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Evaluation of Information Quality Using ISO/IEC 25010:2011 (Case Research: Menu Harianku Application)

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ABSTRACT

This research aims to determine the product quality of the Menu Harianku application and recommend improving the quality of the application based on the ISO/IEC 25010:2011 model with 6 characteristics in product quality dimensions namely Functional Suitability, Performance Efficiency, Usability, Reliability, Security, and Portability. ISO/IEC 25010:2011 standard was chosen because of its very suitable characteristics for measuring software quality. Starts with identifying the problem, Design quality, Testing performance quality, and making application improvement recommendations. According to technical characteristics of Functional Suitability, of 97 test cases, there were 11 failed. Performance efficiency of Mobile and Desktop devices scores 86% of the improvement criteria. Reliability Hosting is only accessible in Asian (Japan) and European locations (all) for no more than 20 VUs. Security with Medium-level vulnerabilities. The portability of the application runs well on 6 Desktop & Mobile browsers. According to users the characteristics of Functional Suitability with a percentage of 84.1%, Performance efficiency at 84%, and Usability at 83.5%. As for the application recommendations related to the results of application quality testing that can be used in improving the quality of the Menu Harianku application.

Keywords:
Evaluation; Quality; Nutrition; ISO/IEC 25010:2011; Application

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1. INTRODUCTION

Quality in information applications becomes an important aspect that must be owned because it has a big influence on user satisfaction, for that quality becomes one of the benchmarks in knowing the success of an information application [1]. According to [2] the quality measure of information applications can be known from the extent to which the application can meet the needs presented in the quality model and categorize product quality based on characteristics and sub-characteristics because in an information application a quality model becomes an important element in the quality assurance process. Menu Harianku is a solution to the website-based Indonesian food planning application that uses the Codeigniter (CI) framework with a bootstrap interface during the creation process [3]. The quality model will determine which quality characteristics to use when evaluating the properties of an information application [4].

The importance of this research refers to the use of ISO/IEC 25010:2011 standardization on the Menu Harianku application which is discussed in detail based on the system characteristics as in Table 1. This research has suggestions for development which can be seen in the conclusion section which adds to the importance of this research to the reader. especially the application developers to improve their applications for the better.

Menu Harianku Application is planned shortly to be used by prospective Indonesian nutritionists, especially students of the S1 nutrition program of Nahdlatul Ulama University Surabaya in helping the process of nutritional care [5]. However, the shortcomings of the Menu Harianku application based on [3] are that it has no credibility over the quality assessment, and the absence of a thorough quality assessment by the software quality measurement standards makes the quality aspect of the application still questionable. Previous research by [3] has been tested the Menu Harianku application Menu using the Black Box method and User Acceptance Testing without standardization to get the results of 13 features on the application that successfully run without errors, and in the User Acceptance Testing test as many as 47% of respondents said it was very easy to use the feature, 61% strongly agreed that this application is useful and 35% strongly agree that this application is easy.

In previous research related to Menu Harianku, The application was tested using user acceptance testing methods and black boxes in the absence of standard software quality measurement models. Black Box only tests the minimal function of the application [6], It can be concluded that application tests from previous studies are still not enough to measure the quality of the Menu Harianku application. To correct these shortcomings, this research aims to measure the quality of my Menu Harianku using the ISO/IEC 25010:2011 software quality measurement model, with product quality dimensions that use only 6 of its 8 characteristics, namely Functional Suitability, Performance Efficiency, Usability, Reliability, Security, and Portability [7]. The reason for excluding 2 characteristics (Maintainability and Compatibility) is due to the Maintainability characteristic, the researcher does not have access to review the source code of the application, and the Compatibility characteristic does not have a significant influence because Menu Harianku is a website-based application. ISO/IEC 25010:2011 standard was chosen because of its characteristics which are very suitable for measuring software quality. And these standards are widely used in information applications in the fields of academia, government, games, institutions, mobile applications, and DSS [21].

From previous research related to the Menu Harianku Application, application tests using user acceptance testing methods and black boxes were conducted in the absence of standard software quality measurement models. Blackbox only tests the minimal function of the application [6]. According to [5], [6], previous research regarding the Menu Harianku application has been carried out from a technical point of view using the (Blackbox) method and the user's point of view using the (UAT) method. Testing is only carried out by taking an outline of the system and is not thorough because the test does not use standardization. Previous research also has no suggestions for the development of the Menu Harianku application. It can be concluded that application tests from previous studies are still not enough to measure the quality of the Menu Harianku application. This research aims to measure the quality of Menu Harianku using the ISO/IEC 25010:2011 model in product quality dimensions in terms of product quality. So the most important point in previous research is the lack of use of standards in measuring software that only measures using black boxes. This research used 6 characteristics of the dimensions of product quality, namely Functional Suitability, Performance efficiency, Usability, Reliability, Security, and Portability. The research phase begins by identifying existing problems, then designing quality testing, carrying out quality measurement testing, and making recommendations to improve application quality.

According to technical characteristics of Functional Suitability, of 97 test cases there were 11 failed. Performance efficiency of Mobile and Desktop devices scores 86% of the improvement criteria. Reliability Hosting is only accessible in Asian (Japan) and European locations (all) for no more than 20 VUs. Security with Medium-level vulnerabilities. The portability of the application runs well on 6 Desktop & Mobile browsers. According to users the characteristics of Functional Suitability with a percentage of 84.1%, Performance efficiency at 84%, and Usability at 83.5%. The application recommendations related to the application quality test results which can be seen in the conclusion section can be used to improve the quality of the Menu Harianku application.

2. METHODS

This research is based on quality testing from the Menu Harianku application. Quality according to [23] explains that quality as a whole character and the characteristics of products or services that support A to satisfy needs. According to [24] quality is an elusive goal because consumer expectations will change every time, whereas if there is a new standard found then consumers will demand more and get another new and better standard. Then to test the Menu Harianku application according to the user's point of view using the questionnaire method. Researchers also use validity tests. According to [25] the validity test serves to determine the level of validity of the instrument in the data set.

The instrument is said to be valid meaning the measuring instrument can be used to measure what is measured. If r calculates ≥ r table (2-sided test with sig. 0.05) then the question items are significantly correlated to the total score and can be said to be valid, otherwise, if r calculates ≤ r table then the statement item is invalid [27]. After the validity test is carried out, it will be followed by the Reliability test. A reliability test is a test that researchers perform to ensure the instrument used can be trusted as a data collection tool and can reveal the same information. Reliability tests are determined by Cronbach's Alpha (α) values calculated using the SPSS program. According to [26] A statement is said to be reliable if Cronbach's Alpha (α) value > 0.6

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The feasibility of the application were also done to determine the feasibility of software development, and whether it will be continued or confirmed due diligence. Followed by determining the value of each instrument which can be seen from the comparison between the actual score and the ideal score. Currently, there are various software measurement standards namely McCall, Boehm, FRUPS, Dromey, Bertoa, ISO 9126 and ISO 25010:2011 [28]. The research used ISO 25010:2011.

In general, ISO / IEC 25010 has 2 scopes, namely quality in use and product quality, in the dimension of quality in use its characteristics are relatively focused on the point of view of system users, quality in use has 5 characteristics, including Effectiveness, Efficiency, Satisfaction, Freedom From Risk and Context Coverage. While in the product quality dimension the characteristics are relatively focused on system elements, where product quality has 8 characteristics such as Functional Suitability, Performance efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability and has several 31 sub-characteristics [7].

The research used the software measurement standard [8] ISO/IEC 25010:2011 [7] with further explanation of the effect of ISO 25010 on information applications measurement [2]. The research also used product quality dimensions [9] in the Black Box testing model [6] and User Acceptance Testing [3]. Measurement of information applications uses models in ISO 25010 [4]. The application measured is the Menu Harianku application which serves to create a diet plan [5]. Measurement of the quality of information applications is very important regarding user views [1]. In conclusion, using the ISO/IEC 25010:2011 standard is very suitable for measuring the quality of software [10]. In this section, it will be explained about the stages of the implementation of this research. This methodology is required as a guide related to the steps taken in the process of research work.

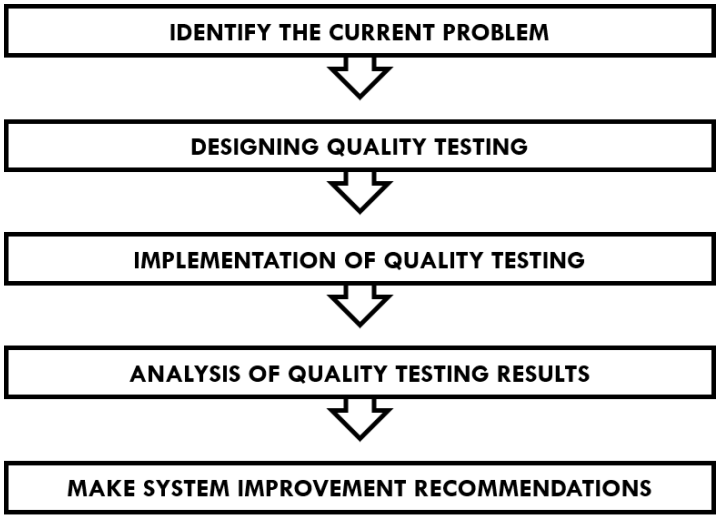

Figure 1 - Research Metodhs

Based on the methodology described in Figure 1. This research uses the ISO/IEC 25010:2011 model with product quality dimensions that use only 6 of its 8 characteristics, namely Functional Suitability, Performance Efficiency, Usability, Reliability, Security, and Portability [29]. The reason the author used ISO/IEC 25010:2011 standardization is based on the comparison in Table 1.

Table 1 Comparison of System Quality Measurement Models

Model Quality	Advantages	Disadvantages
Boehm	The quality structure is divided into 3 parts	Metrics in measuring quality are not clearly defined
Dromey	There is a relationship between the characteristics and sub-characteristics	The criteria mentioned are not clear to measure the quality of the information system.
FURPS	There is a supportability factor	Quality assessment criteria are still limited. There are no important factors such as portability and security.
ISO 9126	Easy to understand. International Standard.	It is an older version of ISO 2510. The type of measurement is comprehensive and not specifically described.
ISO 9126	Updated and more complete version of ISO 9126.	Lack of clear definition in its characteristics and even its sub-characteristics.

	require 2 measurement dimensions focused on technical and user. International Standard.	
ISO 25010	Consists of 3 different points of view when measuring quality. All of its characteristics are suitable for measuring the quality of information systems products.	There are no important factors such as functionality, and performance. Does not have dimensions that focus on measuring the quality of software.

In Table 1 there is comparative data that contain the advantages and disadvantages of each information system quality measurement model. This research will use the ISO/IEC 25010:2011 model because its characteristics can meet the needs of researchers in measuring the quality of the Harianku Menu system model.

Discussion of each stage in the model can be described as follows :

1. As is analysis

Tto get an idea of the problem, at this stage, it involves extracting data on the software's quality attributes. In this research there are data sources used in this research, namely:

a. Primary Data, related to the condition of the Menu Harianku problem using the interview and questionnaire method to developer and users of the Menu Harianku application. The sample taken in this study used the Slovin formula with a 10% error tolerance, which means it has an accuracy rate of 90%. The questionnaire was made on a Likert scale of 1-5. After the questionnaire data is obtained, enter the validation test using the Pearson correlation used in this study is 0.05. If r count r table (two-sided test with sig. 0.05). Continue on the reliability test if the value of Cronbach's Alpha (α) > 0.6. And ends with a feasibility test.

b. Secondary Data, is data collected by others through previous research or existing relevant stakeholder, Secondary data is collected in the form of literature, previous research, and books that are useful for finding data related to current research.

2. Quality Testing Design and Analysis

This research will use the Dimensions of Product Quality in ISO/IEC 25010:2011 based on 2 points of view :

Table 2 Division Of Characteristics Based On Point Of View

User View	Technical View
Functional Suitability	Functional Suitability
Performance efficiency	Performance efficiency
Usability	Reliability
	Security
	Portability

Each point of view will be explained as follows:

a. Test Design Based on Technical Point of View, This quality measurement will tend to be software-oriented with 5 characteristics of ISO 25010:2011 In Functional Suitability characteristics using the Black Box method and questionnaires, Performance efficiency using a website performance testing and monitoring tool called Dareboost which will get performance reports related to Largest Contentful Paint, Total Blocking Time, Cumulative Layout Shift and Weight, Reliability will use a tool called K6 (Load Impact), Security uses the Netsparker tool to get the results of any vulnerability reports found on the application to be investigated, Portability uses the help of a browser that will test through desktop mode and mobile mode.

b. Test Design Based on Users' Point of View

These quality measurements will tend to be oriented to the user's point of view with 3 characteristics of ISO 25010:2011 described earlier, as well as using questionnaire data extracting techniques that will be tested in validity, reliability and feasibility tests to obtain final application criteria.

3. Quality Testing Implementation

At this phase is the process where quality testing is carried out from the previous quality design stage, as well as documented in the form of a software testing report, the report on this research is a test case, and the results of a questionnaire because it takes from 2 technical points of view and the user to get deeper application testing.

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4. Quality Testing Evaluation

At this phase will contain the results of quality measurements that can be seen from 2 sides, namely the technical side and the user after the process of testing has been done. The results of data excavation through literature studies and the results of aids will be converted into quantitative data based on criteria by the matrix tested, the results of the quantitative assessment will be spelled out in values per sub-characteristics of ISO/IEC 25010:2011 that have been determined according to the needs of the software assessment.

5. Proposed Improvements for Application Implementation

At this phase, the results of the quality assessment can be used as application test evaluation data based on the ISO/IEC 25010:2011 standard to the application developer.

3. RESULT AND DISCUSSION

In testing the Menu Harianku application the research will use the ISO 25010:2011 software measurement standard using 6 characteristics of the Product Quality dimension based on 2 points of view, namely technical with 5 characteristics and users with 3 characteristics. To support the research process when testing software, it takes hardware units (Hardware) and software (Software) as in Table 3.

Table 3 - Testing Device

Merk	Processor	RAM	OS
Asus FX505DU	AMD 3750H	16 GB	Windows 10
Pocophone F1	Snapdragon 845	6 GB	Android 11

3.1. Test Results Based on Technical Point of View

3.1.2. Characteristics of Functional Suitability

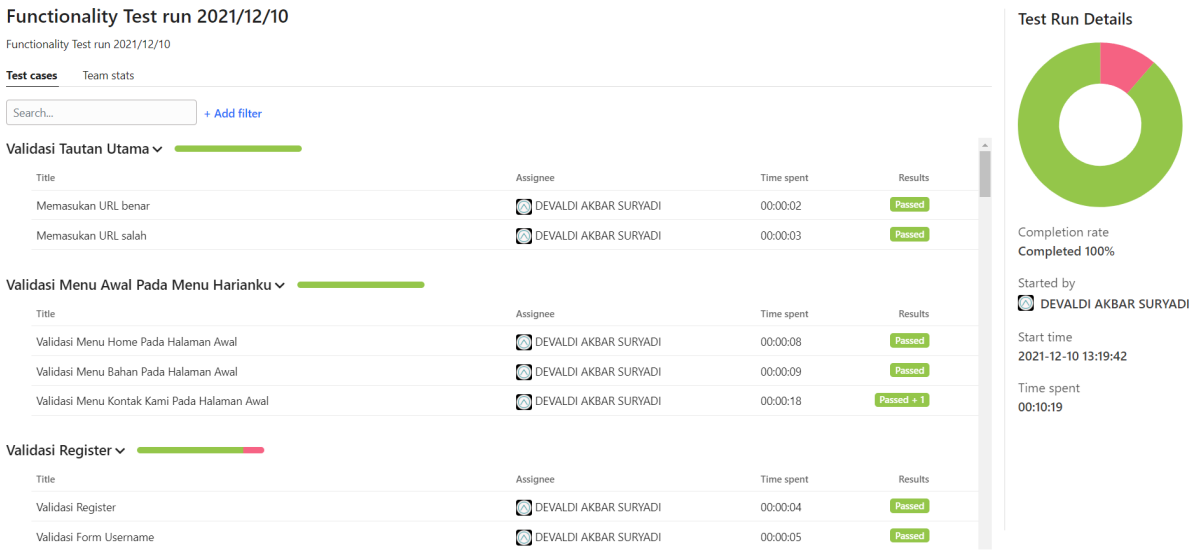

Figure 2 - Functionality Test Run

Functional Suitability characteristic testing will be done using the Black Box method [1]. Figure 2 is the test that requires assistance from the Qase.io website conducted on December 08, 2021, at 10:00 PM (Fix Date) using the device as in Table 3. With conclusions, we got a total of 15 modules with 97 test cases divided into each module, with details of the total results of 86 Passed and 11 Failed or if we percentage with test results of 89% Passed and 11% Failed. With a publicly accessible test report without the need to have an account Qase.io at the link https://s.id/ReportMenuHarianku.

3.1.3. Characteristics of Performance Efficiency

This exposure was carried out on December 10, 2021, at 14:00 WIB using a device with specifications as in point in Table 1 with help of Dareboost tools [2]. Testing on the Mobile version uses a type of 3G connection on an iPhone 6s/7/8 (*Beta*) simulation device with an overall result of 86% which means it needs improvement with details as in Figure 4. As a basis for consideration related to simulation devices that will be used in the Mobile type. Researchers get data based on

the page [3] that the most popular device in the world in 2019 - 2020 is the iPhone 7 Figure 3. For that researcher uses a similar simulation device according to the data, namely the iPhone 6s/7/8 (Beta).

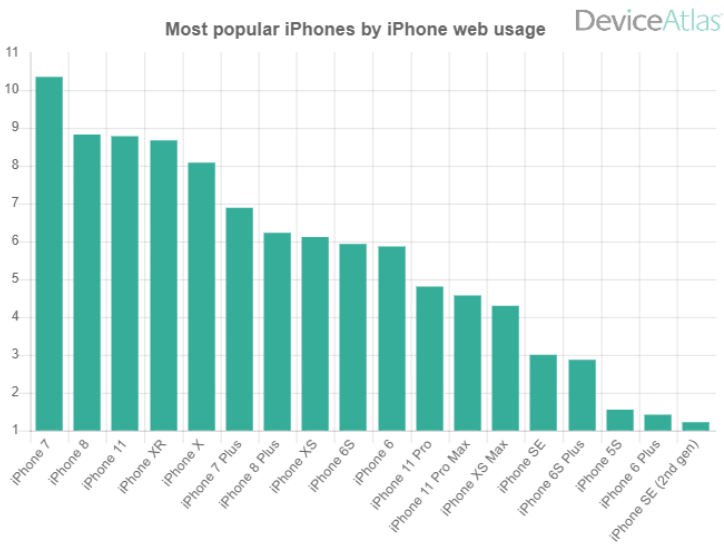

Figure 3 - Most Popular iPhone Mobile Devices

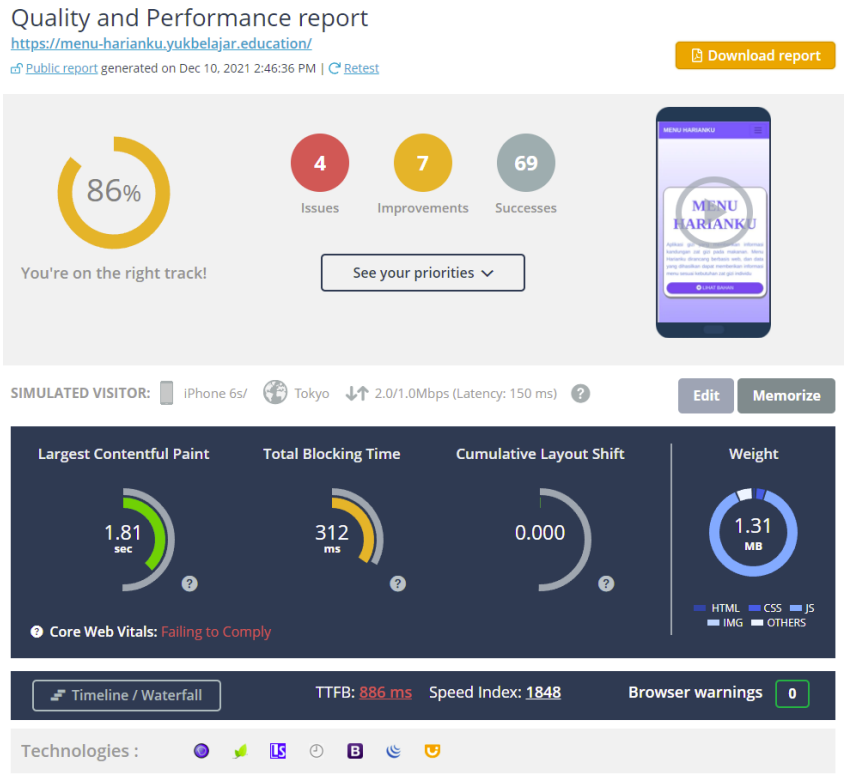

Figure 4 - Mobile Version of Dareboost Report

Followed by further testing on the Desktop version using ADSL connection type using Desktop (Chrome) devices with an overall result of 86% which means it needs improvement according to the explanation of Table 4.4 but better 3% than the previous test as detailed in Figure 5.

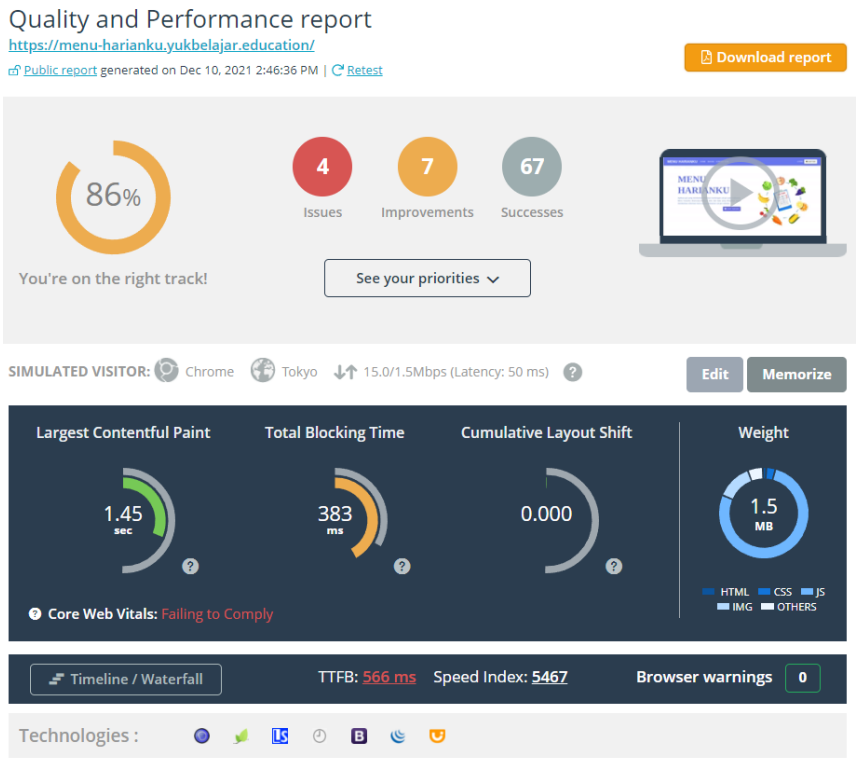

Figure 5 - Desktop Version of Dareboost Report

From the two results of performance efficiency characteristics above, get some test results spelled out in Table 4 as follows :

Table 4 - Performance Efficiency characteristics test results

Matric Measurement	Mobile	Desktop	
	Standard Timings		
Time To First Byte (TTFB)	886ms	566ms	
Start Render	1.83s	1.46s	
Visually Complete	3.27s	17.30s	
Speed Index	1848	5467	
Fully Loaded	7.46s	32.03s	Needs Repairs
Reload (Load Event Start & End)	7.21s → 7.21s	31.88s → 31.88s	
	Core Web Vitals		
Largest Contentful Paint (LCP)	1.81s	1.5s	
Total Blocking Time (TBT)	312ms	383ms	Needs Repairs
Cumulative Layout Shift (CLS)	0.0000	0.0001	
	Advance Timings		
DOM Complete	7.21s	31.88s	
DOM Content Loaded Event	7.20s	31.87s	
DOM Interactive	7.18s	31.85s	Needs Repairs
First Contentful Paint (FCP)	1.81s	1.45s	
Time To (Consistently) Interactive - TTI	7.20s	31.87s	

Based on the description in Table 4 the above can be concluded to make improvements to the website application to get better application performance efficiency. It is also known that performance efficiency results on desktop and mobile types get 86% overall score.

3.1.4. Characteristics of Reliability

To test reliability characteristics the researcher used a tool called K6 to test the reliability of the Menu Harianku application to know its performance capabilities to a predetermined extent [4]. This test was conducted on December 12, 2021, at 16:00 WIB using the device described in point Table 3. With detailed results after testing using K6 in Table 5. This test uses an Asian server (Japan).

Table 5 - Details of Reliability Characteristics Test Results

Virtual Users	*Request Made*	*HTTP Failures*	*Peak RPS*	*AVG Response Time*
20	836	14	5,67	984
30	2841	2592	27,57	493
40	3734	3477	35,67	975
50	3433	3302	33	875

The first location of the end of Menu Harianku will be dominated by Asian visitors, especially the country Indonesia. Testing using VUs focused on nearby Asian locations such as Singapore, Japan, and Sydney. Second, the selection of server locations was influenced by reports from the K6 application with the findings of application restrictions by the hosting party from the Menu Harianku application as in Figure 6 - 7, which is only able to use VUs in Asian locations, Japan only.

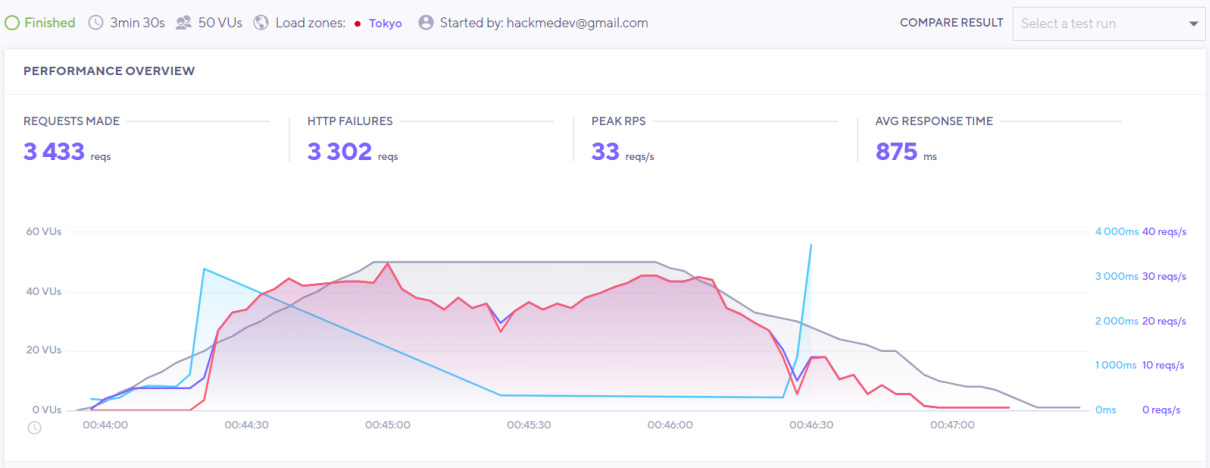

Figure 6 - K6 Reliability Test using 50 VUs (Japan Server)

There is a warning with information from the results of the K6 test (*There could be several reasons for this, eg. web server configuration (timeouts, rate-limiting, etc.) or internal errors caused by saturation of a resource (CPU, memory, disk I/O or database connections*). It usually means the target application is likely to close to its performance limit.

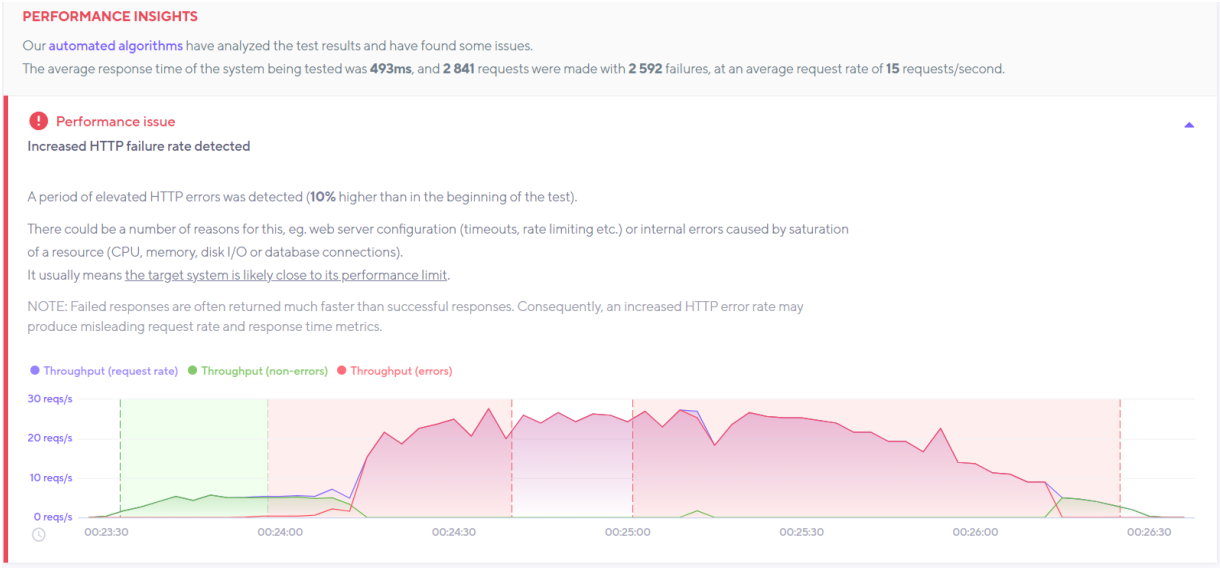

Figure 7 - Limitation report by Menu Harianku server

While on European server locations examples (USA and Germany) found smooth testing without a full RTO with evidence in Figure 8 - 9. This test also found an access limit on hosting Menu Harianku with no more than 20 VUs at the same time. To that end, the conclusion of reliability characteristic testing is to replace the current hosting service and not use the Unlimited (Hoster One) plan of the current hosting.

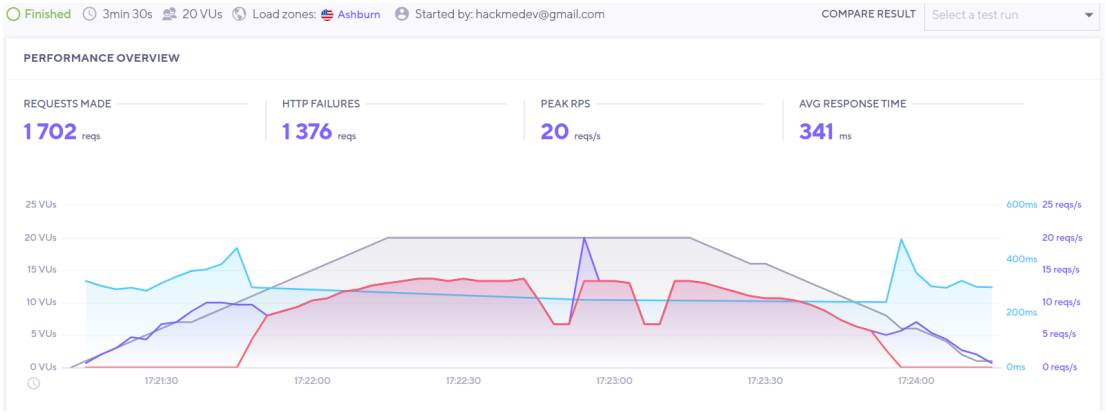

Figure 8 - Proof of USA Location Server Performance (Ashburn)

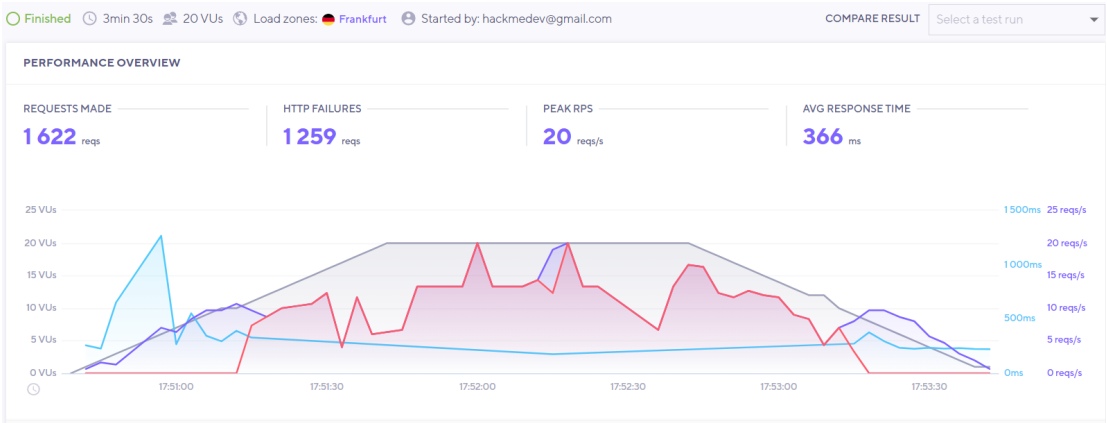

Figure 9 - Proof of German Location Server Performance (Frankfurt)

3.1.5. Characteristics of Security

This test was conducted on November 28 - 29, 2021 at 23:00 - 08:26, as shown in Figure 10, using a device with specifications as in Table 3. In another sense, it takes a long time to get the results of reporting security vulnerabilities on the Menu Harianku application. The report was made with a detailed scan report on 19 December 2021 at 18:49:08 (UTC+07:00) by Netsparker [5]. With the conclusion of vulnerability at the Medium level. With details, 8 vulnerabilities at the medium level, 18 at the low level as well as 32 informational instructions and 32 best practices.

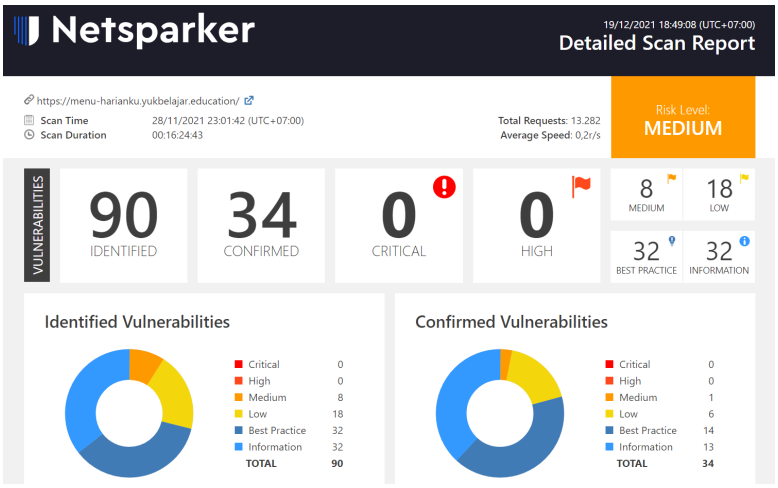

Figure 10 - Detailed Vulnerability Report on Netsparker

3.1.6. Characteristics of Portability

This test was conducted using several desktop and mobile-based browsers that were carried out on December 12, 2021, at 19:30 WIB. While the browsers to be used are Google Chrome, Mozilla Firefox, Microsoft Edge, Opera, Vivaldi, and Brave [6] use devices with specifications such as in Table 1. This test using incognito mode or disguise is selected because the mode does not leave the cache [7]. It is needed to know the real-time needed to access Menu. The results of this test, when accessing the Menu Harianku application for 5x for each type of browser to get loading time data to be calculated the average time, as follows :

Table 6 - Loading Time Details of Each Desktop & Mobile Browser

No	Browser	No Test	Desktop Loading Time	Smartphone Loading Time
1.	Google Chrome	1	2,26s	1,67
		2	1,26s	1,56
		3	1,07s	1,30
		4	1,34s	1,26
		5	1,10s	2,10
	Average		**1,406s**	**1,578s**
2.	Mozilla Firefox	1	1,82	1,82
		2	1,29	1,12
		3	1,38	1,18
		4	1,50	1,18
		5	1,40	1,32
	Average		**1,478s**	**1,324s**
3.	Microsoft Edge	1	1,19	1,89
		2	1,34	1,77
		3	1,67	1,14
		4	1,23	1,57
		5	1,15	1,17
	Average		**1,316s**	**1,508s**
4.	Opera	1	1,62	1,97
		2	1,45	2,94

No	Browser	No Test	Desktop Loading Time	Smartphone Loading Time
		3	1,25	1,96
		4	1,10	1,91
		5	1,36	1,91
	Average		**1,356s**	**2,138s**
		1	1,52	2,16
		2	1,74	1,32
5.	Vivaldi	3	1,39	1,51
		4	1,52	1,30
		5	1,57	1.23
	Average		**1,548s**	**1,572s**
		1	1,28	1,30
		2	1,02	1,80
6.	Brave	3	1,17	1,31
		4	1,29	1,31
		5	1,35	1,20
	Average		**1,222s**	**1,384s**

From Table 6 it can be concluded that the Menu Harianku application can run on 6 different mobile browsers with functions and views that can run as per the user's needs. The fastest browser for the Desktop version fell on Brave with an average access time of 1.222s while for the Mobile version it fell on Mozilla Firefox with an access time of 1.324s.

3.2. Test Results Based on User Point of View

This test will be distributed in the form of questionnaires using the Likert scale method [8]. Then distributed online [21] using Google Form [10] and WhatsApp services [11] to get data related to the quality of the Menu Harianku application based on 3 characteristics namely Functional Suitability with 5 statements, Performance efficiency with 6 statements, and Usability with 9 statement reviews from the user's point of view with a total of 20 statements in the questionnaire. The questionnaire will be distributed to 80 respondents periodically.

Table 7 Interpretation of Validity Test Results

No	count	r_{table}5%(80)	Status
1	0.722	0.2199	Valid
2	0.697	0.2199	Valid
3	0.671	0.2199	Valid
4	0.654	0.2199	Valid
5	0.644	0.2199	Valid
6	0.622	0.2199	Valid
7	0.653	0.2199	Valid
8	0.610	0.2199	Valid
9	0.644	0.2199	Valid
10	0 .719	0.2199	Valid
11	0.700	0.2199	Valid
12	0.777	0.2199	Valid
13	0.729	0.2199	Valid
14	0.736	0.2199	Valid
15	0.732	0.2199	Valid
16	0.676	0.2199	Valid
17	0.610	0.2199	Valid
18	0.735	0.2199	Valid
19	0.740	0.2199	Valid
20	0.698	0.2199	Valid

The validity test results can be seen in Table 7. Shows that all values of r count r table (two-sided test with sig. 0.05). Therefore, all items can be said to be valid so that they can be used as research instruments and continue to test reliability. This test uses SPSS version 25 using the Cronbach's Alpha method can be seen in Table 11.

Table 11 Reliability Test Results

Cases		N	%
	Valid	80	100.0
	Exluded	0	0
	Total	80	100.0

Cronbach's Alpha	N of items
0.941	20

According to Table 11, it is also known that the N of Items column in the Reliability Statistics table is the number of questions that have been filled with Cronbach's Alpha value of 0.941 or above 0.6 which means this questionnaire is reliable or consistent. Based on the reliability decision-making formula, if the Cronbach's Alpha value > 0.6 then it is reliable. For this reason, it can be concluded that the questionnaire in this study can be used as a research instrument.

Table 8 - Eligibility Test Results

Characteristic	Actual Score	Ideal Score	% Scores	Criteria
Functional Suitability	1682	2.000	84,1%	Very Good
Performance Efficiency	2017	2.400	84%	Very Good
Usability	3010	3.600	83,6%	Very Good

With details of test results on functional suitability, characteristics get a percentage of 84.1%, performance efficiency with a percentage of 84%, and Usability at a percentage of 83.5%. It can be concluded that the test results on each of the characteristics mentioned earlier based on the user's view of the Menu Harianku application are very good.

4. CONCLUSION

4.1. Conclusion

This research will help readers with the topic of measuring software quality using ISO/IEC 25010:2011. That measuring software is not only from one point of view, user opinions must also be considered to improve the quality of the application. The shortcomings of what was done are that it doesn't have access to the source code of the Menu Harianku application. This makes this research exclude the characteristics of Maintainability which according to the author is needed to be able to see the quality of the source code and if there is a better improvement. The advantage of this research is that the developer of the Menu Harianku application gets information related to assessments and recommendations to improve the quality of the Menu Harianku application. The product quality of the Menu Harianku application according to technical characteristics :

a. Functional Suitability characteristics concluded that 86 test cases passed and 11 test cases failed. While according to users by 84.1% in the feasibility test with good application criteria.
b. Performance efficiency characteristics technically result in efficiency performance of 86% for both Mobile and Desktop devices with criteria needing improvement. While according to users by 84% in the feasibility test with good criteria.
c. Reliability concludes hosting can only be accessed in Asian locations (Japan) and European locations in all locations. As well as hosting is currently not accessible simultaneously for more than 20Vus.
d. Security infers Medium-level vulnerabilities with details of 8 Medium levels, 18 at Low levels, 32 informational instructions, and 32 best practices.
e. Portability concluded the application runs well on 6 different browsers. Brave became the fastest desktop browser with an average access time of 1.222s while Mozilla Firefox became the fastest mobile browser with an average access time of 1,324s. Usability characteristics according to users get a score of 83.6% on the feasibility test with good application criteria.

Next is the conclusion of the results of application improvement recommendations :

a. Functional Suitability according to technical by coordinating with the programmer to review the errors found and fix them.
b. Performance Efficiency according to technology to improve application efficiency performance using Minify code, Image Compress, and code optimization so as not to lose web visitors.
c. Reliability technically concluded that application improvements to replace hosting services on VPS types with recommended specifications are 5GB SSD, 4GB RAM, 2vCPU with 100Mbps Bandwidth.
d. Security characteristics to coordinate with the programmer to patch security gaps and actively monitor the application in terms of security.

e. Portability characteristics to use the Desktop browser to get a better application user experience and do not forget to optimize the application UI on the Mobile version.
f. While according to users on the characteristics of Functional Suitability, Performance Efficiency, and Usability with recommendations of application improvement. Starting with creating a tutorial service related to how to use Menu Harianku in full to facilitate and maintain a good opinion of the user's point of view.

The measurement of application quality in this research is limited to the dimensions of product quality. This is because the application is still in the process of testing so the need for testing in terms of quality as a product. Furthermore, after the application is formally and massively used by prospective nutritionists, further research can be done. The focus of the research is to measure the quality of the application using the ISO 25010:2011 model in the dimensions of product quality. For this reason, the advice given to further research related to the measurement of the quality of Menu Harianku application using the ISO 25010:2011 model in the Quality in Use dimension to be able to see from the user's point of view by the established model standards ISO/IEC 25010:2011. And start to improve the performance quality of the application to switch hosting type to VPS type and start correcting program errors mentioned in this research.

Disclaimer

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