Analysis The Effect of Website Quality on User Satisfaction with The WebQual 4.0 Method and Importance-Performance Analysis (IPA) (Case Study: SPMB Sebelas Maret University’s Website)

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Abstract. The digital era describes the presence of technology where everyone can exchange information so quickly by the internet. For an institution, a website has its own benefits, among others, as a media for promotion, presenting information, and providing online services. This study aims to evaluate and improve website performance by analyzing the quality of the Sebelas Maret University selection of new student admissions (SPMB) website by utilizing a combination of WebQual 4.0 and Importance Performance Analysis (IPA) methods. In its analysis, WebQual method looks at 3 main dimensions: Usability Quality, Information Quality, and Service Interaction Quality. This research, which involved students in UNS, found that the website’s gap analysis still has a negative value on all attributes and there are several attributes that require improvement related to website design, presentation of detailed and up-to-date information and navigation on the website. The results from this study are expected could be used as evaluation for the SPMB website’s development to meet user expectation.

1. Introduction

Website has an important role for an institution because it is considered as an online existence of the institution. The website has its own benefits for an institution, among others, as a promotional medium, presenting information, and providing online services to its customers. So, it should be for an institution to display website with a good quality. One institution that uses the website is a university.

Sebelas Maret University (UNS) is one of the universities in Indonesia that uses a website as a means of presenting information to the user. One of the websites owned by this university is the Sebelas Maret University Admissions Selection website (SPMB UNS). The SPMB UNS website is the first door for prospective new students to get to know Sebelas Maret University, because the website provides all information on new student admissions such as registration schedules, the announcement of results, and other important information.

Website with a good quality is important for an institution, because the website describes the institution in the cyberspace [1], therefore UNS has the responsibility to provide a good website. Then, this research will test the quality of the website in order to evaluate and to improve the website’s performances. The WebQual 4.0 method was chosen because it is a method that focuses on testing quality of the website. Importance Performance Analysis (IPA) method in this study is used to help find
important factors or attributes of the SPMB website that must be maintained and maximized to meet website user satisfaction.

2. Literature Review

2.1. WebQual

WebQual is the quality measurement methods developed by Stuart Barnes and Richard Vidgen, and has undergone several developments and improvements, and now it has reached version 4.0 [2]. WebQual is used in measuring the website’s quality based on perceptions from users’ or website visitors’ point of view. Website Quality or WebQual model uses 3 main dimensions: Usability Quality, Information Quality and Service Interaction Quality.

Usability Quality deals with the website design, such as the appearance of the website, easy of use, navigation, and website descriptions that reach the user [2]. This usability dimension comes from previous research in the field of Human Computer Interaction (HCI) or human and computer interaction and website usability.

Information Quality comes from research on information systems. The questions developed in this section focuses on the quality of information, data and systems. Information quality is often measured based on information relevance, timeliness, and accuracy[3].

Service Interaction Quality comes from research on service quality in e-commerce, marketing, and information systems. The quality of interaction services usually related to trust and empathy, for example in terms of transaction and information security when accessing website, as well as website personalization and communication with the website administrator [1][2].

The three dimensions of WebQual 4.0 developed by Stuart Barnes and Richard Vidgen, described in 22 questions have been developed according to the research needs shown in Table 1.

| WebQual Instrument | WebQual 4.0 Questions |
|--------------------|-----------------------|
| **Usability Quality** | The site easy to learn and operate |
|                     | Interaction with the site is clear and easy to understand |
|                     | The site has clear navigation |
|                     | The site is easy to use |
|                     | The site has a good appearance |
|                     | The website design according to the type of site (academic website) |
|                     | With this website, it can improve higher education competence |
|                     | The site provides a positive experience for user |
| **Information Quality** | Provides accurate information |
|                       | Provides trusted information |
|                       | Provides timely information |
|                       | Provides relevant information |
|                       | Provides information that is easy to understand |
|                       | Provides information with precise detail |
|                       | Provides information in an appropriate format |
| **Service Interaction Quality** | The site has a good reputation |
|                                   | The site makes users feel safe in carrying out academic activities |
|                                   | The site makes users feel safe with the personal data provided |
|                                   | The site provides space for user personalization |
|                                   | When using the site, users feel part of the UNS academic community |
|                                   | The site makes it easy to communicate with universities |
|                                   | The site provides services in accordance with what is presented |
2.2. Validity and Reliability Test

Validity and reliability testing are used to determine the level of the truthfulness of a survey process or provision of a questionnaire that has been given to selected respondents, when it is known that the data obtained is invalid, the survey or questionnaire filling process must be repeated to obtain valid data [4]. The validity testing is a test of measurement accuracy. The validity test is carried out by using the correlation technique, namely looking at the r-count correlation value, this value is compared to the r-table value, a measuring instrument is valid if r-count correlation > r-table [5]. The general formula for this correlation can be seen in Equation 2.1 below:

\[ r_{xy} = \frac{N \sum xy - \sum x \sum y}{\sqrt{(N \sum x^2 - (\sum x)^2)(N \sum y^2 - (\sum y)^2)}} \]  

(1)

In the reliability test using the basic theory by comparing Cronbach's Alpha with the r-table. The Cronbach's Alpha coefficient value is 0.6. Where if r-table > CA then it is declared reliable. The Cronbach's Alpha test is used by the researcher because it is the questionnaire reliability testing technique most often used [6]. The Cronbach's Alpha formula for calculating the reliability coefficient is as in Equation 2.2 below:

\[ r_{11} = \frac{k}{(k-1)} \left[ 1 - \frac{\sum \sigma^2 b}{\sigma^2 t} \right] \]  

(2)

2.3. Webqual Index

The Webqual Index (WQI) is an analysis technique used to determine the standard (benchmark) of a website as a whole [2]. With this technique, it will be known the quality value of a system based on user's perceptions and expectations. WQI is obtained from the quotient between the weighted score and the maximum score.

\[ WQI = \frac{\Sigma \text{Weighted Score}}{\Sigma \text{Maximum Score}} \]  

(3)

2.4. Gap Analysis

Gap analysis can be defined as a technique for comparing current performance ratings (perception) with the expectations of the intended website user (end-user). The gap in service quality can be seen based on the difference between the average value of consumers' perceptions and expectations [7]. With this gap analysis, we can find out the extent to which customer satisfaction is based on the quality of services provided, calculated by looking at the difference in value between current service quality (perception) and expected service quality (expectation).

\[ Q = P - E \]  

(4)

2.5. Importance Performance Analysis

Importance Performance Analysis (IPA) is a useful and simple technique for identifying service provider’s attributes that need to be prioritized for improvement [8]. This IPA method will help describe any performance attributes that require improvement [9] or need to be maintained based on both sides of the assessment of user perceptions and expectations can be identified. Importance-Performance Analysis (IPA) has four quadrants with the X axis which describes the website’s performance and the Y axis which describes website’s importance.
3. Method
This research has used quantitative descriptive method. This research aims to obtain a factual, systematic, and accurate description of the fact, properties, and relations between the phenomena under study.

3.1. Identify the problem
In general, this research is carried out by applying quantitative methods according to the purpose, which is to determine the quality of the website. One of the problems raised in this study is how users can convey their satisfaction of the targeted website’s quality.

3.2. Questionnaire with webqual
The questionnaire distributed to responders is a closed questionnaire by presenting 22 questions according to the instrument from the webqual equipped with a measurement scale in a range of 1 up to 5 for each attribute.

3.3. Collect data
This research used cluster sampling technique and used Slovin calculation to calculate the minimum required sample size, and the result is 382 people with a minimum number of 30 samples from each subsample. So, this research was determined that the number of respondent from each faculty was not less than 30 respondents.

The distribution of questionnaires was carried out indirectly to Sebelas Maret University’s student class of 2019, using google forms which were distributed through the Whatsapp Group social media in each study program. Questionnaires were distributed in the January-March 2020.

3.4. Analysis and interpretation the results
The purpose of the data analysis method is to interpret conclusions from the amount of data collected. Therefore the data has been collected must be processed and analyzed so it can be used as a basis to make any decisions.

4. Result
The data used in this research were 382 data from respondents from 11 faculties at Sebelas Maret University. There are as much as 42% of the data from the respondents stated that they agree with the questionnaire statement regarding what they are currently feeling.
4.1. Validity and Reliability Testing

In the validity test, it was found that R count of all attributes with a value of more than 0.148 so that they were categorized as valid attributes because they met the requirements for the value of R count > R table.

Table 2. WebQual Attribute Validity

| Attributes | R Count Actual | Description | R Count Expectations | Description |
|------------|----------------|-------------|----------------------|-------------|
| UQ_01      | 0.526          | Valid       | 0.707                | Valid       |
| UQ_02      | 0.587          | Valid       | 0.664                | Valid       |
| UQ_03      | 0.545          | Valid       | 0.676                | Valid       |
| UQ_04      | 0.618          | Valid       | 0.618                | Valid       |
| UQ_05      | 0.412          | Valid       | 0.527                | Valid       |
| UQ_06      | 0.449          | Valid       | 0.42                 | Valid       |
| UQ_07      | 0.643          | Valid       | 0.684                | Valid       |
| UQ_08      | 0.627          | Valid       | 0.611                | Valid       |
| UQ_09      | 0.655          | Valid       | 0.693                | Valid       |
| IQ_10      | 0.616          | Valid       | 0.625                | Valid       |
| IQ_11      | 0.626          | Valid       | 0.695                | Valid       |
| IQ_12      | 0.693          | Valid       | 0.721                | Valid       |
| IQ_13      | 0.677          | Valid       | 0.708                | Valid       |
| IQ_14      | 0.634          | Valid       | 0.688                | Valid       |
| IQ_15      | 0.669          | Valid       | 0.736                | Valid       |
| SI_16      | 0.679          | Valid       | 0.677                | Valid       |
| SI_17      | 0.672          | Valid       | 0.735                | Valid       |
| SI_18      | 0.662          | Valid       | 0.687                | Valid       |
| SI_19      | 0.593          | Valid       | 0.698                | Valid       |
| SI_20      | 0.604          | Valid       | 0.607                | Valid       |
| SI_21      | 0.508          | Valid       | 0.701                | Valid       |
| SI_22      | 0.634          | Valid       | 0.719                | Valid       |

Reliability testing on the website is necessary to ensure validity and proper statistical analysis. The goal is to know the extent to which measurements can be valid and reliable. Obtained a Cronbach Alpha value of .914 on the assessment of user perceptions and of .939 on the expected importance. Both samples has the Cronbach’s Alpha value >0.6, it’s mean all of the attributes used are good and reliable.

4.2. Webqual Index

In the results of data analysis using the WebQual Index method, analysis of various values is obtained. The result of WQI analysis which is the value of the quality of a system based on the user’s perceptions and expectations as a whole is 78%. This value indicates that most of the website users’ expectations are in accordance with the current website.

4.3. Gap Analysis

Based on the data obtained, the result of the gap value is all negative or perspective less than expectation, its mean that the quality has not been fulfill the users’ expectation. The biggest gap value is found in the usability quality variable, concerning the appearance and design of academic websites. From the level of frequency of responders in accessing the website, it can be said that data updates may not be known by respondents who say that the data presented is less detailed and not up-to-date.

4.4. Analysis the Suitability’s level of Importance and Performance

The suitability’s level between the current work performance of the website and user expectations is seen from the results of data processing of the respondent's level of suitability, then the highest level of
suitability is obtained in the 19th attribute with a value of 98%. This says that the website provides a safe personalization space for its users, and the lowest level of conformity is at the 6th attribute with a value of 74%, so that it can immediately be evaluated on the attributes regarding academic website design.

5. Discussion
This Importance Performance Analysis (IPA) will describe the attributes that are following with responder expectations, and provide an overview of the attributes that require improvement. IPA will be presented in the quadrant diagram. The diagram image below is an explanation of the quadrant division in the Cartesian or IPA diagram:

![Cartesian Diagram of the Result of Distribution Attributes](image)

**Figure 2.** Cartesian Diagram of the Result of Distribution Attributes

5.1. The First Quadrant (Concentrate Here)
The first quadrant describes the attributes that have a high expectation and low performance line. In the first quadrant, there is 1 attribute that must be the attention of website owner management. This attribute needs to be prioritized for improvement because the respondents' high expectations for this attribute but the results obtained are low. The following attribute result in the first quadrants is an appropriate type of site as an academic website (UQ_06).

5.2. The Second Quadrant (Keep the Good Work)
The second quadrant describes the attributes with a high expectation and high performance. In quadrant II, 12 attributes should be maintained because they have a high level of importance and have met the expectations of its users. The following attributes in second quadrants is The site is easy to use (UQ_04), The site provides an accurate information (UQ_09), Provides trusted information (IQ_10), Provides relevant information (IQ_12), Provides information that is easy to understand (IQ_13), Provides information in the appropriate format (IQ_15), The site has a good reputation (SI_16), The site makes users feel safe in carrying out academic activities (SI_17), The site makes users feel safe with the personal data provided (SI_18), Provides space for user personalization (SI_19), Users feel part or the UNS academic community (SI_20), and Confidence services in accordance with what is presented (SI_22).

5.3. The Third Quadrant (Low Priority)
The third quadrant describes the attributes with the low expectation and low performance. In this third quadrant, five attributes are considered not very important and their performance is low. The following attributes result in third quadrants is Interaction with the site is clear and easy to understand.
(UQ_02), the site has clear navigation (UQ_03), The site has a good appearance (UQ_05), provide information with precise detail (IQ_14), and easier way to communicate with universities (SI_21).

5.4. The Fourth Quadrant (Possible Overkill)

The fourth quadrant describes the attributes with the low expectation and high performance. In this quadrant, there are 4 attributes that tend to be exaggerated because of low importance but high performance. The following attributes are in the fourth quadrant: the website is easy to learn and operate (UQ_01), The site improve higher education competence (UQ_07), The site has a positive experience for user (UQ_08), and the site provides information in a timely manner (IQ_11).

So that the recommendations for improvement on the website are based on the WebQual 4.0 and Importance Performance Analysis method, in the attributes number 6, 14, 11, and 3 related to website design, presentation of detailed and up-to-date information, and navigation on the website. And for attributes such as a sense of trust in the security of the website as what users feel when accessing the website and the presentation of reliable and easy to understand information, the quality of the website can be maintained so that it is in line with the user’s expectation.

6. Conclusions

The results of the analysis of the gap value obtained on the website still have a negative value on all attributes, with the largest gap value being -1.12, which means that the website is still not following user expectations. These results are supported by further calculations in IPA method. This study found that there are several attributes that require improvement related to website design, presentation of detailed and up-to-date information and navigation on the website. Improving the appearance of the website can be the main focus of improvement, because a good, attractive, and communicative appearance will certainly make it easier for users. In addition to a good appearance, it must be supported by the presentation of detailed, informative, and up-to-date information.

The results from this study are expected could be used as evaluation for the SPMB website’s development to meet user expectation. For further research, in the data collection process, it is better to pay more attention to distributing questionnaires so that the data from the sample obtained is more evenly distributed. Also, the writers hope that further research can combine with other methods that didn’t exist in this study.

Acknowledgments

This research is sponsored by Universitas Sebelas Maret under project Hibah Penelitian Grup Riset.

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