



Website quality analysis using modified webqual method and importance performance analysis on SITU TAK website

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Abstract

Technological developments affect information services, such as website. Information services on the website make it easy to convey information widely. Therefore, the quality of the website can affect the information services. This research assessed one of Telkom University's academic service websites, namely SITU Student Activities Transcript (SITU TAK). The purpose of this study was to measure the quality of the website, user satisfaction, and the factors that can increase the user satisfaction. This study employed Webqual 4.0 method as the indicator and Importance-Performance Analysis (IPA) for grouping the factors based on the quadrant of IPA. Before grouping the data, the data first passed the validity test, reliability test, and gap analysis between user perceptions and expectations. Therefore, it can strengthen the conclusions and recommendations resulted from this study. After conducting this study, the final results were obtained, which stated that SITU TAK website still did not meet the expectations of its users. This can be seen in the results of the gap analysis calculation with a value of -0.63, which means that the level of importance or expectations of the users is still higher than the performance of the website.

1. Introduction

In educational institutions, websites are not only used to disseminate information but also to collect data needed by the institution [1]. SITU Student Activities Transcript (SITU TAK) is a website that supports recording data on student activities of each student at Telkom University, from which they can earn certain depending on the activities that have been carried out by students. SITU is a framework owned by Telkom University, while the Student Activity Transcript is an official record that contains all student activities participated in by Telkom University students, such as student organization activities, student activities, social activities, sports activities, as well as academic and non-academic achievements [2]. This research has several main contributions designed to analyze and improve the quality and user satisfaction of SITU TAK website. The followings are the main points of research contribution from this study:

1. Measuring the quality of the SITU TAK website using modified Webqual 4.0 method.
2. Measuring the user satisfaction on SITU TAK website using Importance-Performance Analysis (IPA) method.
3. Analyzing the factors that can increase the user satisfaction on SITU TAK website .

Many studies have applied Webqual 4.0 method [3], [4] which explain the purpose and function of Webqual 4.0 in each research object. Then, there are also studies that apply Importance-Performance Analysis for measurement of the object under study, as can be seen in research [5], [6]. In addition, in some other researches [7], [8], there are similarities in the use of methods and measurements of the research objects, namely the Webqual 4.0 method and Importance-Performance Analysis (IPA), but the objects studied are different.

Based on the background above, there are two comparison methods used to analyze the quality, namely servqual method, which focuses more on service quality and webqual method, which focuses more on website quality [9]. Therefore, because this research aimed to analyze the quality of the SITU TAK website, the appropriate method used is Webqual 4.0 method which is a quality measurement method consisting of three main dimensions, namely usability, information quality, and service interaction [10]. Then, in an effort to increase the comprehensiveness of website quality measurement, this research added one dimension that was not previously covered, namely security and privacy. By including this dimension, this research can provide a more complete and relevant point of view regarding data quality and security, which is a major concern in website usage. In addition, this research applied Importance-Performance Analysis method, which aimed to measure the relationship between user perceptions and quality improvement priorities based on user perceptions [11].

2. Research Method

2.1 Modified Webqual 4.0

Webqual is a website quality measurement technique based on end-user assessment and is a development of servqual [12], [13]. The Webqual 4.0 method consists of three dimensions, namely:

1. Usability is a dimension that encompasses everything related to appearance, such as content appropriateness and ease of navigation [14].
2. Information quality from information system research is a dimension related to information clarity, information accuracy, and information completeness [15].
3. Service interaction is a dimension that includes the ease with which users interact with the website [16], starting from the speed of website response to the accuracy of website interaction with users, so that no errors occur when users interact with the website.

In this research, the Webqual method were modified by adding dimension or variable of security and privacy aiming to add the measured level of website quality. Security and privacy are important variables in the website because they are related to a sense of security and maintaining user trust when using the website [17]. Figure 1 shows the difference between Webqual 4.0 and modified Webqual 4.0, where there are additional dimension, namely security and privacy.

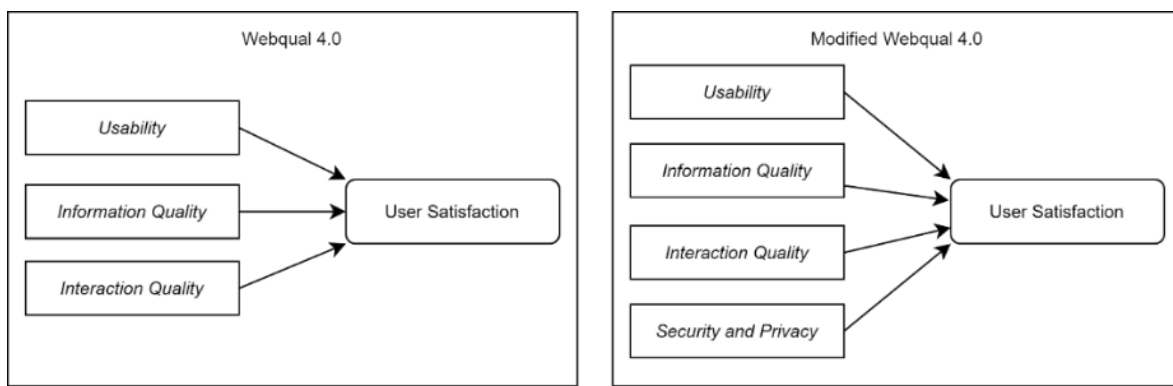


Figure 1. Dimensional Differences between Webqual 4.0 and Modified Webqual 4.0

2.2 Importance-Performance Analysis (IPA)

The Importance-Performance Analysis is a method used to measure the relationship between user perceptions and the performance of a product [18]. In this research, Importance Performance Analysis (IPA) method describes four quadrants that represent the priority of various user needs. Each of these quadrants provides guidance to determine the order and level of importance of improvements that must be prioritized in an effort to improve the quality of the SITU TAK website in accordance with the user expectations. The followings are the explanation of each Importance Performance Analysis quadrant:

1. The first quadrant (high importance & low performance), being a very important factor and must be prioritized in website development [19].
2. The second quadrant (high importance & high performance), as a supporting factor for user satisfaction, so it must be maintained and improved [19].
3. The third quadrant (low importance & low performance), as a factor that is not prioritized in development, because although the level of satisfaction is low, it is not considered too important by users [19].
4. The fourth quadrant (low importance & high performance), as a factor that is not prioritized, and should allocate development to the first quadrant because it is considered not too important and the level of user satisfaction is good [19].

2.3 Research Method

In defining the problem, it is necessary to be directly involved in the development of SITU TAK website, so that a suitable method can be identified. The next step was to determine the objectives and hypotheses based on the case study and problem identification. After determining the research objectives, question statements were created based on the modified Webqual 4.0 dimensions, covering aspects of usability, information, interactivity, as well as modifications determined by the researcher's design, namely security and privacy. The selection of this dimension was made in consideration of the importance of website security and user privacy, which are currently of particular concern in website quality. Meanwhile, the answers to the statements from the questionnaire were in the form of Likert scale, namely in the form of a value range of 1 to 5 [20]. So that the data results can be grouped and can facilitate the data

analysis. Before processing the data, the thing that must be considered was whether the data was valid or not. Therefore, it is necessary to test the validation and reliability of the data. If the data is confirmed to be valid and reliable, then the next step is the data analysis stage using the Importance Performance Analysis method. By using this method, it is hoped that the research objectives will be achieved and can produce conclusions and suggestions from this research. The detail of this research method is presented in Figure 2 flowchart diagram that provides a visual description of the steps and sequence of processes applied to prepare the research.

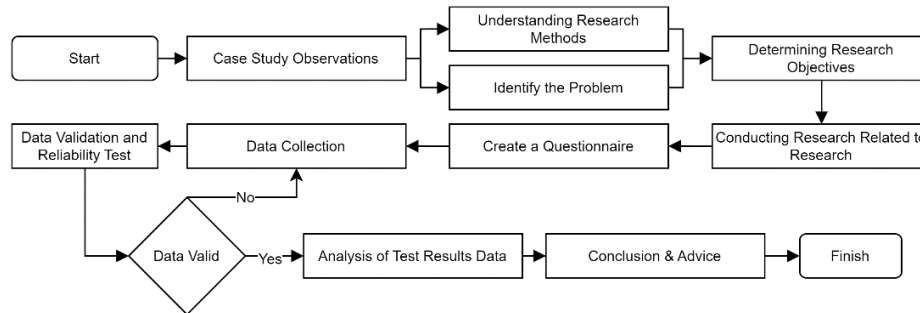


Figure 2. Flowchart of Research Method

2.4 Data, Population, and Sample

The data were collected through a combination of literature reviews and questionnaire distribution. The literature reviews provided theoretical and knowledge-based data relevant to the research. Meanwhile, the questionnaires yielded quantitative data in the form of responses to the statements, as presented in Table 1.

Table 1. Operational Variables

Dimensions (Variables)	Code Indicator	Indicator
Usability	US1	The website operation is easy to understand
	US2	The website display is clear and easy to understand
	US3	The website has good competence
	US4	The website is easy to use
	US5	The website has good navigation
	US6	The website has an attractive appearance
	US7	The appearance of the website is in accordance with the type of site (academic service website)
	US8	The website has a positive impact on users
Information Quality	IF1	The website provides accurate information
	IF2	Information on the website can be trusted
	IF3	The information provided by the website is always updated
	IF4	The website provides relevant information
	IF5	The website provides information in a language that is easy to understand
	IF6	The website provides complete and detailed information
	IF7	The website provides information in an appropriate format
Interaction Quality	IN1	The website has a good reputation
	IN2	The website provides room for personalization
	IN3	The website makes it easy to communicate
Security and Privacy	SP1	The website performs authentication that suits the user
	SP2	Users feel secure about their personal information

This research focused on a specific population that must meet certain criteria. The criteria include being Telkom University students from the class of 2022 who have used the SITU TAK website. To determine the number of samples in this research, the slovin formula is used, presented in Equation 1 as follows:

$$n = \frac{N}{1 + n e^2} \tag{1}$$

The Slovin formula only applies a confidence level of 95%, with 10% margin of error 10% [21]. In addition, the target population is 7,540 people. So, if the calculation is carried out, the minimum sample size will be 98 respondents.

However, there were 105 respondents that have responded to the questionnaire. By exceeding the minimum sample size required, the results can be more accurate.

3. Results and Discussion

3.1 Validity and Reliability Test

The validity test ensures the measurement instrument is suitable for the research variables, while the reliability test measures the consistency of the data. Good results in both tests increase the confidence and quality of research data, strengthening conclusions and recommendations. In the validity test, if the value of R Count > R Table, then the data is declared valid [22]. Table 2 shows the results of validity testing on each performance and importance indicators.

Table 2. Validity Testing Results

Code Indicator	R Count		R Table	Result
	Performance	Importance		
US1	0.675	0.684	0.19	Valid
US2	0.696	0.780	0.19	Valid
US3	0.584	0.776	0.19	Valid
US4	0.610	0.709	0.19	Valid
US5	0.727	0.736	0.19	Valid
US6	0.682	0.755	0.19	Valid
US7	0.792	0.769	0.19	Valid
US8	0.659	0.758	0.19	Valid
IF1	0.622	0.648	0.19	Valid
IF2	0.583	0.711	0.19	Valid
IF3	0.529	0.660	0.19	Valid
IF4	0.659	0.765	0.19	Valid
IF5	0.604	0.784	0.19	Valid
IF6	0.576	0.754	0.19	Valid
IF7	0.621	0.811	0.19	Valid
IN1	0.490	0.736	0.19	Valid
IN2	0.636	0.680	0.19	Valid
IN3	0.560	0.726	0.19	Valid
SP1	0.661	0.788	0.19	Valid
SP2	0.617	0.746	0.19	Valid

Meanwhile, in conducting the reliability test, if Cronbach's alpha value exceeds 0.07, it can be concluded that the data used in this research can be considered reliable [23]. The values of Cronbach's alpha obtained in this research can be seen in Table 3.

Table 3. Reliability Testing Results

Reliability Testing Description		
Reference Value	Cronbach's Alpha Value	Conclusion
0.7	0.994	Reliabel

3.2 Descriptive Analysis

This descriptive analysis used the main methodological approach in the data collection, measurement, and analysis [24] with the main purpose of revealing and describing the thoughts and views held by respondents on several variables. In collecting the data, a Linkert scale of 1 to 5 was used to measure the level of importance and performance on modified Webqual 4.0 variables, which results in a continuum line to measure the importance and performance categories, as shown in Figure 3.

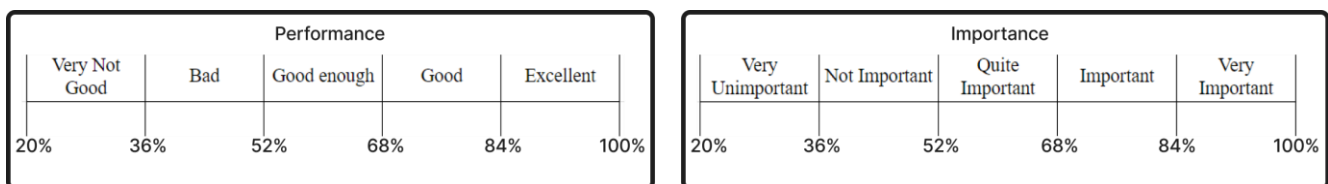


Figure 3. Continuum Line of Performance & Importance

After forming the continuum line, the next step was to process the data based on the performance variable and the importance variable to determine the category of each variable based on the percentage value obtained. Table 4 is the result of the descriptive analysis calculation.

Table 4. Descriptive Analysis Calculation Results

Variabel	Performance		Importance		Ideal Score
	Score	Category	Score	Category	
Usability	3243 (77%)	Good	3763 (90%)	Very Important	4200
Information Quality	2847 (77%)	Good	3313 (90%)	Very Important	3675
Interaction Quality	1172 (74%)	Good	1397 (89%)	Very Important	1575
Security and Privacy	833 (79%)	Good	943 (90%)	Very Important	1050

3.3 Gap Analysis

The gap analysis between the importance and performance of SITU TAK website aimed to determine the value of the gap between performance and importance [25] against the indicators in the modified Webqual 4.0. To calculate the gap value, the GAP formula [26] is used, presented in Equation 2 as follows:

$$GAP = performance(i) - importance(i) \quad (2)$$

Table 5 shows the gap analysis results.

Table 5. Gap Analysis Results

Indicator Code	Performance	Importance	Gap
US1	3.78	4.45	-0.67
US2	3.97	4.47	-0.50
US3	3.61	4.44	-0.83
US4	3.78	4.54	-0.76
US5	3.73	4.49	-0.75
US6	3.84	4.47	-0.63
US7	4.10	4.47	-0.36
US8	4.07	4.52	-0.46
IF1	3.81	4.52	-0.71
IF2	4.20	4.50	-0.30
IF3	3.60	4.50	-0.90
IF4	3.85	4.50	-0.66
IF5	4.02	4.50	-0.49
IF6	3.70	4.51	-0.81
IF7	3.93	4.51	-0.58
IN1	3.64	4.46	-0.82
IN2	3.93	4.38	-0.45
IN3	3.59	4.47	-0.88
SP1	3.89	4.43	-0.54
SP2	4.05	4.55	-0.50
Average	3.85	4.48	-0.63

The results of the gap analysis between the importance and performance of SITU TAK website is -0.63, and the overall indicator values are all < 0. From these results, it can be concluded that the website still does not fully meet the expectations of its users, and there are potential improvements that need to be made to improve its quality according to the user needs.

3.4 Results of Importance-Performance Analysis

The results of the Importance-Performance Analysis (IPA) are presented in the form of coordinate points on a Cartesian diagram, resulting from the average value of the importance and performance indicators.

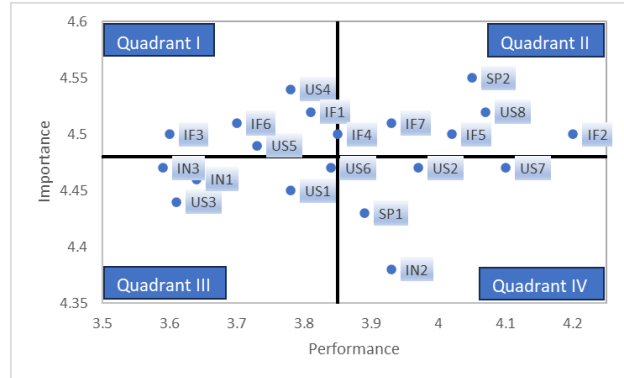


Figure 4. Cartesian Diagram

The coordinate points in Figure 4 diagram represent each indicator. In quadrant I, it shows that the importance of user needs is high while the performance of SITU TAK website is low or has not met user needs, so the indicators in quadrant I are very important factors and must be prioritized in website improvement. Table 6 shows the indicators contained in quadrant I.

Table 6. Quadrant Indicator I

Quadrant I		
Variabel	Code Indikator	Indikator Description
Usability	US4	The website is easy to use
	US5	The website has good navigation
Information Quality	IF1	The website provides accurate information
	IF3	The information provided by the website is always updated
	IF4	The website provides relevant information
	IF6	The website provides complete and detailed information

In quadrant II, it shows that the importance of the user needs is high, and the performance of SITU TAK website is good or has met the needs of its users, so the indicators in quadrant II must maintain their performance. Table 7 shows indicators contained in quadrant II.

Table 7. Quadrant Indicator II

Quadrant II		
Variabel	Code Indikator	Indikator Description
Usability	US8	The website has a positive impact on users
Information Quality	IF2	Information on the website can be trusted
	IF4	The website provides relevant information
	IF5	The website provides information in a language that is easy to understand
	IF7	The website provides information in an appropriate format
Security and Privacy	SP2	Users feel secure about their personal information

In quadrant III, it shows that although the performance of SITU TAK website is low or has not met the needs of users, the importance of the needs of users is also low, so the indicators in quadrant III are not a priority in website improvement. Table 8 shows indicators contained in quadrant III.

Table 8. Quadrant Indicator III

Quadrant III		
Variabel	Code Indikator	Indikator Description
Usability	US1	The website operation is easy to understand
	US3	The website display is clear and easy to understand
	US6	The website has an attractive appearance
Interaction Quality	IN1	The website has a good reputation
	IN3	The website makes it easy to communicate

In quadrant IV, it shows that the importance of the needs of users is low and the performance of SITU TAK website is good or has met the needs of users, so the indicators in quadrant IV do not need to be improved because the performance is good. Table 9 shows indicators contained in quadrant IV.

Table 9. Quadrant Indicator IV

Quadrant IV		
Variabel	Code Indikator	Indikator Description
Usability	US2	The website display is clear and easy to understand
	US7	The appearance of the website is in accordance with the type of site (academic service website)
Interaction Quality	IN2	The website provides room for personalization
Security and Privacy	SP1	The website performs authentication that suits the user

3.5 Discussion and Implications

In research [7], there are significant differences in the variables used in the analysis. This research adopted the WebQual 4.0 framework as the basis for analysis, which is a framework that has been well-accepted in previous studies. However, in this research, it decided to modify WebQual 4.0 by adding security and privacy variables to the framework. The presence of these variables provides a more comprehensive dimension in measuring the website quality, which may not be covered in the previous research.

On the other hand, research [8] also took a similar approach by adopting modified Webqual 4.0 as the basis of analysis. However, the key difference lies in the modifications made in this research, which involves the addition of the user interface quality dimension. In addition, there is a similarity in the object under research, namely the academic system. The average gap value obtained in this research is -0.32. Of course, these results are different even though this research used the same framework. Differences in modifications applied to the framework can produce differences in research results.

4. Conclusion

Based on the results of the gap analysis involving 105 respondents who use SITU TAK website, it is concluded that the website needs improvement because it has not reached user expectations. The average gap value is -0.63, and all indicators in the gap analysis table get a gap value <0 , indicating that website performance is still below the level of importance expected by users. Meanwhile, based on the results of the Importance Performance Analysis (IPA) analysis, it is concluded, along with suggestions for further website development, that SITU TAK website needs to get improvements on several indicators that are the top priority, including ease of use, ease of navigation, accuracy, novelty, relevance, completeness, and detail of the information presented. In addition, there are indicators that have met user expectations and can be used as a reference for maintenance, such as positive impact, trust, language used, appropriate format, and information security. There are also indicators that need to be improved, although not a priority, such as ease of understanding website operations, competence, appearance, reputation, and ease of communication. Finally, there are indicators that, although they meet the user expectations, are not considered important by the users, such as clear display, appropriate academic services, personalization, and appropriate authentication.

In the context of this research, there are theoretical suggestions that can be applied for further research. One of them is the need to expand the number of respondents to improve data accuracy by taking a sample of at least 25% of each faculty at Telkom University. In addition, it is recommended to combine research methods, such as interviews and direct observation instead of relying solely on questionnaires in data collection.

Notation

- n : Minimum sample size
 N : Population size
 e : Margin of error

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