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## Analysis of the MTSN 2 Poso Education Data Collection System Using the Cognitive Walkthrough Method

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### Abstract

#### Keywords

Cognitive Walkthrough, EMIS, Education, Usability, Website

This study examines the usability of the EMIS 4.0 website at MTsN 2 Poso using the Cognitive Walkthrough method. The increasing implementation of digital education management systems requires educational institutions to ensure that information systems are efficient, user-friendly, and capable of supporting accurate educational data management. However, several users of EMIS 4.0 still experience difficulties operating the system, particularly when completing administrative tasks. Therefore, this research aims to evaluate the usability level of EMIS 4.0 by identifying task completion success, user errors, efficiency, and user experience during system interaction. This study employed a quantitative usability evaluation approach using the Cognitive Walkthrough method. Data were collected from 20 teachers and education personnel selected through purposive sampling. Respondents were asked to complete seven task scenarios related to the use of EMIS 4.0. The results showed that the task completion rate reached 85%, while the error rate was 26%. Several tasks, such as updating employment data, uploading attendance documents, and printing portfolios, required longer completion times than other tasks. The time-based efficiency score obtained was 0.0272 goals/second. The findings indicate that EMIS 4.0 still requires improvements in interface design, feature accessibility, and server performance. In conclusion, the Cognitive Walkthrough method effectively identified usability problems and provided recommendations for improving the usability and user experience of the EMIS 4.0 system

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## INTRODUCTION

Madrasah Tsanawiyah is a formal educational institution that provides general education equivalent to junior high school (Sekolah Menengah Pertama—SMP), but with the distinctive feature of Islamic religious education. This institution has three levels of basic education and serves as a continuation of elementary school (Sekolah Dasar—SD), Madrasah Ibtidaiyah (MI), and other equivalent institutions that have been officially recognized as equivalent to SD or MI (Pemerintah Magelang, 2023).

To support the teaching and learning process and quality services, four software programs are available at MTsN 2 Poso, namely SIMPATIKA, EMIS 4.0, PUSAKA, and RDM. One of these is EMIS 4.0, an information system for teachers and education personnel. EMIS 4.0 is an information and data collection system for teachers and education personnel based on information technology within an electronic network (Kementrian Agama, 2024). EMIS 4.0 is designed to integrate all data collection and information administration processes centrally and systematically, thereby minimizing fraud and errors that are commonly

encountered (Hikmah Romalina, 2025). However, the level of service implementation, users' ability to operate EMIS 4.0, the ease of using EMIS 4.0, and users' perceptions of EMIS 4.0 are not yet clearly understood. In accordance with these issues, an analysis of ease of use, acceptance, user ability, experience, and user perceptions of EMIS 4.0 is necessary.

Usability is a crucial aspect of application success, focusing on efficiency, effectiveness, and ease of use (Jauhar et al., 2025). The Cognitive Walkthrough method is used to evaluate usability in user interfaces. Cognitive Walkthrough focuses on ease of learning through exploration (Afrian Piesca Firmanda et al., 2023). The Cognitive Walkthrough test is an evaluation method that requires user responses to task scenarios designed by the researcher (Muhammad & Persada, 2022). The purpose of Cognitive Walkthrough is to introduce more relevant cognitive theories into practical design improvement and user evaluation (Wahyudin Ismiarta; Rusydi, Alfi Nur, 2025). Based on this background, a usability evaluation was conducted on the EMIS 4.0 website using the Cognitive Walkthrough method. This method was chosen because it allows users, as respondents, to complete task scenarios directly. Unlike other methods, such as heuristic evaluation, which requires experts, the use of respondents enables the discovery of more realistic problems because they have previously used the system (Ginting et al., 2021). This usability evaluation can help draw conclusions and provide suggestions for improvement. Cognitive Walkthrough is used as a user experience analysis method. Through this method, several shortcomings and improvement opportunities are expected to be identified in order to enhance system quality and user experience (Akbar, 2022).

Digital transformation in education has become a global priority because educational institutions are increasingly required to manage data accurately, quickly, and transparently. Education Management Information Systems (EMIS) play an important role in supporting planning, monitoring, and policy evaluation because educational administrative data usually include information on schools, teachers, and students. UNESCO also emphasizes that EMIS is central to producing education indicators and supporting SDG 4 monitoring.

In practice, the success of digital education systems is not only determined by system availability but also by usability. A system that is difficult to use can reduce data accuracy, slow administrative services, and create user resistance. Therefore, user experience, ease of learning, efficiency, and error reduction are important aspects in evaluating educational data systems. In the context of madrasah education, EMIS 4.0 is used to integrate teacher and education personnel data into a centralized digital platform.

The specific issue addressed in this research is the usability of the EMIS 4.0 website at MTsN 2 Poso. The manuscript explains that MTsN 2 Poso uses several education information systems, including SIMPATIKA, EMIS 4.0, PUSAKA, and RDM. However, the level of service implementation, user ability, ease of use, and user perceptions of EMIS 4.0 have not been clearly understood.

This issue is important because EMIS 4.0 is designed to support systematic and centralized education data collection. If teachers and education personnel experience difficulty completing basic tasks such as logging in, updating profiles, managing employment data, viewing schedules, uploading attendance records, printing portfolios, and logging out, then the effectiveness of the system may decline. The manuscript shows that this study used seven task scenarios to examine these user activities.

Previous research has shown that the Cognitive Walkthrough method is useful for identifying usability problems in digital systems. Ginting et al. compared Cognitive Walkthrough and heuristic evaluation, while Bancin and Rachmaniah used Cognitive Walkthrough to evaluate the PayPOS application. Other studies, such as those by Aprilina and Gustalika, found that 84% of respondents could complete task scenarios, while Kusuma Dewi et al. reported usability testing results using Cognitive Walkthrough and the System Usability Scale.

Nevertheless, previous studies have generally focused on applications, websites, or digital platforms outside the specific context of EMIS 4.0 in madrasah education. This creates a research gap because the usability of EMIS 4.0 for teachers and education personnel, especially at MTsN 2 Poso, has not been deeply examined through direct task-based evaluation. Therefore, this study is needed to provide empirical evidence about real user difficulties in operating EMIS 4.0.

The urgency of this research lies in the need to ensure that EMIS 4.0 can truly support accurate and efficient education data management. The manuscript reports that only five respondents completed all scenarios successfully, with an overall task success rate of 85%, an error rate of 26%, and a time-based efficiency score of 0.0272 goals/second. These findings indicate that several features still require improvement.

The novelty of this research lies in its focus on evaluating the EMIS 4.0 education data collection system at MTsN 2 Poso using the Cognitive Walkthrough method and translating the findings into redesign recommendations. This study not only measures completion rate, errors, and efficiency, but also proposes interface improvements, such as dashboard news updates, a clearer logout button, automatic date-of-birth input, and madrasah statistics features.

The purpose of this research is to analyze the usability of the EMIS 4.0 website based on user performance in completing task scenarios. Specifically, this research aims to identify the level of task completion, the number of errors made by users, the time required to complete tasks, and the problems experienced by teachers and education personnel when using EMIS 4.0. These results are expected to serve as a basis for improving the system interface and user experience.

This research contributes to both academic and practical fields. Academically, it enriches studies on usability evaluation in educational information systems, especially through the Cognitive Walkthrough approach. Practically, the findings can help EMIS 4.0 developers, madrasah administrators, and education policymakers improve system usability, reduce user errors, and strengthen digital education data management. The main benefit of this research is to support a more user-friendly, efficient, and reliable EMIS 4.0 system for madrasah education.

## **RESEARCH METHOD**

### **Cognitive Walkthrough**

Cognitive Walkthrough is a usability evaluation method in which one or more evaluators work on a series of task scenarios and ask various questions from the user's perspective. Usability testing using the cognitive walkthrough method involves several stages, namely the preparation stage and the execution stage. The preparation stage includes a literature study, determining the respondents for the system to be tested, and compiling the task scenarios that

need to be completed by the respondents (Ulinuha et al., 2020). This method requires evaluators to observe what users do when performing the given task scenarios so that evaluators can understand whether the system is understandable or not. Previous studies have shown that Cognitive Walkthrough testing can identify problems experienced by users when using an interface. Developing an interface based on the results of the above test can improve the effectiveness of website usage (Tileng, 2021).

### Sample

Data collection was conducted by focusing on teachers and educators from MTs N 2 Poso Kota who were registered in EMIS 4.0. In the sampling process, the technique applied was purposive sampling, which is a technique of selecting samples according to specific criteria. The Slovin formula applied was (1):

$$n = \frac{N}{1+Ne^2} \quad (1)$$

Where:

n = Number of research samples

N = Population size

e = Error or margin of inaccuracy due to sampling error, tolerable at 10%)

Then, the purposive sampling formula is applied as a sample filter after the selected size. Purposive sampling is applied to select respondents based on specific needs. At MTs N 2 Poso, there are 25 teachers who have access to or accounts for EMIS 4.0, so the Slovin formula is applied. The result is a sample size of 20 respondents.

### Compiling Scenario Activity Details

It is at this stage that the Cognitive Walkthrough method is implemented in the evaluation process, which includes two sub-stages, namely developing task scenarios and task action stages. The Cognitive Walkthrough method is implemented in the evaluation process, namely developing task scenarios and task action stages.

According to Nooriza & Fitroh (2022) the number of task scenarios, there are five to fourteen task scenarios. The task scenarios developed are as follows:

**Table 1. Task Scenarios**

ST Code	Function	Task
ST1	Login	Log in using your Email and Password
ST2	Display profile	Change/match teacher identity, for example, match personal data, only temporarily. Once the task is completed, the teacher's identity can be changed back to the original.
ST3	Display employment information	Add or match employment data.
ST4	Open teaching schedule	View the teacher's hourly teaching schedule
ST5	Open attendance display	Upload/display attendance summary
ST6	Print portfolio	Print teacher portfolio

ST 7	Logout	Log out of the Website
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Source: Research Data Processed by Authors (2025).

## Test Result Analysis

### Task scenario completion rate Number (Completion Rate)

The Completion Rate indicates how many users were able to complete the assigned task [18]. A high number indicates that the application is easy to use and users can achieve their goals (Susanto et al., 2021). At this stage, a table visualizing the results of each respondent after completing the task scenario will also be presented. The number of results for each respondent will be measured to calculate the success rate (completion rate) using the following equation (2)(Wijaya, 2024):

$$Successful = \frac{\text{Number of successful ST}}{\text{Total ST}} \times 100\% \quad (2)$$

Description:

Number of successes = Total number of successes for each respondent (indicator value 1 for success and 0 for failure)

### Process of Analysis and Visualization of the Number of Errors in Evaluation

The number of errors that occur is indicated by the number of mistakes made by respondents when operating the system. These errors illustrate the difference between what users perceive and what the system actually explains. As shown in the following formula 3:

$$E = \sum_{i=1}^n \sum_{j=1}^m E_{ij} \quad (3)$$

Explanation:

1.  $E$ : Total *Errors* that occurred during the evaluation.
2. Sigma ( $\sum$ ): Symbol used to sum the elements in a set. In this context, sigma indicates that it is used to sum the errors from all respondents and all tasks.
3.  $n$ : Number of respondents in the study.
  - Example: If there are 5 respondents, then  $i$  will run from 1 to 5.
4.  $m$ : Number of tasks that must be completed by each respondent.
  - Example: If there are 3 tasks, then  $j$  will run from 1 to 3.
5.  $E_{ij}$ : The error made by respondent  $i$  on task  $j$ 
  - A value of 1 is given if an error occurs on that task, and 0 if there is no error

### Time-Based Efficiency Analysis and Visualization Process

The components selected based on time-based efficiency are the percentage of tasks that users describe well. Completion is recorded when respondents have completed one task scenario, and this continues until all task scenarios have been completed. The time calculation is based on the duration used by respondents to complete all task scenarios (Farhan & Setiaji, 2023) Regardless of whether the respondent succeeds or fails to complete a task scenario, the time will still be recorded. The parameter that causes the respondent to fail in completing the task scenario is when the respondent does not continue working on the scenario and moves on to the next scenario. To find out the time calculation, you can use equation (4) below:

$$\text{Time based Efficiency} = \frac{\sum_{j=1}^R \sum_{i=1}^N \frac{n_{ij}}{t_{ij}}}{NR} \quad (4)$$

Explanation of Elements in the Formula:

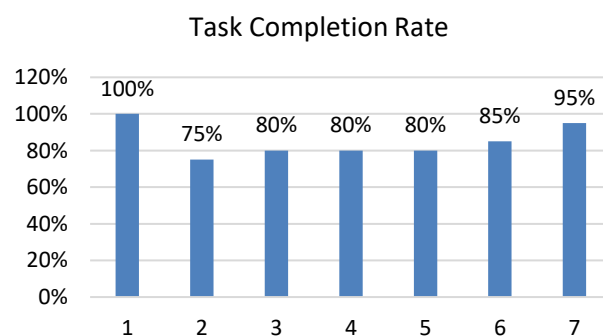
- a. *Time-Based Efficiency* : Measures the time efficiency required to complete a task. The result is expressed in the number of tasks per second (*goals per second*).
- b. Sigma ( $\sum$ ): A symbol used to sum the elements of all tasks and all respondents.
- c. *N*: Total number of tasks given in the test. For example, if there are 3 tasks, then *i* will run from 1 to 3.
- d. *R*: Total number of respondents in the test. If there are 5 respondents, then *j* will run from 1 to 5.
- e. *n<sub>ij</sub>*: The status of task *i* completion by respondent *j*. A value of 1 is given if the task can be completed, and a value of 0 if it is not completed.
- f. *t<sub>ij</sub>*: The time required to complete task *i* by respondent *j*, usually measured in seconds.

## RESULT AND DISCUSSION

Cognitive Walkthrough testing is an evaluation process in which evaluators assess all the efforts that users must make to complete tasks according to predetermined scenarios. The success rate of each task stage is calculated based on the percentage of respondents who were able to correctly complete the task scenario (Wijareni et al., 2022). This test was conducted offline between March 6 and 10, 2025. Efficiency is related to the amount of time needed by respondents and the number of errors made by respondents in achieving the objective.

### Level of Analysis and Visualization of Success in Completing Task Scenarios (Completion Rate)

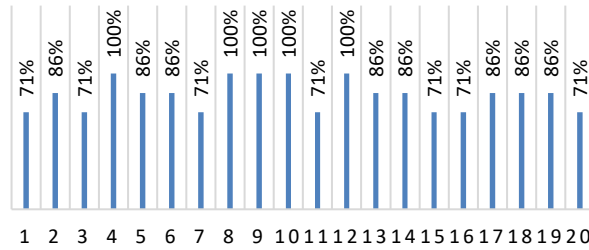
Completion Rate indicates how many users can complete the given task. A high number indicates that the application is easy to use and users can achieve their goals (Wijaya, 2024). Based on the Cognitive Walkthrough test results, the success rate for each task shows a success rate of 85%. Five respondents were able to complete the task scenario correctly, while the rest were categorized as respondents who were unable to complete all task scenarios correctly.



**Figure 1 Task Completion Rate**

The results of the respondents' success rates are shown in Figure 1. The task that all respondents were able to complete correctly was 1, namely logging in (scenario 1), and the scenarios that were not successfully implemented were matching and changing teacher identities, matching and adding employment data, adding and viewing teacher teaching schedules, printing portfolios, displaying and uploading attendance records, and logging out of accounts.

### COMPLETION RATE OF EACH RESPONDENT



**Figure 2 Completion rate of each respondent**

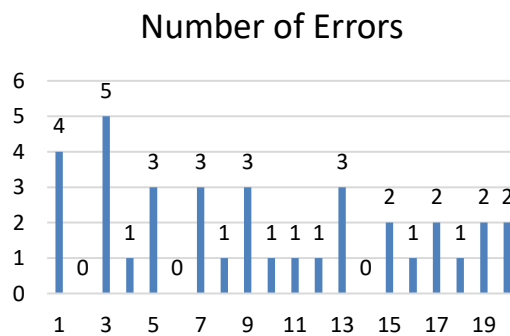
Based on Figure 2, the percentage of respondents who completed the task, namely R1, through the task scenario was 71%, with a minimum of 5 tasks completed. Meanwhile, the highest percentage was R4, with 100% of the given task scenarios completed. In the following figure, those who were able to successfully complete all tasks were R4, R8, R9, R10, and R12. Meanwhile, the respondents who successfully completed at least 7 tasks were R1, R3, R7, R11, R15, R16, and R20.

#### Number of Errors Made

Errors can be seen when respondents repeat and are unable to complete the task. For example, in ST3, respondents were given the task of adding or changing employee data, but it turned out that the respondents did not change one or all three of them, so this was considered an error.

The respondent error rate is 26%. For example, the respondent made 5 errors in task one, which involved entering an email and password incorrectly. In task 2, the respondent made a total of 6 errors, mostly due to network problems and the respondent not changing the personal data as instructed in the task. And in task 5, the respondent made errors because they failed to download the teaching schedule due to server problems and incorrectly uploaded the attendance document.

The use of tables and figures should be mentioned in the tables and figures should be mentioned in the text by mentioning table 1; Figure 1 and so on.



**Figure 3 Number of Errors**

As shown in Figure 3, the most common error made by R3 was 5 errors. This was because the respondents did not understand the features available on the website. Then R1 with 4 errors is the second most, R5, R7, R9 and R13 made three errors, R15, R17, R19 and R20 made 2 errors, R4, R8, R10, R11, R12, R16 and R18 made 1 error, and R2, R6 and R14 made no errors at all. Based on the average number of errors made by respondents, there are features in EMIS that respondents do not yet understand, as well as server issues that take a long time to resolve.

### Time-Based Efficiency Analysis and Visualization Process

The task completion scenario, calculated from the time the respondent completes the initial stage to the final stage of completing the scenario, is recognized as the scenario completion time (Ajeng Fadila Aprilina1, 2023). According to the recapitulation results, respondents completed the completion scenario in a minimum time of 2 seconds and a maximum time of 476 seconds. The longest time taken by respondents to complete the task was R1 with 1982 seconds with a task scenario completion rate of 71%, while the fastest was R20 with 491 seconds with a task scenario completion rate of 71%. The average time taken to complete all task scenarios was 1092 seconds. The fastest task completed was ST1 with 2 seconds, and the longest task completed was ST5 with 430 seconds. This can be seen in Table 2 below.

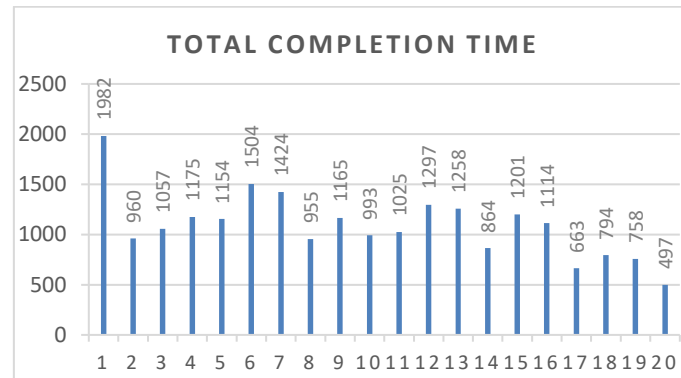
**Table 2 Average time required**

Responden	ST1	ST2	ST3	ST4	ST5	ST6	ST7	Total	Rata-Rata
R1	100	140	220	276	360	410	476	1982	283,1428571
R2	60	120	180	60	300	180	60	960	137,1428571
R3	40	130	146	93	320	278	50	1057	151
R4	86	70	120	70	343	354	132	1175	167,8571429
R5	40	120	253	66	371	248	56	1154	164,8571429
R6	244	230	200	267	345	144	74	1504	214,8571429
R7	190	149	361	50	430	189	55	1424	203,4285714
R8	30	67	214	72	321	185	66	955	136,4285714
R9	62	83	197	95	375	253	100	1165	166,4285714
R10	56	68	221	64	276	288	20	993	141,8571429
R11	45	72	178	134	321	193	82	1025	146,4285714
R12	132	77	254	125	365	254	90	1297	185,2857143
R13	102	97	271	105	324	266	93	1258	179,7142857
R14	30	64	182	79	264	195	50	864	123,4285714
R15	60	144	264	131	342	182	78	1201	171,5714286
R16	153	103	130	115	355	190	68	1114	159,1428571
R17	2	3	176	92	261	123	6	663	94,71428571
R18	20	57	200	57	310	147	3	794	113,4285714
R19	3	90	134	72	260	149	50	758	108,2857143
R20	2	25	145	6	187	127	5	497	71
Rata-Rata	72,850	95,450	202,300	101,450	321,50	217,750	80,700	1092	156
MIN	2	3	120	6	187	123	3	444	63,42857143
MAX	244	230	361	276	430	410	476	2427	346,7142857

Source: Research Findings Processed by Authors (2025).

Table 2 above shows the total percentage of time spent by respondents on completing a total of 7 tasks assigned by the evaluator. In the figure above, usability testing shows that

adding or changing employee data (task scenario 3), uploading and displaying attendance records (task scenario 5), and printing teacher portfolios (task scenario 6) are the three task scenarios that, on average, require the longest time to complete. Task scenario 3 took 202.30 seconds, task scenario 5 took 321.50 seconds, and task scenario 6 took 217.750 seconds.



**Figure 4 Total completion time**

The results in Figure 4 above show that the longest time was R1, which was 1982 seconds, while the fastest was R20, which was 497 seconds. Efficiency can be applied by calculating the time taken by participants to complete the tasks set by the examiner, whether the tasks were completed or failed. The time is calculated from the moment the respondent starts the task until completion. The time measurement unit is seconds. Then, the time-based efficiency calculation is performed using the following equation (4):

$$\begin{aligned}
 \text{Time based Efficiency} &= \frac{\sum_{j=1}^R \sum_{i=1}^N \frac{n_{ij}}{t_{ij}}}{NR} \\
 &= \frac{1,6444 + 0,5262 + 0,0844 + 0,3603 + 0,0514 + 0,0818 + 0,9726}{7 \times 20} \\
 &= \frac{3,7211}{140} \\
 &= 0,0266 \text{ goals/sec}
 \end{aligned}$$

Based on the results of the time-based efficiency calculation, the usability evaluation results for the efficiency component were 0.0272 goals/sec.

### Problems and Recommendations for Improvement

The test results show that respondents experienced various obstacles in completing the task scenarios. The problems and recommendations for improvement are based on errors or suggestions from respondents. The input covers various important aspects that affect usability and user experience, ranging from application response speed, feature completeness, interface design, identification capabilities, to personalization options (Sari et al., 2025). Analysis of the success rate, number of errors, and task completion time indicates that there are aspects that need to be improved. Therefore, improvements to the EMIS 4.0 system are necessary to address the problems identified through these findings.

The UI and UX are designed according to user requirements for the application to be built, including features, display design, and several other requirements (Firmansyah et al.,

2024). It is hoped that the findings and recommendations for improvement will enhance the usability of EMIS 4.0 in the future. They will also serve as a benchmark for developers in developing the EMIS 4.0 website, as shown in Table 3 below.

**Table 3 Problems and Recommendations for Improvement**

No	Problem	Recommendations for Improvement
1	Users need a long time to open features, upload documents, and download	Strengthen and improve the server so that opening the application does not take a long time. For example, one respondent took 1982 seconds.
2	No news feed on the website homepage	The dashboard section needs to include news updates, such as the latest developments in the Ministry of Religious Affairs or announcements from the Ministry of Religious Affairs to employees.
3	The logout button is difficult to find	Improve the layout of the logout button so that it is visible to users.
4	Changing the year on the calendar is still manual	Add an automatic birth year feature to make it easier for users to fill in their personal details.
5	Does not show Madrasah statistics as on the previous website	Add a madrasah statistics feature or information about madrasahs to make it easier to find information.

Source: Usability Testing Results Processed by Authors (2025).

### EMIS 4.0 User Interface Redesign Results

The user interface (UI) of the EMIS 4.0 website has been redesigned using Figma. This redesign is the result of usability testing using the cognitive walkthrough method.

### Addition of Events on the EMIS 4.0 Dashboard

On the improved dashboard display, researchers added a feature for the latest news and current events in the Ministry of Religious Affairs in the field of education, so that teachers and teaching staff are aware of information from the Ministry of Religious Affairs.



**Figure 6 Initial Dashboard Display**

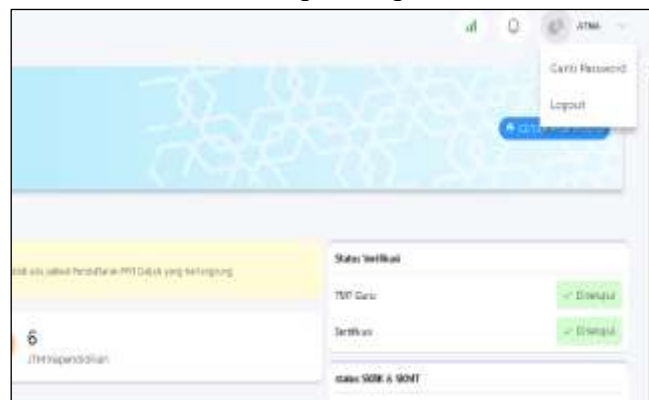


**Figure 7 Proposed Dashboard Display**

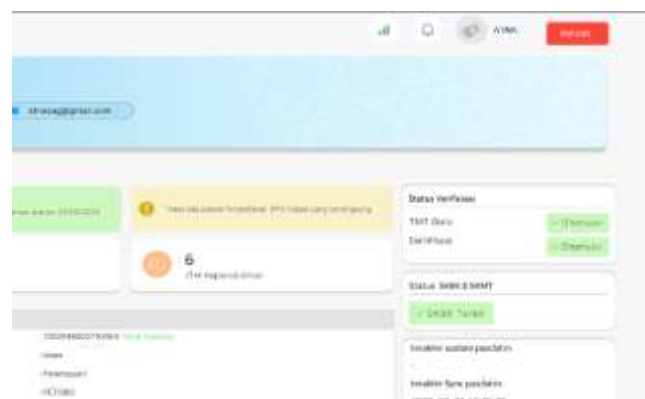
### Improving the logout button that was difficult for users to find

Next, improvements were made to the logout button, because during testing, respondents had difficulty finding the logout button in task scenario 7. Therefore, the author redesigned the logout button so that it would be easy for users to find.

The addition of this logout button was suggested by users because some users took a long time to complete the task scenario; for example, respondent 1 took 476 seconds.



**Figure 8 Initial Logout Screen**



**Figure 9 Proposed Logout Feature Display**

### Improving the automatic date of birth feature

On the personal data change screen, the author added a feature to automatically enter dates, making it easier for users to change or add personal data. This improvement is intended to make it easier for users to change their personal data, especially their date of birth.

The image shows a web form with several input fields. The first field is empty. The second field is labeled 'TANGGAL LAHIR' and contains the date '1971-02-20', which is enclosed in a red rectangular box. The third field is labeled 'NOMOR IKK' and contains the number '720201200907014'. The fourth field is labeled 'ACARA' and contains the text 'Islam'.

**Figure 10 Initial Date of Birth Display**

The image shows a web form with a date picker calendar. The calendar is for the month of July 2025. The date '1971-02-20' is displayed in the date input field above the calendar. The calendar shows the days of the month, with the 1st, 2nd, and 3rd highlighted in blue.

**Figure 11 Proposed Date of Birth Display**

### Adding Statistics Features to the EMIS 4.0 Dashboard

The addition of these statistics features allows teachers or teaching staff to view the data available in EMIS 4.0. For example, to find learning statistics or teacher statistics at Mts N Poso Kota, simply search for the school name in the search field and the statistics or data from the school in question will appear. This is intended to make it easier for users to find school data and teacher statistics. For example, if the madrasah has 25 teachers and 10 teaching staff, this data can help teachers or teaching staff who do not have access to the website.



**Figure 12 Initial Dashboard Display**



**Figure 13 Proposed Statistics Feature Display**

The discussion concluded that the process of conducting usability analysis using the Cognitive Walkthrough method began with collecting data from several references, such as manuals, journals, and related literature, in order to obtain an overview for solving the problems found in the study. Respondents were then identified by selecting a sample of MTsN 2 Poso Kota educators who had EMIS 4.0 accounts, resulting in 20 respondents. Next, the EMIS 4.0 application was tested by preparing task scenarios to be performed by the respondents, consisting of seven tasks. From the results of the respondents' work, data were obtained on task success, number of errors, and time required during testing. The data were then processed by the author using Excel to obtain the goals/second value of the application.

The results of the Cognitive Walkthrough method showed that the success rate for each task was 85%. Five respondents were able to complete all task scenarios successfully, while the remaining respondents were considered unsuccessful in completing one or more scenarios. Meanwhile, the respondents' error rate was 26%. For example, respondents made five errors in Task 1, which involved entering an incorrect email address and password. In Task 2, respondents made a total of six errors, mostly due to network problems and failure to change personal data as instructed in the task. Usability testing showed that adding or changing employee data (Task Scenario 3), uploading and displaying attendance records (Task Scenario 5), and printing teacher portfolios (Task Scenario 6) were the three task scenarios that required a relatively long time to complete. Task Scenario 3 took 202.30 seconds, Task Scenario 5 took 321.50 seconds, and Task Scenario 6 took 217.75 seconds. The efficiency aspect was measured by calculating the time taken by respondents to complete the tasks assigned by the testers, whether the tasks were successfully completed or failed. The time was calculated from the moment the respondent started working on the task until the task ended. The unit used for this measurement was seconds. Based on the results of the time-based efficiency calculation, the evaluation result for the usability component of efficiency was 0.0272 goals/second.

The findings of the test results indicate that respondents experienced various obstacles in completing the task scenarios. Problems and recommendations for improvement were identified from the errors made by respondents and from their suggestions. The analysis of success rate, number of errors, and task completion time indicated several aspects that required improvement. This finding is supported by research conducted by Afrian Piesca Firmanda et al. (Afrian Piesca Firmanda, Ulya Anisatur Rosyidah, 2023). The author then redesigned EMIS 4.0 based on the problems found and the improvement recommendations obtained from respondents in the field. It is expected that these findings and recommendations will make EMIS 4.0 easier to use in the future. They may also serve as a benchmark for developers in improving the EMIS 4.0 website.

## CONCLUSION

The results of this research indicate that the usability evaluation of the EMIS 4.0 website at MTsN 2 Poso using the Cognitive Walkthrough method successfully identified several important issues related to user experience, effectiveness, and efficiency. The findings revealed that the task completion rate reached 85%, indicating that most respondents were able to complete the assigned scenarios, although several users still experienced difficulties in performing certain tasks. The study also found an error rate of 26%, which mainly occurred in activities such as changing personal data, uploading attendance documents, and managing employment information. In addition, the time-based efficiency analysis showed that several task scenarios required a relatively long completion time, particularly in employment data management, attendance uploads, and portfolio printing. These findings demonstrate that the EMIS 4.0 system still requires improvements in interface design, feature accessibility, and server responsiveness to enhance usability and user satisfaction. Furthermore, the redesign recommendations proposed in this study, such as improving the logout button visibility, adding dashboard news updates, implementing automatic date input features, and providing statistical information, are expected to improve the overall user experience of the system.

For future research, it is recommended that researchers expand the scope of usability evaluation by involving a larger number of respondents from different madrasahs or educational institutions to obtain more comprehensive findings. Future studies may also combine the Cognitive Walkthrough method with other usability evaluation approaches, such as System Usability Scale (SUS), Heuristic Evaluation, or User Experience Questionnaire (UEQ), in order to produce more in-depth analysis results. In addition, further research should examine the impact of system improvements after redesign implementation to determine whether the proposed recommendations effectively increase usability, efficiency, and user satisfaction. Future researchers are also encouraged to explore the influence of technological infrastructure, internet stability, and digital literacy on the successful implementation of EMIS 4.0 in educational environments.

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