Measuring the quality computer based test services using servqual method (case study admission system University of Janabadra)

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Abstract. This Computer Based Test (CBT) is one of the services provided at the new admissions system at a college. User satisfaction (prospective new students) is one of the important factors of successful development and implementation of this CBT. This study aims to measure the quality of CBT services by combining Servqual (Service Quality) model. Servqual model is used to measure service quality from user perception to five dimensions of service quality that is tangible, reliability, responsiveness, assurance, and empathy. The object of research is Janabadra University CBT system with the respondent is a new student academic year 2017/2018. The method used is determining the variables and dimensions to be measured, making and distributing questionnaires, validity and reliability test, processing the data of questionnaires by combining Servqual model, and analyzing data of questionnaire processing result. In this research, we will measure Gap 5 Servqual dimension that is the gap between service obtained with service expected by user. The results of this study can be the basis for development and improvement of CBT system on Universitas Janabadra in order to be more competitive in the future.

1. Introduction

Learning There are one hundred and six higher education in Yogyakarta, causing tighter competition among higher education in increasing the number of new students. Each higher education competes to provide the best service to attract new prospective students, including through one day service and online registration. Since 2010 Janabadra University has been using the online new student registration system including in its computer based tests. It is necessary to measure the quality of services provided by Janabadra University's new admissions system in order to make better and more competitive services. Since the implementation of computer based test of Janabadra University (pmb.janabadra.ac.id), there has never been any analysis of customer satisfaction measurement (prospective new students) on the services provided by the system.

The quality of products or services will be realized when all of activities of the organization is oriented on customer satisfaction. Quality is a dynamic state associated with product, services, people, processes, and environments that meet customer needs and expectation and help produce superior values [1].
Quality has two perspectives, ie producer perspective (computer based test of Janabadra University) and consumer perspective (new student candidate), if the two things are put together it will be able to achieve the match between the two sides known as fitness for consumer use (fitness for consumer use). Compliance for use is a conformity between consumers and producers, then it can be made a mutually agreed standard, eliminating the perception gap between producers and consumers, so as to meet the needs and expectations of both parties. The purpose of this study is identifying the gap that exists between the expectations of the consumer (the new student candidate) with the services it receives and knowing the emphasis of efforts to be done for the improvement of attributes that really diangap important by consumers in order to improve customer satisfaction.

The definition of service quality has been widely expressed by various studies, in simple terms, service quality is defined as "conformity with customer specifications. Quality does not meet a number of criteria determined by an organization, but quality is meeting the criteria set by the customer. Quality is usually not determined by a single attribute or dimension of a product or service, but is determined by several attributes [2]. However there are some opinions that say the quality of service can be defined from different expectation of users toward the service provided with the perception of the service received [3].

1.1 Servqual Method

The Servqual method is a method used to measure service quality from the attributes of each dimension, so that the gap value will be obtained which is the difference between the respondent's perception of the service that has been received with the expectation of what will be received[4]. The measurement is this method by measuring service quality from the attributes of each dimension, so that the gap value will be obtained which is the difference between the respondent's perception of the service received by the respondent and the service that will be received. Through a series of studies on various service industries, Parasuraman et al (1985) and used by other researchers [3][4] identified five dimensions of service quality. Table 1 shows five crucial dimensions that leads to model of service quality developed.

| No. | Dimensions | Definition |
|-----|------------|------------|
| 1   | Tangible  | describes the physical facilities, equipment, and appearance of personnel and the presence of users. |
| 2   | Reliability | describe with the ability to provide accurate services from the first time without making any mistakes and deliver their services according to the agreed time |
| 3   | responsiveness | describes the willingness and ability of employees to assist respondents and respond to their requests, and inform when services will be provided and then provide services quickly. |
| 4   | Assurance | describing the behavior of employees capable of growing respondents' trust in institutions and institutions can create a sense of security for the respondents. |
| 5   | Empathy  | describing caring and individual attention are provided to customers |

1.2 Gap analysis

The service quality dimensions mentioned above, must be managed properly. If not, this can lead to a gap between the company and customers, because of their different perceptions of the form of service. 5 types of gaps proposed by Parasuraman et.al in [5] which are shown in Figure 1.
1. Gap 1 (Gap of Management Perception)
   That is the gap between consumer expectations and management views, the management does not always feel exactly what the consumer wants or how consumers judge the service components.

2. Gap 2 (Gap Quality Specification)
   That is the gap between the perceptions of management regarding service user expectations and service quality specifications.

3. Gap 3 (Gap Penyampaian Pelayanan)
   That is the gap between service quality and service delivery.

4. Gap 4 (Service Delivery Gap)
   That is the gap between service presentation and external communication.

5. Gap 5 (Gap in Perceived Service)
   That is the gap between services received and expected by consumers.

2. Research Metodology

2.1. Population and Sample
This research is quantitative research. The success of quantitative research is based on the validity of the data obtained and processed. This study was conducted by questionnaire-based survey distributed to new students who enroll in the academic 2017/2018. The number of new students per department presented in table 2.

| No | Department                      | Number of New Student |
|----|--------------------------------|-----------------------|
| 1  | Law                             | 276                   |
| 2  | Management                      | 226                   |
| 3  | Accounting                      | 96                    |
| 4  | Economics of Development        | 17                    |
| 5  | Civil Engineering               | 175                   |
In this study the number of samples is calculated using the Slovin formula [6] where the population is the total new student in the last three academic years is 967 people, namely:

\[ n = \frac{N}{1+\left(N \times e^2\right)} \]  

(1)

where:
- \( n \) = Number of samples
- \( N \) = Population
- \( e \) = Inaccuracy ease due to intolerable sampling error (using 10%)

Based on the formula (1) above, the sample number is as follows:

\[ n = \frac{967}{1+\left(967 \times 0.1^2\right)} = 90.62 \]  

(2)

Thus the minimum sample size in this study was 91 respondents.

2.2. Level Of Expectation And Perceived By Respondents

Assessment of the expected level and perceived by respondents (new student of University Janabadra) was calculated based on questionnaires given to 91 samples on a scale of 1 to 5. It has been used in previous research [7] and shown in table 3.

| Scale | Expectation Value | Perceived Value |
|-------|-------------------|-----------------|
| 1     | Very Unneeded     | Very unsatisfying |
| 2     | Unneeded          | Unsatisfying    |
| 3     | So so             | So so           |
| 4     | Needed            | Satisfying      |
| 5     | Very needed       | Very satisfying |

2.3. Validity and Reliability Testing

The questionnaire was considered valid if the question in the questionnaire was able to reveal the contents of the questionnaire. In this study, data obtained from 23 attribute questions consisted of five dimensions of service quality using Servqual method based on customer satisfaction surveys conducted by the University of Janabadra.

A validity test is used to determine the degree of instruments accuracy in measuring its function. To test the validity of constructs is done by correlating between the score of the question items with the total score. The formula used to test the validity of this instrument is Product Moment from Karl Pearson, as follows:

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

(3)

Where:
- \( R_{xy} \) = koefisien korelasi antara variabel X dan Y
\(\sum XY\) = Jumlah perkalian antara variabel X dan Y
\(\sum X^2\) = Jumlah dari kuadrat nilai X
\(\sum Y^2\) = Jumlah dari kuadrat nilai Y
\((\sum X^2\)) = Jumlah nilai X kemudian dikuadratkan
\((\sum Y^2\)) = Jumlah nilai Y kemudian dikuadratkan

Then result of \(r_{xy}\) consulted with critical price of product moment \(r_{table}\), if result obtained \(r_{count} > r_{table}\), then instrument is valid.

Reliability testing is used to measure consistency between each question in the questionnaire. A questionnaire is said to be reliable if it can provide relatively similar results during the measurement of return on different objects at different times or give consistent results. The reliability test is calculated by the cronbach alpha formula as follows:

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

(4)

Where :
- \(R_{11}\) = reliabilitas yang dicari
- \(N\) = jumlah item pertanyaan yang diuji
- \(\sum \sigma^2_b\) = jumlah variasi skor tiap-tiap item
- \(\sigma^2_t\) = variasi total

If the coefficient Cronbach Alpha \(r_{11}\) ≥ 0.6 then it can be said the instrument is reliable [8]. To determine the validity and reliability of the data collected, are used through the IBM Statistuc version 22 SPSS program.

2.4 Data analysis technique
This study focuses on the fifth approach to service quality, namely the gap between services received and expected by consumers. This Servqual model defines that the gap (G) for service quality factors is:

\[G = P \text{ (Perceptions)} - E \text{ (Expectations)}\]

(5)

Negative gap indicate that consumer expectations are not met, the greater the gap occurs, the wider the gap between consumer desires and what they actually get [9]. Servqual analysis can be done in several forms, namely analysis per item (example: \(P_1-E_1, P_2-E_2\)); analysis per dimension (eg \(((P_1 + P_2 + P_3 + P_4) / 4) - ((E_1 + E_2 + E_3 + E_4) / 4)\), where \(P_1\) to \(P_4\) and \(E_1\) to \(E_4\) represent statements of four perceptions and expectations (expectations ) to 1 type of dimension.

3. Result And Discussion

3.1 Service attributes
There are 23 service attributes for the new student admission system at Janabadra University (pmb.janabadra.ac.id) which were used in this study and divided into 5 dimensions as shown in Table 2. The tangible dimension is measured by six service attributes, T1 to T6, the responsiveness dimension is measured by five service attributes, Re7 to Re 11, the reliability dimension is measured by three service attributes, R12 to R14, the assurance dimension is measured by three service attributes, A15 to A17 and the empathy dimension is measured by six service attributes, E18 to E23

| Dimension | No | Service attributes |
|-----------|----|--------------------|
| Tangible  | T1 | The facilities supporting beneficial system are well provided |
|           | T2 | The system is well organized |
|           | T3 | The system has a standard navigation consistently |
The interaction between the system and the user is understandable clearly and easily. The System provides complete menus. The system has an attractive interface. The system can be operated easily. The system usage runs smoothly. The test can be done easily. The appeared information always up to date. The information can be found according to the provided menus. The system provides chatting facilities or complaining menus. The menu provided by the system are quickly showed up after clicked. The loading time to open the website is relatively quick. There is no disruption in using the system. The Information displayed on the system can be justifiable. The procedure in doing computer-based test is implemented easily. The system provides online registration guidance. The provided information in the website is clearly to the user. The system provides relevant information. The test results can be known quickly. The attractive appearance and the complete information are well provided by system. The system is accessible easily.

Validity and reliability testing of data the expectations of new students and the reality received by new students

Validity test results obtains \( r_{table} \) value is 0.197. All service attributes items can be said valid because \( r_{count} > r_{table} \), it can be seen from table 3. This validity test is the result of calculations using IBM SPSS 20.

| Service Attributes | Correction Item Total Correlation (Expected Value) | Correction Item Total Correlation (Perceived Value) |
|--------------------|---------------------------------------------------|---------------------------------------------------|
| T1                 | 0.712                                             | 0.410                                             |
| T2                 | 0.655                                             | 0.685                                             |
| T3                 | 0.717                                             | 0.415                                             |
| T4                 | 0.381                                             | 0.693                                             |
| T5                 | 0.210                                             | 0.422                                             |
| T6                 | 0.572                                             | 0.328                                             |
| Re7                | 0.493                                             | 0.545                                             |
| Re8                | 0.594                                             | 0.581                                             |
| Re9                | 0.635                                             | 0.428                                             |
| Re10               | 0.331                                             | 0.439                                             |
| Re11               | 0.431                                             | 0.479                                             |
| R12                | 0.563                                             | 0.911                                             |
| R13                | 0.746                                             | 0.901                                             |
| R14                | 0.569                                             | 0.371                                             |
| A15                | 0.603                                             | 0.594                                             |
| A16                | 0.595                                             | 0.531                                             |
| A17                | 0.580                                             | 0.575                                             |
| E18                | 0.383                                             | 0.421                                             |
| E19                | 0.436                                             | 0.502                                             |
The reliability testing of Data The expectations of new students and the reality received by new students are shown in Table 6. This reliability test is the result of calculations using IBM SPSS 20.

Table 6. Reliability Test Results of Expectation and Perceived

| No. | Dimension   | Cronbach’s Alpha | Number of Attributes |
|-----|-------------|------------------|----------------------|
| 1   | Tangible    | 0.707            | 6                    |
| 2   | Reliability | 0.662            | 5                    |
| 3   | Responsiveness | 0.718      | 3                    |
| 4   | Assurance   | 0.683            | 3                    |
| 5   | Empathy     | 0.664            | 6                    |

From the reliability test table produced by SPSS, it can be seen that the cronbach alpha for the dimensions of tangible, responsiveness, relativity, assurance and empathy is above 0.6, which means that the data of expectations and reality received by new students on all dimensions are reliable because cronbach’s alpha exceeds 0.6.

3.3. Gap Analysis of the level of expectations of new students and the reality received by new students

Total score of respondents expected value and perceived value can be calculated by this formula [7]

\[
\text{Expectation value} = \frac{\text{Total Score}}{\text{Number of Respondent}}
\]  

\[
\text{Perceived value} = \frac{\text{Total Score}}{\text{Number of Respondent}}
\]

The results of the calculation of gap analysis for each dimension can be seen in table 7.

Table 7. The gap between the expectation value and the perceived value

| No. | Dimension   | Perceived Value | Expected Value | Gap   |
|-----|-------------|-----------------|----------------|-------|
| 1   | Tangible    | 3.85            | 4.07           | -0.22 |
| 2   | Reliability | 3.75            | 4.18           | -0.43 |
| 3   | Responsiveness | 3.71      | 4.21           | -0.50 |
| 4   | Assurance   | 3.84            | 4.14           | -0.30 |
| 5   | Empathy     | 3.90            | 4.23           | -0.33 |

Based on table 7 it can be seen that all the values of the gap in service quality dimensions above are negative. This shows that Janabadrada University new students have not felt satisfied with the services provided. From table 7 it can also be seen that the largest gap is in the responsiveness dimension, which is -0.50 and the smallest gap is in the tangible dimension, which is -0.22.
4. Conclusion
Based on the results of the research that has been done, some conclusions can be drawn:

- a. In general, the quality of service in the new student admission system at Janabadra University has not been able to optimally satisfy all expectations of consumers (prospective new students).
- b. The dimensions that are prioritized for immediate improvement are the dimensions of responsiveness, these dimensions are related to the willingness to help customers and provide fast and appropriate services to customers by delivering clear information.
- c. In more detail, when viewed from the service attributes that must be corrected immediately is the system has not provided chat facilities or complaints menu, the menus contained in pmb.janabadra.ac.id when selected does not appear quickly and the load time to open the website is still slow
- d. The dimensions considered to be the most satisfying to consumers (prospective new students) are tangible dimensions, this is related to the ability of a company to show its existence to external parties through physical facilities, work equipment, and employee appearance.
- e. In more detail, when viewed from the service attributes considered by consumers to be satisfactory are the facilities supporting beneficial systems are well provided, the system is well organized, the system has a standard navigation consistently, the interaction between the system and the user is understandable clearly and easily, the system provides complete menus and an attractive interface system.

5. References
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