Development of the Human Resources Information System (HRIS) Based on Usability Analysis with Usefulness, Satisfaction, Ease to Use (USE) Questionaire and Cognitive Walkthrough Methods

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Abstract

HRIS application is an application that is needed to manage human resources well and integrated the system. Usability in a system is very necessary in the development of a system so that it can affect the use of the application. The author tests the usability user interface on HRIS products using the cognitive walkthrough evaluation method, which works through a series of task scenarios and asks a number of questions from the user's perspective, and the method of usefulness, satisfaction, ease of use (USE) Questionnaire to assess how much usability is done by the user. The cognitive walkthrough testing is done by using the application that has been made by the author, after that the author makes improvements to the system according to the results of the test. Then after being repaired, the system was tested again with the same application, then the results were assessed using the USE Questionnaire and compared with previous results. The result is that the system has increased from previously by 3.67 from a scale of 1-5 to 4.04, up by 0.34

I. INTRODUCTION

The growing growth in the technology field at the end of this year has made many companies use various technologies for various aspects of the company. One such technology is the HRIS (Human Resource Information System) in the field of employee management, HRIS is an application for storing, processing, and collecting data related to HRD or management of employees.

The HRIS application has a very significant influence on company management. In addition, HRIS can facilitate HRD to manage employees more efficiently so that the objectives of HRD to establish good and mutually beneficial relationships between employees and the company will be achieved. Many features obtained by the company in the use of HRIS, some of these features are making it easier for employees to access salary slips to apply for leave or all permits done online, calculation of compensation rates such as overtime pay, bonuses, and THR can be done accurately without taking a long time, online employee absenteeism and close the possibility of employees cheating in attendance attendance.

QEY-HRIS is a HRIS application product that is useful to help companies achieve their goals in managing their employees well and creating great relationships between employees and companies. So many features are presented in the QEY-HRIS application so education and training are needed in the use of QEY-HRIS. this is done so that employees can use this application properly. In addition, the design of the user interface in the application must also be considered well because the QEY-HRIS application is quite complex so it demands to have a good level of usability so that employees can easily use this application. A good usability level can be measured as employees can use the functionality of the system effectively, efficiently, and satisfactorily in achieving a certain goal.

In most usability studies, they only use one method on usability alone Khoirida (2012), Marthasari (2017), and the results of the study mostly display the results of assessment of the usability of the application without comparing before and after the application was tested Priyo (2016). In previous studies using the cognitive walkthrough method in the method used, using video screen recorder tools to view and record all the tests conducted by respondents, while in this study using an application that can record all actions taken by respondents in real time and summarize the results of testing.

Research Purposes:
1. To find out which parts of the user interface need improvement.
2. Facilitate IT Developers to improve applications.
3. Increase the usability of the application user interface so that it is easy to use and application users increase.

II. METHODS

The author uses the Cognitive Walktrough and USE Questionnaire methods to examine usability user interfaces in the Human Resources Information System (HRIS). The USE Questionnaire method is used to assess the application of the Human Resources Information System (HRIS) by referring to usefulness, satisfaction, and Ease of Use. The results of the assessment can be seen whether the application in terms of its usability is referred to as feasible or not. While the Cognitive Walkthrough Method is used to find out which parts of the application need improvement with a series of testing tasks performed by the respondent.

2.1. Research Steps
Following are the steps carried out in this study:
1. Analysis of USE Questionnaire
   Analyzing the filling of questionnaires given to customers / clients that are used to determine the weaknesses and strengths of the QEY-HRIS application in managing employees.
2. Cognitive Walkthrough Testing
   In this test there are several steps that are carried out, the stages are:
   a. Preparation Stages
      At this stage include the literature study stage and understand the system to be tested, also compile the scenario of tasks to be carried out.
   b. Stage of Execution
      At this stage, prepare everything that is done for the testing process and execution for testing directly to the Respondents.
3. Analysis of Test Results
   At this stage an analysis of the tests conducted has been carried out. The analysis looks at the success rate of respondents in performing a task, the level of failure or error of the respondent in carrying out a task and seeing the respondent's processing time in completing a task scenario.
4. Repair Identification and Recommendations
   After analyzing the usability test results, it is identified the problems faced by respondents when using the application. Problems that arise in each task scenario will be given recommendations for improvements that are prioritized to be carried out immediately.
5. Application Repair according to Repair Recommendations
   At this stage the author carries out an application repair in accordance with recommendations for improvements from the previous test. This improvement also adjusts the Respondents' requests and complaints regarding their use in using the QEY-HRIS application. Repairs are carried out on the task scenario that has been tested.
6. Retesting with the Repaired Application
   At this stage the author re-tests using the method previously carried out, namely the USE Questionnaire and the Coginitive Walkthrough. Technical Testing is carried out slightly differently than before, if previously the Respondents conducted the Cognitive Walkthrough test at the end after knowing the results of testing the USE Questionnaire, this time the respondents conducted cognitive walkthrough testing first so that users could experience the application that had been repaired after the respondents filled out questionnaires about experience of Respondents in using the application.
7. Final Test Result Analysis
   In this stage the author analyzes the test results by using a fixed application. The analytical method used is the same as the previous analysis, namely looking at the success rate of the respondent in completing the task scenario, the Respondent's error rate in completing a task scenario, and the amount of time needed to complete the task scenario. Whereas for the USE Questionnaire method, the analysis is the same as before, namely looking at the average respondent in assessing the questionnaire.

8. Testing Summary

This stage is the final stage, this stage presents a comparison between before repairs are made after repairs are made. The result is that the usability increases after a system repair? These comparisons include comparisons when testing using the previous cognitive walkthrough method with the present, looking at the success of the respondents, the respondent's mistakes and the time used by the respondents. The end result can be seen by comparison with the previous USE Questionnaire method with the current one, on average the Respondents assessed from the experience of the respondents in performing the task scenario in the improved application.

2.2. Responden Characteristic

Respondents of this study included users who were the main target in using HRIS applications, namely several companies that had used QEY-HRIS applications in managing employees. The number of respondents and the characteristics of the respondents chosen can be seen in table 1.

Tabel 1: Responden Characteristic Table

No	Profile	Description	Total	%
1	Educations	SMA	1	10
		D3/S1	9	90
		Total	**10**	**100**
2	Gender	Male	7	70
		Female	3	30
		Total	**10**	**100**
3	Age	17 – 25 Years	5	50
		26 – 35 Years	5	50
		Total	**10**	**100**
4	Experience	< 2 Years	4	20
		2 – 5 Years	3	30
		>5 Years	3	30
		Total	**10**	**100**

2.3. Responden Characteristic

In this study the authors explain the instruments used in the data collection process. The instrument used was the application of the ssi test based on the Cognitive Walktrough method because the data collection method was carried out through application testing and questionnaire filling. This application calculates each click made by the Respondent to complete the task scenario, and calculates the time needed by the respondent in completing a task scenario. In addition, after all the task scenarios have been carried out, there will be a button to see the summary or the results of the tests conducted by the respondent. The following indicators are calculated in this test.

1. Error

Error = JK-LS

Information :

JK: Number of clicks made by Respondents

LS: The correct steps are taken by the Respondents

2. Successful Workmanship (%)

Success = (LS / JT) * 100%

Information :

LS = Step of Success conducted by Respondents

JT = Number of Stages in one Task Scenario

3. Time

The time saved in the system is time in seconds, the length of time the respondent completes a task scenario.

III. RESULTS AND DISCUSSION

3.1. USE Questionaire Analysis

After Resoponden has filled out the questionnaire, the author analyzes the low or high usability in the QEY-HRIS application. The results of the analysis can be seen in table 2.

Tabel 2 : Table of Usability Analysis Results

Criteria	Total	Average
Usefulness	25	3.99
Ease Of Use	25	3.41
Ease Of Learning	25	3.7
Satisfaction	25	3.57
All	25	**3.67**
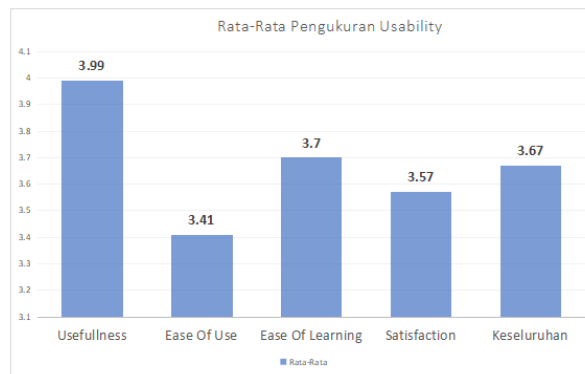
Figure 1: Average Usability measurement chart

From Figure 1, it can be seen that the overall value of usability shows a value of 3.67 on a scale of 1 - 5. This shows that the usability level is still standard so it is necessary to develop the system so that usability in the application increases. Each Ease of use (3.41), Ease of learning (3.7), and Satisfactions (3.57) criteria still have standard values. Ease of Use has the lowest value (3.41) while Usefulness (3.99) has the highest value of all criteria.

3.2. Test Result Cognitive Walkthrough

After all respondents tested the QEY-HRIS application. The author analyzes to see the extent to which the respondents interacted with the QEY-HRIS application, looked at the completion of the task, the number of errors made, and the amount of time needed to complete the task.
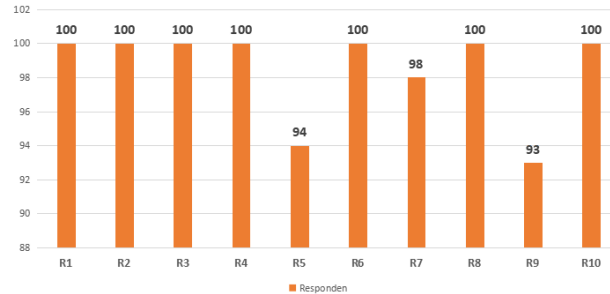

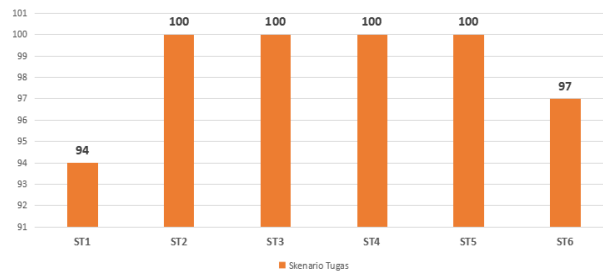Figure 2: Diagram of the number of respondents who successfully completed the task scenario (%)

Figure 3: Diagram of the number of task scenarios completed by respondents (%)

In Figure 2 and Figure 3 shows that the level of task completion is measured based on the task scenario that is completed correctly in accordance with the stages recommended by the respondent. Seeing from the picture shows (task scenario 1) that Attendance Detail is not completed by the respondent by (94%) the lowest compared to other task scenarios. From all tasks only 2 task scenarios that were not successfully completed were task 1 scenario and task scenario 6 employee attendance details and added and edited employee salary. There are only 3 Respondents who did not succeed in completing the entire task, namely respondents 5, 7, and 9. And the lowest did not complete the task scenario correctly, namely the respondents 9 (93%). The level of task completion is a measure of the number of resolutions successfully completed by the respondent for each task (George 2008). The usability results show that not all task scenarios can be completed correctly, in the figure there are task scenarios that can be completed correctly and cannot be completed correctly by the respondent.
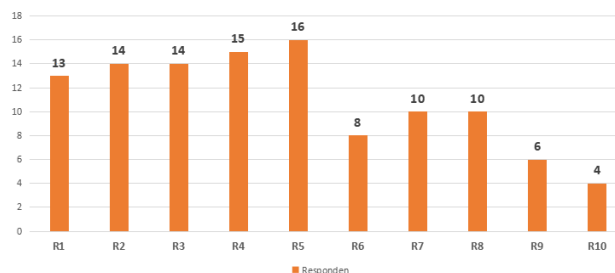

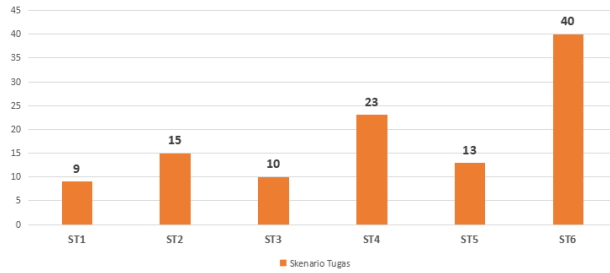Figure 4: Number diagram of errors made by respondents (times)

Figure 5: Amount of error diagram for each task scenario (times)

In Figure 4 shows that respondents 8 made the most mistakes (16 times) compared to other respondents, and the respondents who made the lowest mistakes were respondents 10 (4 times). In the picture shows all respondents must have made mistakes in completing the task scenario. In Figure 5, it shows that the task scenario that has the least error is in the task scenario 1 (9 times), which is on Employee Attendance Details. The most frequently done task scenario is the task scenario 6 (40 times), namely Add and Update Basic Employee Salary.

Table 3: Table of Amount of Time for completion of the Task scenario

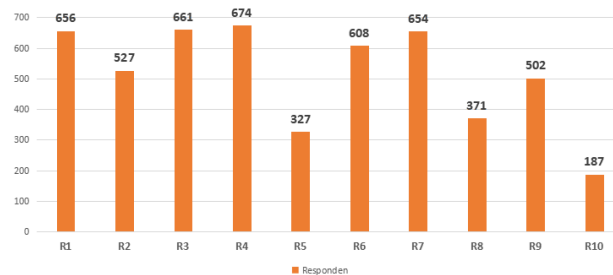| Rspn	ST1	ST2	ST3	ST4	ST5	ST6
R1	146	138	129	40	97	106
R2	69	110	80	116	94	58
R3	164	109	124	53	130	81
R4	74	114	234	56	118	78
R5	75	54	41	42	104	11
R6	69	80	56	237	90	76
R7	177	158	106	17	24	172
R8	73	42	33	69	125	29
R9	38	41	34	21	327	41
R10	24	18	37	57	32	19
Rata	90.9	86.4	87.4	70.8	114.1	67.1
MIN	24	18	33	17	24	11
MAX	177	158	234	237	327	172

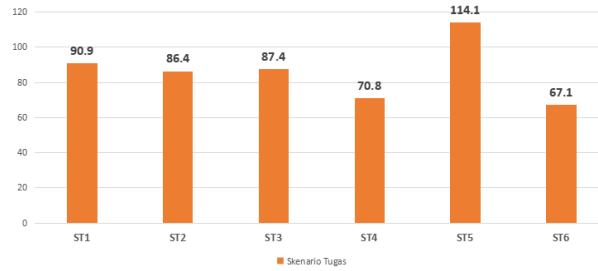Figure 6: Diagram of the amount of time used by the Respondent to do the Task Scenario (seconds)

Figure 7: Average time diagram per task scenario (seconds)

In table 3 is the breakdown of the time the respondent did to carry out testing while seen in Figure 6, shows that respondent 4 had the longest time that is (674 seconds), while the fastest was respondent 10 which was (187 seconds). And in Figure 7 shows that the task scenario that has the longest average time is the Task Scenario 5 Employee Status Update which is (114.1 Seconds) while the fastest scenario is scenario 6, Add and edit employee salary which is (67.1 seconds).

3.3. Repair Recommendation

Based on the explanation described in usability analysis by looking at the completion parameters in the task scenario, the errors found in the task scenario, and the time taken in completing the task scenario, it is necessary to make improvements. Some of the improvement recommendations can be seen in table 4.

Table 4: Table of Repair Recommendations

ST	Modul	Problem	Repair Solution
ST1	Attendance Details	1. When pressing the import data attendance button, the import process loads a new page so that it takes a long time. 2. This module has little content that can be added with other content	1. When you press the import button, a popup/capital will appear so you don't have to load the page. 2. This module will be combined with the recap attendance module, so there are not many pages to upload attendance.
ST2	Data Recap Attendance	When selecting Combobox, you still need to press the data processing button to display data	When selecting the combo box the table will automatically change according to the selected data in the combobox.
ST3	Employee Payroll Data	1. Load old payroll data not yet using datatable side sarver 2. It is necessary to press the data process to process the process indirectly when selecting the combo box option	1. Using a server side system so that data load can be processed quickly. 2. When selecting a datatable combo box it will automatically change according to choice, no need to press the process button.

3.4. Application Repair

After several tests on the QEY-HRIS application, the author made application improvements in accordance with several recommendations from testing the Cognitive Walktthrough method. This improvement will be expected to be able to answer complaints and inputs that have been submitted during the previous testing. The following are some of the application model designs that have been repaired in accordance with recommendations for improvements from the previous test can be seen in Figure 8.
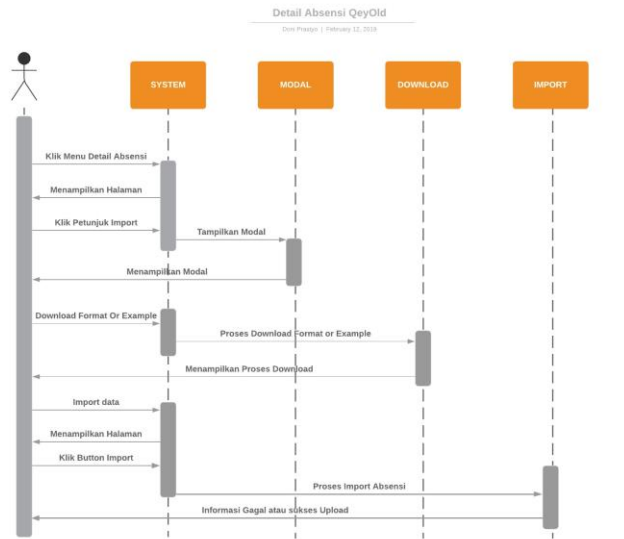
Figure 8: Sequence Diagram Module Time Attendance Before Repairing

In addition, the following is the appearance of the application from before repairing and after repairing, can be seen in Figure 9 and Figure 10.
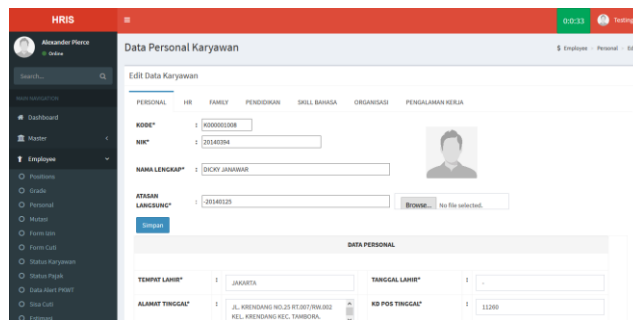

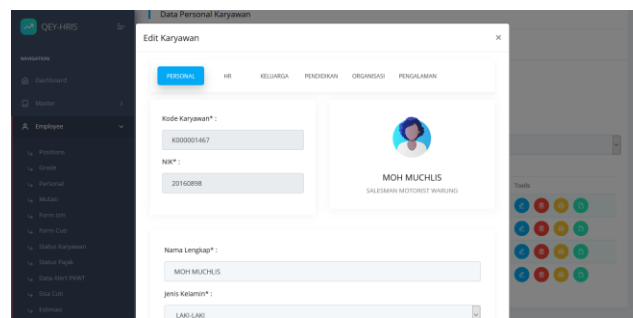Figure 9: Old Display Module Employee Status Update

Figure 10: Latest Views of the Employee Status Update Module

3.5. After Improved Cognitive Walkthrough Test

The author analyzes the test using the technical that had previously been done. The Cognitive walkthrough method analyzes the same as before, namely seeing the success rate of the Respondents in completing the task scenario, seeing the level of errors made by the Respondents in completing the task scenario, and the time taken to complete the task scenario. While the USE Questionnaire is also the same as before, namely looking at the average respondent in assessing the application. And here are the results of analysis of the application that has been fixed :
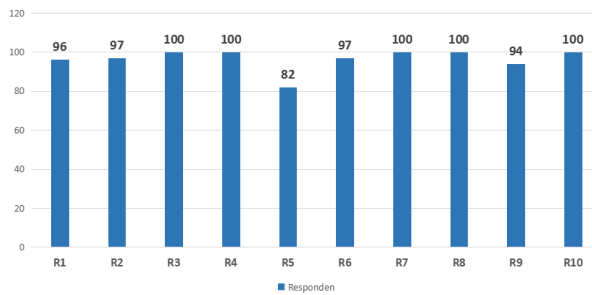

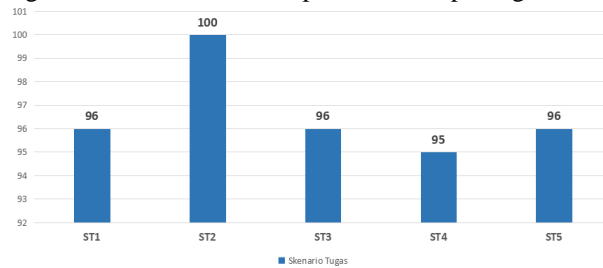Figure 11: Diagram of the number of respondents completing the task scenario (%)

Figure 12: Diagram of the Task Scenario assessed by Respondents (%)

In Figure 11 and Figure 12 shows that (task scenario 4) is the update of employee status not completed by the respondent at (95%) the lowest compared to other task scenarios. Only one task scenario that can be completed properly is task scenario 2, the payroll process can be completed by 100%. There were 5 respondents who succeeded in completing the entire task, namely respondents 3, 4, 7, 8 and 10. And the lowest did not complete the task scenario well, namely the respondents 5 (82%).
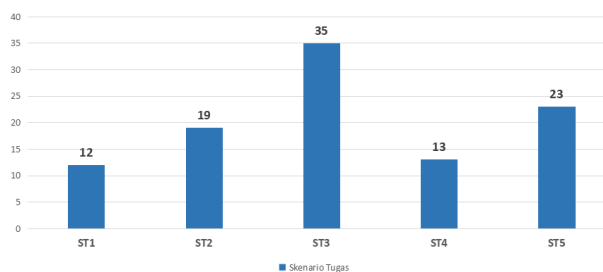

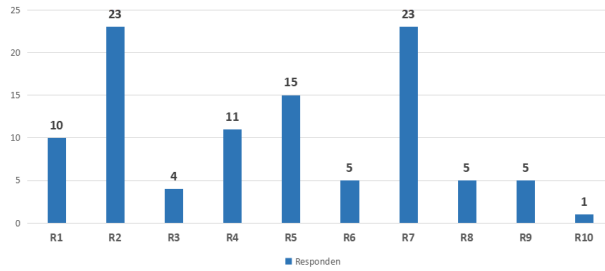Figure 13: Amount of Error Diagram Each Task Scenario (times)

Figure 14: Number of Respondent Error Diagrams (times)

In Figure 13 shows that the task scenario that has the least error is in the task scenario 1, that is (12 times) uploading employee absences, while the one with the most errors when doing the task is task 3 scenario (35 times) Add New Employees. In Figure 14 shows that the respondents who made the least mistakes in completing the task scenario were respondents 10 (1), and the most mistakes in completing the task scenario were respondents 2 and 7 (23 times).

Table 5: Table of Amount of Time for completion of the Task scenario

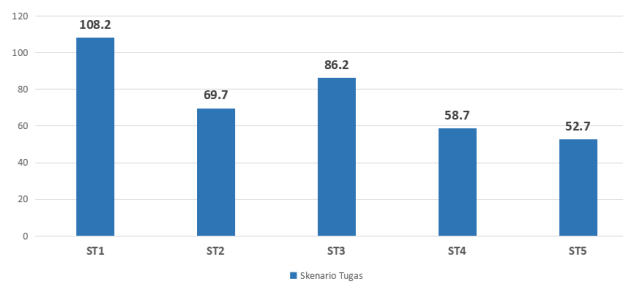| Rspn	ST1	ST2	ST3	ST4	ST5	Total
R1	194	81	60	78	55	468
R2	58	58	244	62	69	491
R3	159	90	69	83	89	490
R4	160	95	114	80	52	501
R5	30	32	24	14	12	112
R6	138	90	160	51	43	482
R7	154	108	15	70	59	406
R8	122	71	69	66	95	423
R9	33	36	94	64	32	259
R10	34	36	13	19	21	123
Rata	108.2	69.7	86.2	58.7	52.7	375.5
MIN	30	32	13	14	12	112
MAX	194	108	244	83	95	501

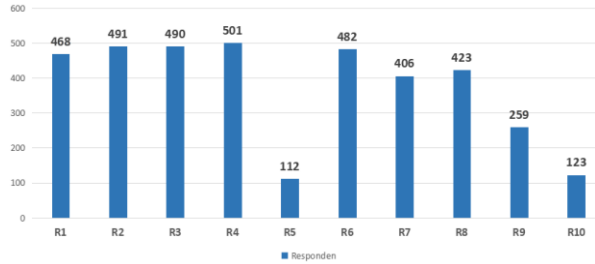Figure 15: Average number of time diagrams (seconds)

Figure 16: Diagram of the amount of time used (seconds)

In table 5 is a detailed breakdown of the time respondents did in completing a task scenario. in Figure 15 shows that the task scenario that has the longest average time is the Task Scenario 1 Upload Attendance that is (108.2 seconds) while the average scenario that is the fastest is scenario 5, the loan is (52.7 seconds). And in figure 15, shows that respondents 4 have the longest time that is (501 seconds), while the fastest is respondent 5 which is (112 seconds).

3.6. Analyze USE Questionaire After Repairing

After Resoponden has tested the application that has been repaired. The following results from Analysis of the USE Questionnaire can be seen in Table 6 and Figure 17.

Table 6: Table of Usability Analysis Results after Improved

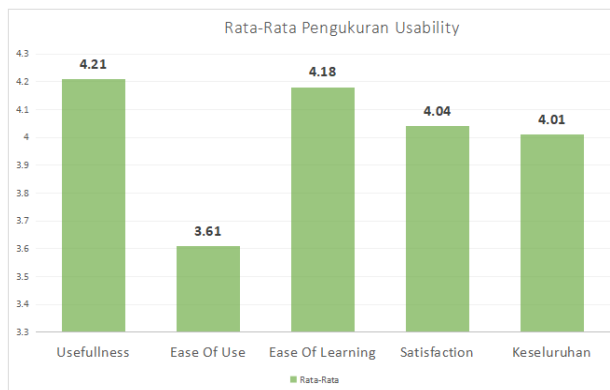| Criteria	Total	Average
Usefulness	25	4.21
Ease Of Use	25	3.61
Ease Of Learning	24	4.18
Satisfaction	25	4.04
All	25	**4.01**

Figure 17: Average diagram of usability measurements

In table 6 shows the details of the usability analysis using the USE Questionnaire method. And in Figure 17 it can be seen that the overall value of usability shows a value of 4.01 from a scale of 1-5. This shows that the usability level is good. Each of the Usefulness criteria (4.21), Ease of use (3.61), Ease of learning (4.18), and Satisfactions (4.04) already have good usability.

3.7. Testing Summary

After conducting various tests and analyzes from before the system is repaired and after the system is repaired, the author will compare the results of the test so that it can be seen whether the usability of the application has increased or not can be seen in Figure 18.
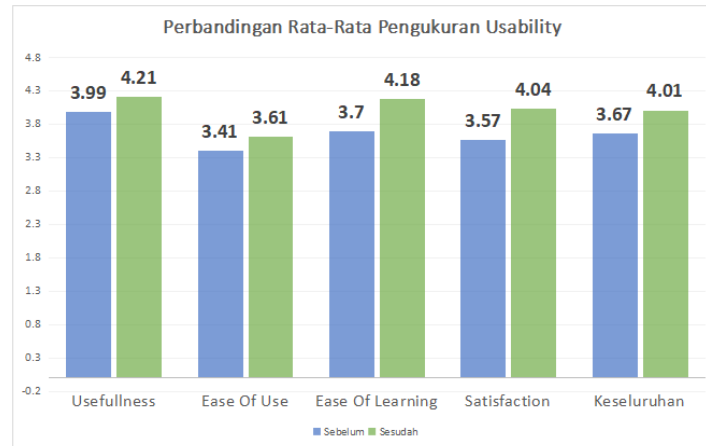

Figure 18: Comparison diagram of average usability measurements

In Figure 18 shows that from all usability categories from before to after the system improvement has increased on the usefulness criteria has increased from the original of 3.99 up to 4.21, Ease of Use also experienced an increase which is from 3.41 to 3.61, Ease of learning experiences also experienced from 3.7 to 4.18, the Satisfactions criteria also increased from 3.57 to 4.04. If total overall usability criteria has increased, from the previous one of 3.67 to 4.01 (increase of 0.34). After repairing the total usability is 4.01 on a scale of 1-5, this shows that the criteria fall into the "AGREE" category. The usability experienced a significant increase from all criteria so that it was expected to facilitate users in using this application.

IV. CONCLUSIONS

In the course of the QEY-HRIS application there are several complaints from customers regarding the performance of the application, Analysis using Usefulness, Satisfactions, Ease to Use (USE) Questionnaire tells us that the QEY-HRIS application has a low usability, so it requires a system to improve usability from the application.
Testing with the cognitive walkthrough method is used to analyze and identify problems faced by users when using the application. Tests in the form of task scenarios that must be completed by the respondent. The author tested 10 respondents including 70% male and 30% female, age of respondent was 17-25 years by 50%, 26-35 years and 50%. respondent's education is 10% high school and 90% D3 / S1, respondent's working experience is <2 years by 40%, 2-5 years by 30%, and> 5 years by 30%.

The test results before the improvement show that the application usability level is 3.67 on a scale of 1-5, with Usefulness (3.99), Ease of Use (3.41), Ease of Learning (3.7), and Satisfaction (3.57). this is still categorized as low usability. And after doing a system improvement based on usability testing with the cognitive walkthrough, the results were 4.04 on a 1-5 scale, with usefulness (4.21), Ease of Use (3.61), Ease Of Learning (4.18) and Satisfactions (4.04). This shows the increase in usability of the overall criteria from the initial average usability of 3.67 up to 4.04 (up by 0.34).

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