Performance analysis of SiJaspro application as a physical fitness test tool at Jasdam II Sriwijaya Using PIECES and GTMetrix Methods

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Abstract: Technological advancements affect nearly every aspect of daily life, including sports. Accurate calculations are essential for physical exercise. To address this, Jasdam II Sriwijaya developed the SiJaspro application, which provides crucial information and calculations for training. The app is designed to assess fitness scores, offer training materials, and present information related to Jasdam II Sriwijaya. Despite its recent launch, the app has issues such as bugs on some pages, difficulties displaying user data, and compatibility limited to Android devices. The analysis of SiJaspro uses the PIECES method, which includes Performance, Information and Data, Economics, Control and Security, Efficiency, and Service. This evaluation aims to assess the app's effectiveness at Jasdam II Sriwijaya and compare its performance against expected goals. Performance testing is done with GTMetrix to evaluate speed and performance, and Google Transparency Report to measure security.

Keywords: Analysis; SiJaspro; PIECES; GTMetrix; Google Transparency Report

1. Introduction

The development of technology has greatly influenced our daily lives and activities, with various apps and websites often used as both work and entertainment tools. These technologies have a significant impact on our productivity performance in various activities, including sports, where precise calculations are essential [1].

Jasdam II Sriwijaya has developed the SiJaspro application, which provides information and calculations to assist users during physical training at the institution. The application is designed to facilitate training by providing garjas value tests, physical training materials, and information related to Jasdam II Sriwijaya. However, since this application is still new, there may be some problems such as bugs or errors on the page, inability to display user data output, and limited access only for Android devices and not yet for iOS[2].

Previously, Jasdam II Sriwijaya employees conducted a manual data collection system using excel and paper. The presence of this application aims to facilitate access to physical exercise information. The physical training program offered is public, open to teenagers who want to become prospective TNI members, with requirements including a medical test and filling out a personal data form. Exercises are conducted five times a week in the afternoon with materials that include intervals, violets, and combinations, with certain grade requirements.

The app developers try to maximize the effectiveness of this app and hope that it can provide more benefits to its users. Therefore, this research is important to analyze the performance of the application system to assess how well the application functions. This research is entitled "Performance Analysis of the SiJaspro Application as a Physical Training Test Tool for Jasdam II Sriwijaya" using the PIECES method, which includes the dimensions of Performance, Information and Data, Economy, Control and Security, Efficiency, and Service. The PIECES method was chosen to analyze and evaluate in depth, identify advantages and disadvantages, and provide references for further development. Application performance testing is carried out using GTMetrix to assess speed and Google Transparency Report to measure the security of the SiJaspro application.

This analysis aims to evaluate the intensity and effectiveness of using the SiJaspro application at Jasdam II Sriwijaya and obtain a value that reflects the extent to which the current application performance meets the expected objectives[3].

This is also supported by the research titled "Performance Analysis of the Siransija Application Using the PIECES Method," which aims to identify and analyze issues or challenges faced by the Siransija application, as well as to evaluate its performance in measuring employee productivity at the DPMD-KC office of Gorontalo Province [4].

There is also a study titled "Performance Analysis of the Communication and Informatics Office Website Using the PIECES Method," which aims to analyze the implementation of the e-Puskesmas system by applying the PIECES framework (Performance, Information, Economic, Control, Efficiency, & Service). The findings indicate that the implementation of e-Puskesmas is generally satisfactory; however, there are some issues, such as suboptimal network connectivity, inadequate access security due to the use of shared usernames and passwords, and long patient wait times resulting from network problems. Although the e-Puskesmas application operates effectively, these challenges impact the workflow of the staff. Therefore, regular reporting, follow-up, and evaluation of the e-Puskesmas system are necessary, particularly in the patient data entry process, to enhance the effectiveness and efficiency of services [5].

This study is also titled "Applying the PIECES Framework to Evaluate Student Satisfaction with the Integrated Academic Information System (SIAKADU) at Surabaya State University." It aims to enhance the performance of SIAKADU to prevent errors during simultaneous use and to assess student satisfaction with the system. The research employs an average satisfaction formula and evaluates satisfaction levels based on the six aspects outlined in the PIECES framework [6].

2. Research Method

This research uses a mixed method, which combines quantitative and qualitative approaches in one study. The quantitative method is applied to analyze attributes that are considered priorities as well as expectations in improving user satisfaction of the SiJaspro application. On the other hand, a qualitative approach is used to evaluate performance on the SiJaspro application.[7]

2.1. problem Identification

The formulation of the problems raised in this study are: "How effective is the performance of the SiJaspro application to its users to get information about physical exercise in Jasdam II Sriwijaya if analyzed using the PIECES method and and analyze the performance of the SiJaspro application performance with the GTMetrix testing technique"[8].

2.2. Testing Techniques

In testing the SiJaspro application, GTMetrix and Google Transparency Report techniques are used. GTMetrix is used to evaluate and ensure that the application always meets the standards The search engine used is GTMetrix to assess application performance by involving four indicators. Green indicators indicate that the application performance score is between 91% and 100%, light green indicators indicate scores between 29% and 90%, orange indicators indicate scores between 51% and 75%, and red indicators indicate scores between 0% and 50%.[9]

The results of the application performance assessment using GTMetrix include levels from A to F. If the application gets a score of A, this indicates that the loading speed of the application is very good. A score of B indicates possible flaws in the application, while a score of C indicates the need for improvement, such as in the theme, image selection, CSS, and other aspects. GTMetrix has several advantages, including the use of Google Pagespeed and YSlow as analysis tools, the ability to compare multiple URLs simultaneously, automatic scheduling of website tests, and in-depth analysis with good measurement consistency and complete records with scores. However, the downside of GTMetrix is that it requires fast internet access to run the tests[9].

2.3. Interview

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In the interview stage for data collection in this study, the author directly asked questions to related parties, such as trainers and physical exercise participants using the SiJaspro application. The author asks about the performance of the application among users, thus obtaining information related to the performance and problems faced by the application[5].

2.4. Literature Study

In this research, literature studies are carried out by searching and studying various sources such as books, websites, laws and regulations, articles, journals, and previous studies that are relevant to the variables to be studied by the author[6].

2.5. Questionnaire (Primary Data)

Questionnaire is a data collection method that involves providing a series of questions or written statements to respondents who have been determined to be answered[10]. This technique is used to collect information from respondents regarding the performance of the SiJaspro application as a physical exercise test tool at Jasdam II Sriwijaya. This study requires 57 respondents, namely SiJaspro application users or physical exercise program participants at Jasdam II Sriwijaya. The sample consists of participants who use the SiJaspro application, with a population of 57 users based on age. Determining the number of samples using the Slovin formula, where the variable (X) is the SiJaspro application and the variable (Y) is the user. The scale used in this study was a Likert scale, and the final data analysis was carried out with SPSS. This questionnaire contains various statements covering the research variables, namely Performance, Information and Data, Economy, Control and Security, Efficiency, and Service[11].

3. Result And Discussion

At the performance stage, GTMetrix is used to test the performance of the SiJaspro application or website. To test with GTMetrix, access this service via Google page by entering the URL of the site or system to be tested[12]. GTMetrix will measure the speed of the website and display the results. The test results from GTMetrix can be seen in Figure 1 below.
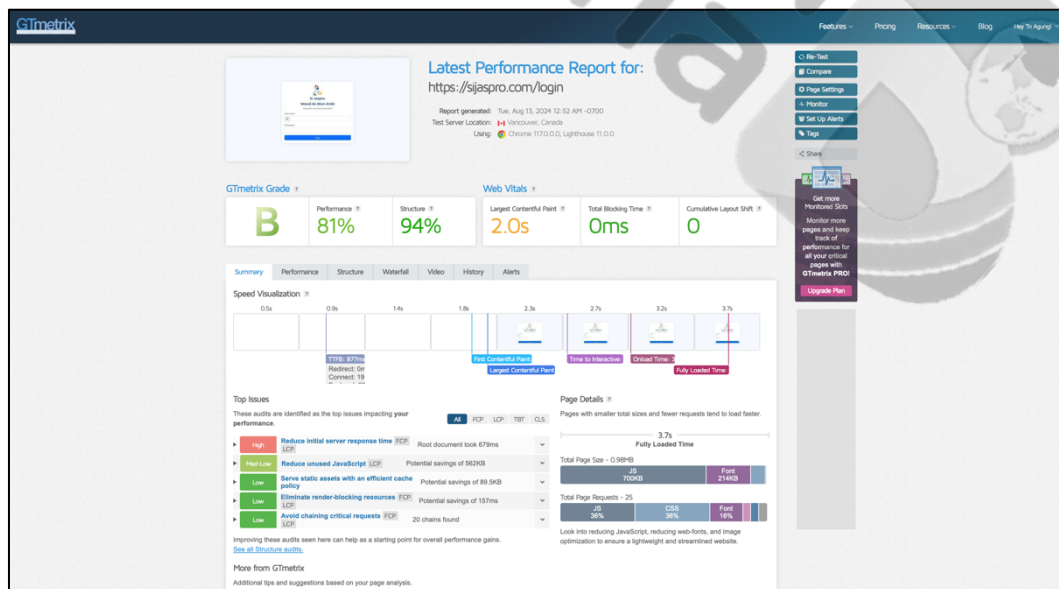

Figure.1. GTMetrix Performance Results

In Figure 1 above, it can be seen that the SiJaspro application received an overall grade of B, with a performance score of 83% and a website structure score of 95%. The higher the grade obtained, the better the system performance, which is expressed in the form of grades A, B, C, and so on. The performance score measures the speed of website access by users in percentage, where the higher the percentage, the faster the site is accessed. Meanwhile, the structure score assesses the quality of website construction in percentage, where the higher the percentage, the better the structure of the site. When using GTMetrix to analyze the performance of the SiJaspro application, the results of the Web-Vitals analysis will be reviewed. This analysis includes the measurement of several core elements of the website. One of the metrics used is the calculation of website load time. When analyzing the performance of the SiJaspro application using GTMetrix, the tool provides a detailed visualization of the time it takes for the application to load. The SiJaspro app start page took 3.0

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seconds to load, while the full load time was 3.7 seconds, indicating that the content on the app appeared at that time. Interactive time measures the point at which the page becomes usable, while Largest Contentful Paint (LCP) represents the largest content element that appears on the application, which occurs within 2.0 seconds for SiJaspro. The application speed index based on this analysis is 1.9 seconds, with a recommended request time of 1.3 seconds according to GTMetrix suggestions [13].
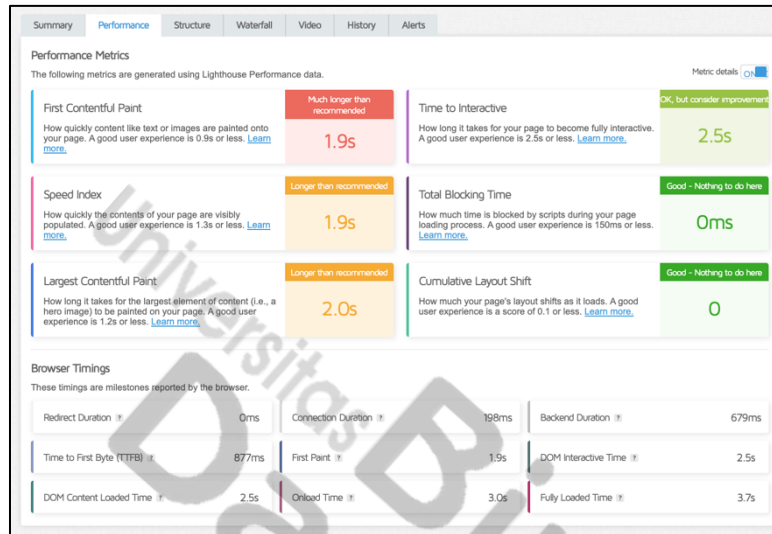

Figure.2. Results of Web-Vital Analysis of SiJaspro Application with GTMetrix

The results of the analysis of the SiJaspro application using GTMetrix include browser time, which measures the speed of the application when using a web browser [14]. The web browser used in this analysis is Safari, and the findings of the SiJaspro application are divided into several sections:

Tabel 1. Analysis of the SiJaspro Application Using GTMetrix

No	Browser Timing	Duration
1	Redirect Duration	0ms
2	Time To First Byte	877ms
3	DOM Content Loaded Time	2.5s
4	Connection Duration	198ms
5	First Paint	1.9s
6	Onload Time	3.0s
7	Backend Duration	679ms
8	DOM Interactive Time	2.5s
9	Fully Loaded Time	3.7s

To assess the performance of the SiJaspro application in the performance variable, the results can also be seen from the calculation value of respondents' answers to the questionnaire consisting of 10 questions related to the SiJaspro application, as shown in table 2 below.

Table 2. Performance Questionnaire

No	Questions
1	Can the Sijaspro application be accessed easily by users?
2	Sijaspro application system performance is stable when used simultaneously?
3	Operation on several sijaspro application commands is relatively short and without experiencing obstacles and bugs?
4	Does the Sijaspro application respond quickly to a command?
5	Menus, Features and navigations in the Sijaspro application run easily and responsively?
6	Menus, Features and navigations in the Sijaspro application run easily and responsively?The display provided by Sijaspro is easy to understand and attractive?
7	The menus and literature of the Sijaspro application display information that is highly desirable to users?
8	The navigation provided in the Sijaspro application provides easy action for users?
9	The output produced by the Sijaspro application has a consistent appearance?
10	Does the Sijaspro application ever experience errors or bugs when used?

Table 3. Performance Questionnaire Response Results

Performance					
Jawaban	STS	TS	C	S	SS
Skor	1	2	3	4	5

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Total Jawaban	0	4	166	351	93

$$RK = \frac{JSK}{JK}$$

$$RK = \frac{(5.93) + (4.351) + (3.166) + (2.4) + (1.0)}{(10.57)}$$

$$RK = \frac{465 + 1.404 + 498 = 8 + 0}{570}$$

$$RK = \frac{2.375}{570} = 4.16$$

Based on the calculation of the performance variable obtained, the value of 4.16 is concluded according to Table 3, the value of 4.16 is included in the PUAS category.

In the Information and Data variable, there are 4 questions related to the SiJaspro application listed in table 7 below:

Table 4. Information And Data Questionnaire

No	Questions
1	Information on the Sijaspro application is presented with high user satisfaction?
2	The Sijaspro application provides the appropriate information needed?
3	The Sijaspro application provides information that is easy to understand and easy to learn
4	The Sijaspro application provides access that can be used according to the needs of users?

Table 5. Information And Data Questionnaire Response Results

Information And Data					
Jawaban	STS	TS	C	S	SS
Skor	1	2	3	4	5
Total Jawaban	0	1	59	138	34

$$RK = \frac{JSK}{JK}$$

$$RK = \frac{(5.34) + (4.138) + (3.59) + (2.1) + (1.0)}{(4.57)}$$

$$RK = \frac{170 + 552 + 177 + 2 + 0}{228}$$

$$RK = \frac{901}{228} = 3.95$$

Based on the calculation of the Information and Data variable obtained a value of 3.95 which is concluded that table 5, the value of 3.95 is included in the PUAS category.

In the Economy variable, there are 2 questions related to the SiJaspro application which are listed in table 6 below:

Table 6. Economy Questionnaire

No	Questions
1	The Sijaspro application saves users operational costs in finding physical exercise information?
2	The Sijaspro application helps reduce operational costs and improve the efficiency of using natural resources Exercise test results calculation?

Table 7. Economy Questionnaire Response Results

Economy					
Jawaban	STS	TS	C	S	SS
Skor	1	2	3	4	5
Total Jawaban	0	0	54	58	4

$$RK = \frac{JSK}{JK}$$

$$RK = \frac{(5.4) + (4.58) + (3.54) + (2.0) + (1.0)}{(2.57)}$$

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$$RK = \frac{20 + 232 + 162 + 0 + 0}{114}$$
$$RK = \frac{414}{114} = 3.63$$

Based on the calculation of the results of the Economy variable which obtained a value of 3.63, it can be concluded that according to table 7, the value of 3.63 is included in the PUAS category.

In the Control and Security variable, there are 2 questions related to the SiJaspro application which are listed in table 8 below:

Table 8. Control And Security Questionnaire

No	Questions
1	The Sijaspro application grants access limitation rights to users?
2	The Sijaspro application provides a guarantee of user data security?

Table 9. Control And Security Questionnaire Response Results

Control And Security					
Jawaban	**STS**	**TS**	**C**	**S**	**SS**
Skor	**1**	**2**	**3**	**4**	**5**
Total Jawaban	0	2	26	64	24

$$RK = \frac{JSK}{JK}$$
$$RK = \frac{(5.24) + (4.64) + (3.26) + (2.2) + (1.0)}{(2.57)}$$
$$RK = \frac{120 + 256 + 29 + 4 + 0}{114}$$
$$RK = \frac{409}{114} = 3.58$$

Based on the calculation of the results of the Control and Security variable obtained, the value of 3.58 can be concluded according to table 9, the value of 3.58 is included in the PUAS category.

This shows that the Control and Security variable shows a positive indication. In addition, the security of the SiJaspro application can also be seen through the Google Transparency Report used to measure it, as shown in Figure 3.
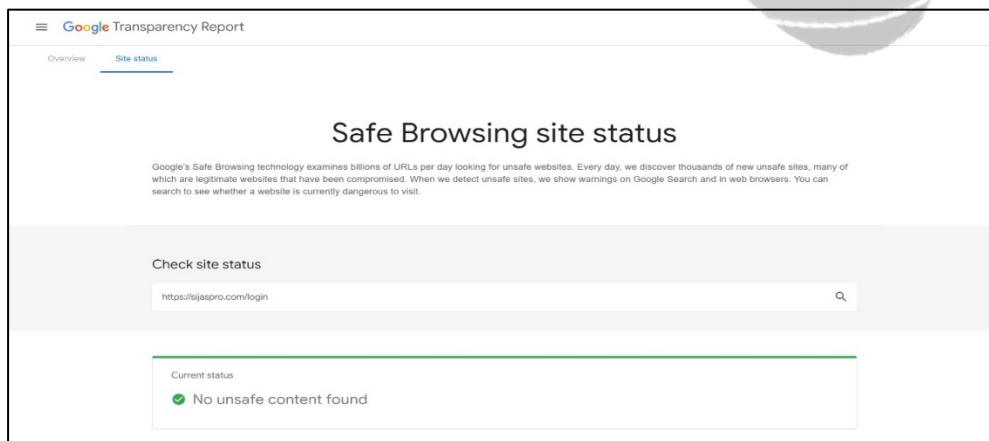

Figure.3. SiJaspro URL Results on Google Transparency Report

From the picture above, it can be seen that the SiJaspro application has been analyzed by Google Transparency Report [15]. The analysis results show that no malicious content was found, so the SiJaspro application is declared safe to access.

In the Efficiency variable, there are 4 questions related to the SiJaspro application which are listed in table 10 below:

Table 10. efficiency Questionnaire

No	Questions

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1	Sijaspro application is easy to operate?
2	To load the sijaspro page does not take long?
3	Sijaspro application saves cost, time, and effort?
4	With the sijaspro application application helps work to be easy and more efficient?

Table 11. Efficiency Questionnaire Response Result

Efficiency					
Jawaban	STS	TS	C	S	SS
Skor	1	2	3	4	5
Total Jawaban	0	0	61	136	35

$$RK = \frac{JSK}{JK}$$
$$RK = \frac{(5.35) + (4.136) + (3.61) + (2.0) + (1.0)}{(4.57)}$$
$$RK = \frac{175 + 544 + 183 + 0 + 0}{227}$$
$$RK = \frac{902}{227} = 3.97$$

Based on the calculation of the results of the Efficiency variable which obtained a value of 3.97, it can be concluded that according to table 11, the value of 3.97 is included in the PUAS category.

In the Service variable, there are 5 questions related to the SiJaspro application which are listed in table 12 below:

Table 12. Service Questionnaire

No	Questions
1	Which features in the Sijaspro application generate user-friendliness?
2	Aspects and access to the Sijaspro application are met according to the desired needs?
3	Is the information on the Sijaspro application well conveyed?
4	Using the Sijaspro application is easy to use?
5	On Sijaspro application information can be accessed easily?

Table 13. Service Questionnaire Response Result

Service					
Jawaban	STS	TS	C	S	SS
Skor	1	2	3	4	5
Total Jawaban	0	1	70	168	51

$$RK = \frac{JSK}{JK}$$
$$RK = \frac{(5.51) + (4.168) + (3.70) + (2.1) + (1.0)}{(5.57)}$$
$$RK = \frac{255 + 672 + 210 + 2 + 0}{285}$$
$$RK = \frac{1.139}{285} = 3.99$$

Based on the calculation of the results of the Service variable which obtained a value of 3.99, it can be concluded that according to table 13, the value of 3.99 is included in the PUAS category.

4. Conclusion

Based on the explanation of the results and discussion in the previous section based on the PIECES method in analyzing the performance of the Sijaspro application obtained in each variable, such as variable performance getting a value of 4.16 with the PUAS category, variable information and data getting a value of 3.95 with the PUAS category, variable economy getting a value of 3.63 with the PUAS category, variable control and security getting a value of 3.58 with the PUAS category, variable efficiency getting a value of 3.97 with the PUAS category, and variable service getting a value of 3.99 with the PUAS category. In addition to using the PIECES method, to analyze the performance of the Sijaspro application using measuring tools such as GTMetrix measuring website speed and displaying test results. It was found that in the GTMetrix test the Sijaspro application was in grade B with a performance score of 83% and a website structured score of 95%. Web Vitals which contains the Largest Contentful Paint 1.8s, which means it takes time to load the website page such as in the hero image or body text section. There is also Total Blocking Time with a result of 0ms and Cumulative Layout Shift with a result of 0, so the result of that is that there are no obstacles in the process. In the Control and security variable, a measuring instrument is used which functions for the security of the Sijaspro application, the results of the test found no malicious content, so the Sijaspro application is declared safe to access. It can be concluded that the Sijaspro application is declared efficient and effective as a physical exercise test tool at Jasdam II Sriwijaya

Based on the conclusions of this research, the researchers suggest several follow-up actions for the SiJaspro application. Further surveys or analyses are needed regarding the performance and services of the SiJaspro application, particularly in the area of control, to ensure that the application does not encounter errors when used simultaneously in the future. It is also hoped that this study can serve as a reference for future researchers in analyzing systems. Additionally, the research is expected to encourage the implementation or development of new analytical or evaluative techniques that have not been applied previously.

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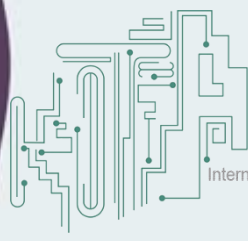
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