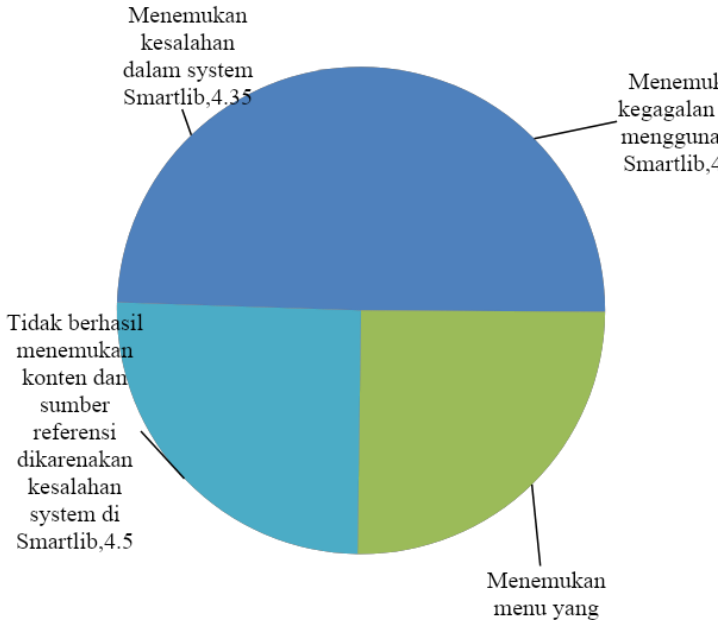
Table 6 Error Indicators (Failure in Smartlib)

No	Question	Answer Option					Total	Mean	Category
		SS	S	KS	TS	STS			
1	Found a failure when using Smartlib	44	51	-	-	-	95	4,46	Very good
		220	204	-	-	-	424		

2	Found a menu that wasn't working properly in Smartlib	45	50	-	-	-	95	4,47	Very good
		225	200	-	-	-	425		
3	Unable to find content and reference sources due to a system error in Smartlib	48	47	-	-	-	95	4,50	Very good
		240	188	-	-	-	428		
4	Found an error in the Smartlib system	41	47	7	-	-	95	4,35	Very good
		205	188	21	-	-	414		
Total (N)		**178**	**195**	**7**	**-**	**-**	**380**	**4,45**	**Very good**
Score		**890**	**780**	**21**	**-**	**-**	**1691**		

Based on the research results that have been presented in the recapitulation table of Errors indicators (Failures in Smartlib), it can be said that the Riau Muhammadiyah Library Smartlib is very good with an average value of 4.45, so that failures can be found in the system. For this reason, improvements are needed to overcome the failure problems that are often found in Smartlib.

Figure 5 Errors Indicator Graph (Failure on Smartlib)



The Muhammadiyah Riau University Library Smartlib service often experiences failures or errors when searching for certain features. Where this failure is more due to high usage at the same time and working on the same feature, thus causing access failure. Meanwhile system failures rarely occur, because they are easy to access.

Satisfaction (User Satisfaction on Smartlib)

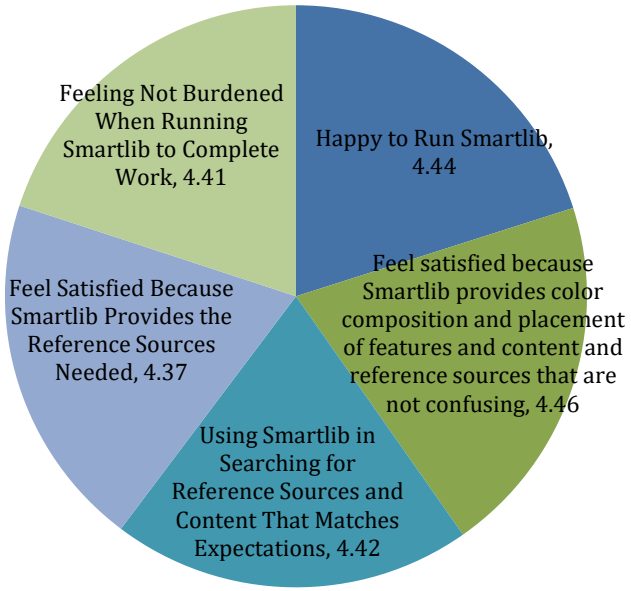
According to Nielsen (Nielsen 1994) the user's pleasure and comfort with a system will influence the intensity of use of the system. The more users feel happy and comfortable with a system, the more often the system will be used.

Table 7 Satisfaction Indicators (User Satisfaction with Smartlib)

No.	Question	Answer Option					Total	Mean	Category
		SS	S	KS	TS	STS			
1	Happy to Run Smartlib	42	53	-	-	-	95	4,44	Very good
		210	212	-	-	-	422		
2	Feel satisfied because Smartlib provides color composition and placement of features, content and reference sources that are not confusing	44	51	-	-	-	95	4,46	Very good
		220	204	-	-	-	424		
3	Using Smartlib in Searching for Reference Sources and Content that Match Expectations	40	55	-	-	-	95	4,42	Very good
		200	220	-	-	-	420		
4	Feel Satisfied Because Smartlib Provides the Reference Sources Needed	38	55	2	-	-	95	4,37	Very good
		190	220	6	-	-	416		
5	Feel Not Burdened When Running Smartlib to Complete Work	41	52	2	-	-	95	4,41	
		205	208	6	-	-	419		
Total (N)		205	267	4	-	-	475	4,42	Very good
Score		1025	1064	12	-	-	2101		

Based on the research results that have been presented in the recapitulation table of Satisfaction indicators (user satisfaction with Smartlib), it can be said that the Riau Muhammadiyah Library Smartlib is very good with an average value of 4.42, so it is able to provide satisfaction for its users.

Figure 6 Satisfaction Indicator Graph (User Satisfaction on Smartlib)



The satisfaction of Smartlib users of the Muhammadiyah Riau Library, namely students, especially in collecting various references for various assignments, is at very good criteria. Where users are happy and satisfied running Smartlib because the display (color composition, features, content and writing) is easy to read, most of the information needed, especially from the results of journal research, theses, dissertations, etc., is available, so it is very easy to use. assists in collecting various references and information.

Evaluating Usability Test Repository Using Nielsen's Attributes Of Usability (NAU) Model

In research on evaluating usability test repositories using the Nielsen's Attributes of Usability (NAU) model, usability indicators are used, namely:

1. Learnability describes the level of ease for users to open and learn the first time they see or use the repository.
2. Efficiency explains that the features presented in the repository are easy to understand and suit the user's needs.
3. Memorability describes the level of ease with which users can use the repository well, after not using it for a while.
4. Error number of errors, how many times users made errors, how serious the errors were and how they corrected these errors.
5. Satisfaction explains the level of user satisfaction in using the repository.

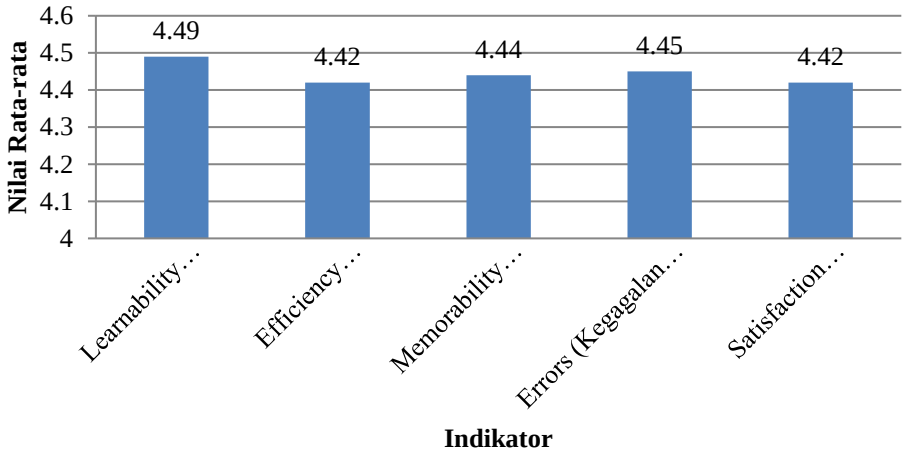
The results of the research have been described in each question item, so comprehensive conclusions can be drawn from the responses given by respondents. Where the results of this research can be described in the form of table 8.

Table 8 Evaluation of Usability Test Repository Using Nielsen's Attributes Of Usability (NAU) Model

No.	Indicator	Mean	Persentage	Category
1	Learnability (Ease of Users Learning/Understanding Smartlib	4,49	89,8%	Very Good
2	Efficiency (User Needs Can Be Completed Accurately and Completely Using Smartlib)	4,42	88,4%	Very Good
3	Memorability (Ease of Users Remembering the Smartlib System)	4,44	88,8%	Very Good
4	Errors (Failure with Smartlib)	4,45	89,0%	Very Good
5	Satisfaction (User Satisfaction on Smartlib)	4,42	88,4%	Very Good
Jumlah		**22,22**		
Rata-rata		**4,44**	**88,8%**	**Very Good**

The data outlined in the table above shows that the Usability Test Repository Evaluation Using the Nielsen's Attributes of Usability (NAU) Model in the Smartlib Library of the Muhammadiyah University of Riau is in the very good category with an average score of 4.44 (88.8%).

Figure 7 Usability Test Repository Graph Using Nielsen's Attributes Of Usability (NAU) Model in Smartlib Library, Muhammadiyah University of Riau



Based on the data and graphic images above, it can be seen that the Usability Test Repository using the Nielsen's Attributes Of Usability (NAU) Model in the Smartlib Library of the Muhammadiyah University of Riau has the highest score, namely learnability with an average of 4.9. Meanwhile, the lowest score was for the efficiency and satisfaction indicators with an average of 4.2. These results show that the Muhammadiyah Riau University Library's Smartlib is very good at supporting student information needs.

CONCLUSION

The conclusion obtained from the research that has been carried out is that the Repository Usability Test Using the Nielsen's Attributes of Usability (NAU) Model in the Smartlib Library of the Muhammadiyah University of Riau is in the very good category with an average score of 4.44 (88.8%). With each indicator:

a) Based on the results of the Learnability indicator (ease of users in studying/understanding the Riau Muhammadiyah Library Smartlib) with an average value of 4.49 in making it easy for users to study/understand and run it.
b) Based on the results of the Efficiency Indicator (user needs can be resolved accurately and completely using Smartlib) with an average value of 4.42 in meeting user needs accurately and completely.
c) Based on the results of the Memorability Indicator (user's ease in remembering the Smartlib System) with an average value of 4.44 in making it easier for users to remember the system in Smartlib.
d) Based on the results of the Errors Indicator (failure in Smartlib) with an average value of 4.45, failures can be found in the system. For this reason, there needs to be improvements in overcoming failure problems that are often found in Smartlib, namely access speed, so that access failures can be reduced.
e) Based on the results of the Satisfaction Indicator (user satisfaction with Smartlib) with an average value of 4.42, it is able to provide satisfaction for its users.

The conclusion presents a summary of the description of the results and discussion, referring to the research objectives. Based on these two things, new ideas were developed which constitute the essence of the research findings.

SUGGESTION

It would be better if the Muhammadiyah Riau University Library further improves the quality of its services, especially related to repository access. For further research, it is necessary to examine the reliability of the SmartLib system belonging to the Muhammadiyah Riau University Library.

THANK YOU-NOTE

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