

Analysis of Service Quality on Academic Information System toward User Satisfaction Using Kano Method Base on SERVQUAL Dimensions (Case Study: Academic Information System on STT Wastukencana Purwakarta)

Dayan Singasatia¹, Irsan Jaelani²

^{1,2}Department of Informatics, STT Wastukencana, Purwakarta, West Java, Indonesia

Abstract: *Competitive competition among colleges requires that they do excellent service for all components to involve in business processes. In order to meet these needs, then the academic information system is one of the media that need to be considered by colleges in providing the best service to students. An academic information system at each college has different services, according to the needs and facilities provided by the campus. Services provided in order to improve the service quality of a system can be one indicator in measuring user satisfaction. The problems that arise are which services should be improved and that must be maintained to achieve user satisfaction academic information system. So the steps taken in this study is to identify the attributes for each dimension of quality service. The result is 16 attributes for 5 dimensions of quality service. It then identifies how the student's preferences as users of the system to the academic information system and satisfaction grade of each service attribute by Kano method. Then each service attribute measured the gap between performance and expectations. So it can be mapped to each attribute that has been calculated service gap with the grade generated from Kano method. The main result of this study is to make priority which service attribute should be improved or maintained in order to achieve user satisfaction of academic information system.*

Keywords: Service, Satisfaction, Kano, Academic Information System

1. Introduction

The current community's need for formal education is increasing, especially at college level. This makes the college one of the strategic sectors in creating quality human resources. Every colleges certainly have an academic information system, as well as one of the famous colleges in Purwakarta namely Sekolah Tinggi Teknologi (STT) Wastukencana. Currently already applied an academic information system known as SIMAK, which is a system that provides services to students and lecturers in supporting academic activities. With various innovations in providing special features as a service that aims to facilitate users in using information systems, but not necessarily the features that exist can provide satisfaction to the user. Because the level of user satisfaction is quite difficult to measure instantly.

Research on service quality, one of which is often used is SERVQUAL (Service quality) method, according to Zeithaml, et.al. (1990) there are 5 (five) dimensions of service quality, namely: Tangibles, Reliability, Responsiveness, Assurance and Empathy. Jiang (2002) using SERVQUAL method is used to measure the quality of information system services by using the five dimensions. The most important thing for the campus is to know the expectations and user satisfaction of the existing information system services, so as to sort out which services have not met satisfaction.

In the industry there are methods that categorize the attributes of products and services, and measure how well

these attributes can satisfy the needs of its customers, the method known as Kano. The categorization of these attributes can be distinguished into Must-be, One-Dimensional, Attractive, Indifferent, Reverse and Questionable [1]. When colleges can identify the attributes that can provide user satisfaction of a system service based on the dimensions that exist in servqual, then the college can be easily in the development or improvement of the system.

2. Literature Review

2.1 Service Quality

Service quality is a measure of how good the level of service provided is able to match customer expectations [2]. Quality of service is the fulfillment of consumer expectations or consumer needs that compare the results with expectations and determine whether the consumer has received quality services [3].

As for the many opinions about the dimensions of service quality, the credibility is quite high, judging by the number of researchers who make it a reference that is SERVQUAL model, there are five dimensions of service quality are: Tangibles, Reliability, Responsiveness, Assurance, Empathy[10].

The dimensions of service quality should be well mixed so as not to cause a gap between the company and the customers because of their different perceptions about the

form of service. The five gaps that Parasuraman [2] put forward are:

- 1) Gap between consumer expectations and management perceptions.
- 2) Gap between the perception of management to consumer expectations and service quality specifications
- 3) Gap between service quality specifications and service delivery.
- 4) Gap between service delivery and external communication.
- 5) Gap between perceived services and expected services.

2.2 SERVQUAL Method

Measurement of service quality in SERVQUAL method is based on multi item scale designed to measure customer expectation and perception as well as gap or gap between them on five service quality dimensions (Reliability, Tangible, Assurance, Responsiveness and Empathy), the five dimensions of quality are described in several item questionnaire for attribute expectation and perception variable based on likert scale.

SERVQUAL scores for each pair of questions for each customer can be calculated based on the following formula (Zeithalm, et, al., 1990) [4]

Servqual Score = Perception Score - Hope Score

The Gap score of service quality at various levels in detail can be calculated based on:

- 1) Item-by-item analysis, eg P1 - H1, P2 - H2, etc.
Where P = Perception and H = Hope
- 2) Dimension-by-dimensional analysis
Example: $(P1 + P2 + P3 + P4 / 4) - (H1 + H2 + H3 + H4 / 4)$ where P1 to P4 and H1 to H4 represent 4 perceptual statements and expectations related to a particular dimension.
- 3) Calculation of single-size service quality / gap SERVQUAL i.e.
 $(P1 + P2 + P3 .. + P22 / 22) - (H1 + H2 + H3 + ... + H22 / 22)$

The larger the gap generated by this calculation, the less good the quality of service. Therefore, the priority of service quality improvement is done from the biggest gap or gap. Conversely, the smaller the gap (the gap is near zero or positive) the better the service quality.

2.4 Satisfaction theory

Satisfaction of a person to a thing has a variety of meanings. Satisfaction is not always measured with money, but rather based on the fulfillment of feelings about what one needs. Satisfaction (Satisfaction) derived from the *latin* is *satis* which means enough or enough and *facio* meaning to do or do, so that satisfaction can be interpreted as effort fulfillment something or make something adequate. A satisfaction can also be defined as a perception of something that has met his expectations. Therefore, a person will not be satisfied if he has a perception that his expectations have not been fulfilled. Someone will feel

satisfied if the perception is equal or greater than expected [5]

Kotler (1997) states that satisfaction is the feeling of pleasure or disappointment of someone who comes from the comparison between the impression of a product's results with expectations [13].

Satisfaction is a state of fulfillment of wishes, expectations, and customer needs. If the services provided to meet the wishes, expectations, and customer needs, assessed the service was satisfactory [6].

Kotler identified four methods to measure customer satisfaction, as follows:[14]

- 1) Complaint and suggestion system
- 2) Ghost Shopping
- 3) Lost customer analysis
- 4) Survey of customer satisfaction

2.3 Kano Method

Kano method is a tool used to produce a quality product or service. Based on the mentioned explanation, Kano method can be used in order to improve the quality of a product or service based on perception owned by the customers.[7]. In the Kano method there are six categories that affect satisfaction, as follow:

- 1) Must-be: This attribute signifies a feature is a basic feature must exist in a product / service. If the feature does not exist then it can lead to dissatisfaction from the customers.
- 2) One-dimensional: This attribute produces satisfaction when fulfilled and dissatisfaction if not met. These are attributes that are often talked about and can be used in competition with other companies.
- 3) Attractive: This attribute provides satisfaction when fully achieved, but does not cause dissatisfaction if it is not met. This is an attribute that is usually unthinkable.
- 4) Indifferent: This attribute refers to aspects that are not good or not bad, and features that have this attribute will not affect customer satisfaction.
- 5) Reverse: This attribute aims to show that if the feature exists then leads to user dissatisfaction.
- 6) Questionable: This attribute indicates the inconsistency of the respondent. This inconsistency can be regarded as an error, and can occur due to poor questionnaires or other factors. So it needs to be studied more deeply about the questions posed in the questionnaire.

The Kano method diagram shown in Figure 1.

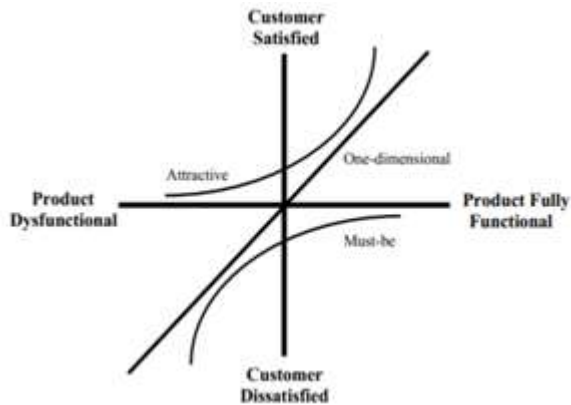


Figure 1: Kano Diagram [8]

3. Methodology

3.1 Object Location

This study was conducted at STT. Wastukancana Purwakarta-West Java, Indonesia, the place where the academic information system being studied is used. STT. Wastukancana or better known as SIMAK. This system began to be introduced at the end of 2012. This system exists because at that time the academic information system that is running is not possible to use because along with the development of STT. Wastukancana and rapidly growing students. The development of this system is done by the IT team in STT. Wastukancana. This system provides online facilities to students in meeting their academic needs. Users of this system are students, guardian lecturers and administrators or academic departments. This academic information system can be accessed online through www.simakwastu.net. [9]

3.2 Research Design

In this study used a questionnaire to collect data and was designed by adopting Kano method and dimension of SERVQUAL which used by Robison (2009)[7], Ramdon and Surendro (2014)[11] and Widiawan (2005)[12] and has been adapted to the purpose of this study. The questionnaire using 18 attribute for 5 dimensions SERVQUAL.

3.3 Population and Sample

This study takes the population of STT students. Wastukancana. The total number of active students in the academic year 2015/2016 odd is 1,766 students in 5 study programs. [9]

Sample in this study using the Stratified Sampling method, which divides the population into several subpopulations based on existing study programs in STT. Wastukancana. Each subpopulation in the study program will be taken several samples in order to disseminate the research questionnaire. Sampling technique with Stratified Sampling method is choosing a random sample of the number of subpopulation of each study program that has been determined.

The validity of a study is also influenced by the sample size. In this study to determine the size of the sample is

calculated mathematically using the Slovin formula (1967) [12] with the estimation error of 10% (0.10) obtained amount is 95 respondents.

3.4 Instrument

In the Kano's questionnaire, respondents were asked to answer questions relating to the functional and dysfunctional aspects of the attributes concerned. The functional question states the conditions expected by the student if certain attributes are met / available. Instead the dysfunctional question states the perceived condition of the student if the facility or service is not met / not available on a 5 points Likertscale

Determine the Kano categories for each attribute by using Blauth Formula [8] as follows:

- If $(\text{one-dimensional} + \text{attractive} + \text{must be}) > (\text{indifferent} + \text{reverse} + \text{questionable})$, then the grade is obtained from the maximum of (one-dimensional, attractive, must-be).
- If $(\text{one-dimensional} + \text{attractive} + \text{must-be}) < (\text{indifferent} + \text{reverse} + \text{questionable})$ then grade is obtained from the most maximum of (indifferent, reverse, questionable).

In measuring the services quality of academic information system, the first step needs to be identified the gap between system user expectations and performance that has been given by the system based on SERVQUAL dimension is tangible, reliability, responsiveness, assurance and empathy [10]. Measurement scale used in the questionnaire to measure the wishes and expectations of STT Wastukancana students using 5 Likert scale points.

4. Results

4.1 Collecting Data and Pre-Test

This study uses quantitative research approach, and questionnaire instrument developed based on indicator of each variable in research conceptual model and adopted from theory and / or previous research. The pre-test was conducted by distributing questionnaires to 32 students from several departments in STT Wastukancana. To check the validity and reliability of this instrument we use pearson product moment correlation technique by comparing the Corrected Item-total Correlation and looking at the result of Cronbach Alpha calculation [15] with SPSS Statistics Version 24 software.

From our analysis results show that there are 2 indicators on our 18 instruments did not pass the validity test. For corrected item-the total correlation to the two indicators indicates a number below 0.296 based on r-table with 10%, N-2 or 30 degrees of freedom, taking into account the sample size (N) pre-test 32. Test reliability with Cronbach Alpha value of all The indicator shows the number above 0.930. The questionnaire in this research is continued with 16 instruments for all SERVQUAL dimension by eliminating one indicator of Reliability dimension and one indicator of Emphaty dimension

4.2 Respondent Demographics

The questionnaire in this research is distributed to 125 respondents, 121 questionnaire returned and can be processed as many as 98 respondents. Respondents consisted of 52 men and 46 women in all study program each generation with an age range of 18-25 years.

4.3 Measuring

4.3.1 User Preferences Regarding System Academic Information System Service Quality (SIMAK) STT. Wastukencana.

Preferences of users of the system or students about the quality of services that have been given the academic information system STT. Wastukencana as follow:

- a) **Tangible:** Student's preference for tangible dimension is mostly the higher the service of physical evidence given to the student then the student's satisfaction will be increased (one-dimensional) that is like a service that can be accessed well using mobile device, accessible by a variety of interesting browsers and animations. While the physical evidence of the service that is the basis and indeed must be fulfilled from this dimension (must-be) is a user friendly interface or easy to use.
- b) **Reliability:** Student preference to the dimension of reliability most of which is the higher reliability of services provided to students then the satisfaction of students will not increase far above normal. But if otherwise it will produce dissatisfaction (must-be), because the service is supposed to exist in the academic information system, such as the search needs academic information or academic year value (IPK), filling the Study Plan Card (KRS Online) and password change facility. While the reliability of services that will produce satisfaction if fulfilled and generate dissatisfaction if the opposite (one-dimensional) is a stable access speed.
- c) **Responsiveness:** Student preference to dimension of responsiveness that is higher responsiveness of service given to student does not affect student satisfaction (indifferent) that is like service user guide or how to use system. Then the responsiveness of services that can produce satisfaction if fulfilled and generate dissatisfaction if not met is the service in displaying an error message when an input error occurs. Finally the responsiveness of services that will produce satisfaction if fulfilled but does not cause dissatisfaction if not fulfilled (attractive) ie information activities and latest academic news is displayed on the front page
- d) **Assurance:** Student preference to assurance dimension is higher guarantee of service given to student hence not so much influence to student's satisfaction because it should be fulfilled (must-be), like ability of access from outside campus network and guarantee of academic information confidentiality. While the service guarantees that produces satisfaction if fulfilled and generate dissatisfaction if not met (one-dimensional) is the accuracy of the data.
- e) **Empathy:** Student preference to empathy dimension is higher empathy service given to student hence will

produce satisfaction, but on the contrary if empathy service given not fulfilled then will lead to dissatisfaction (one-dimensional) like service there contact person and there is menu suggestion and error report.

4.3.2 Integration of Kano and SERVQUAL Methods

At this stage the steps are carried out as follows:

a) Calculation the service gap of each attribute

In determining the gap of each service attribute between student expectations and perception using formula gap is equal to perception minus expectation of the results system as shown in table 1.

Table 1: Gap Between Expectation And Perception

No	Service Attribute	Expect	Percep	Gap
<i>Tangible</i>				
1.	Accessible with both mobile devices	4,2737	2,8316	-1,4421
2.	Accessible to various browsers	3,7368	3,0842	-0,6526
3.	The interface is user friendly or easy to use	4,4000	3,0737	-1,3263
4.	Interesting animations	3,6105	2,7579	-0,8526
<i>Reliability</i>				
5.	Searching for academic year and overall academic value information (GPA)	4,5895	3,3053	-1,2842
6.	Charging Study Plan Card (KRS Online)	4,2000	3,0842	-1,1158
7.	Password change facility	3,3684	3,1789	-0,1895
8.	Stable access speed	4,6737	2,6105	-2,0632
<i>Responsiveness</i>				
9.	The latest activity and academic news information is displayed on the front page	4,3053	2,7895	-1,5158
10.	user guide or how to use the system	3,9474	2,7474	-1,2000
11.	Displays a warning message when an error occurs	4,2421	2,8842	-1,3579
<i>Assurance</i>				
12.	Accessibility from outside the campus network	4,4000	2,8526	-1,5474
13.	Guarantee of confidentiality of academic information	4,4526	3,0526	-1,4000
14.	Accuracy of data	4,5579	3,0947	-1,4632
<i>Empathy</i>				
15.	There is a Contact Person	4,0526	2,9368	-1,1158
16.	There is a suggestion menu and error report	4,2211	2,8526	-1,3684

From table 1 it can be seen that the gap value of each attribute in the SERVQUAL dimension has a high average value, meaning that the service quality that has been given has not fulfilled the students' satisfaction as the system user.

b) Classify the categories of all service attribute gaps.

The average total gap value, after that compared with the gap value of each attribute by using k-means calculation formula then there are two categories of comparison result:

- UP, if the gap value of each attribute is greater than the average of the total gap, it means that the service attribute must be increased.

- HOLD category, if the gap value of each attribute is smaller than the average of the total gap, it means that the service attribute must be retained.

The results of this stage are presented in Table 2.

Table 2: Determination of Gap Category

No	Service Attribute	Gap	Average	Category
<i>Tangible</i>				
1.	Accessible with both mobile devices	-1,4421	-1,2434	UP
2.	Accessible to various browsers	-0,6526	-1,2434	HOLD
3.	The interface is user friendly or easy to use	-1,3263	-1,2434	UP
4.	Interesting animations	-0,8526	-1,2434	HOLD
<i>Reliability</i>				
5.	Searching for academic year and overall academic value information (GPA)	-1,2842	-1,2434	UP
6.	Charging Study Plan Card (KRS Online)	-1,1158	-1,2434	HOLD
7.	Password change facility	-0,1895	-1,2434	UP
8.	Stable access speed	-2,0632	-1,2434	HOLD
<i>Responsiveness</i>				
9.	The latest activity and academic news information is displayed on the front page	-1,5158	-1,2434	UP
10.	user guide or how to use the system	-1,2000	-1,2434	HOLD
11.	Displays a warning message when an error occurs	-1,3579	-1,2434	UP
<i>Assurance</i>				
12.	Accessibility from outside the campus network	-1,5474	-1,2434	UP
13.	Guarantee of confidentiality of academic information	-1,4000	-1,2434	UP
14.	Accuracy of data	-1,4632	-1,2434	UP
<i>Empathy</i>				
15.	There is a Contact Person	-1,1158	-1,2434	HOLD
16.	There is a suggestion menu and error report	-1,3684	-1,2434	UP

From Table 2 it can be concluded the results of this step, there are 10 attributes included into the category of UP and 6 attributes that belong to the category HOLD

c) Mapping Category Gap to Kano Grade.

The next step is to map the categorization results for each attribute by Kano method. There are 8 categories in the mapping done, as presented in Table 3

Table 3: Mapping Category Gap To Kano Grade

No	Gap Category	Kano Grade	Priority	Description
1	UP	O	U1	The first priority should be improved
2	UP	M	U2	The second priority should be improved
3	UP	A	U3	The third priority should be improved
4	UP	I	U4	The fourth priority should be improved
5	HOLD	O	H1	The first priority should be maintained
6	HOLD	M	H2	The second priority should be maintained
7	HOLD	A	H3	The third priority to be maintained

8	HOLD	I	H4	The fourth priority must be maintained
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Then continue to mapping Service Attribute Priority, as presented in Table 4

Table 4: Service Attribute Priority Mapping

No	Service Attribute	Category	Kano Grade	Priority
<i>Tangible</i>				
1.	Accessible with both mobile devices	UP	O	U1
2.	Accessible to various browsers	HOLD	O	H1
3.	The interface is user friendly or easy to use	UP	M	U2
4.	Interesting animations	HOLD	O	H1
<i>Reliability</i>				
5.	Searching for academic year and overall academic value information (GPA)	UP	M	U2
6.	Charging Study Plan Card (KRS Online)	HOLD	M	H2
7.	Password change facility	UP	M	U2
8.	Stable access speed	HOLD	O	H1
<i>Responsiveness</i>				
9.	The latest activity and academic news information is displayed on the front page	UP	A	U3
10.	user guide or how to use the system	HOLD	I	H4
11.	Displays a warning message when an error occurs	UP	O	U1
<i>Assurance</i>				
12.	Accessibility from outside the campus network	UP	M	U2
13.	Guarantee of confidentiality of academic information	UP	M	U2
14.	Accuracy of data	UP	O	U1
<i>Empathy</i>				
15	There is a Contact Person	HOLD	O	H1
16	There is a suggestion menu and error report	UP	O	U1

From table 4 each priority has a number of different attributes. The numbers of service attributes included in the UP1 priority are 4 attributes, UP2 priority is 5 attributes, UP3 priority is 1 attribute, HOLD 1 priority is 4 attributes, HOLD 2 priority is 1 attribute, HOLD 4 priority is 1 attribute.

The final step explains the main priority to be improved, as follow:

- 1) The First priority to be upgraded is from tangible dimension that can be accessed by using mobile device, from responsiveness dimension that is displaying warning message when error occurs, from assurance dimension that is data accuracy and from empathy dimension that there is suggestion menu and error report.
- 2) The second priority to be upgraded is from the tangible dimension that is user friendly or easy to use interface, 2 attributes of the reliability dimension is the search for academic and whole year value information (IPK) and password change facility, and 2 attributes of the

assurance dimension that is the access ability from outside campus network and academic information confidentiality guarantee.

- 3) The third priority to be improved is from the responsiveness dimension that is the activity information and the latest academic news is displayed on the front page.
- 4) The main priority to be maintained is the 2 attributes of the tangible dimension that can be accessed by a variety of interesting browsers and animations, from the dimension of reliability that is stable access speed, and the dimension of empathy is the presence of contact person.
- 5) The second priority to be maintained is from the dimension of the reliability of the study plan card (KRS Online).
- 6) The last priority to be maintained is from the four dimension of the user guide or how to use the system.

5. Conclusion

In the research it can be concluded that:

- 1) There are 4 service attributes that are the top priority to be upgraded (U1) which means that these 4 attributes have a high service gap (UP) and affect user satisfaction where the student preference for the attribute if the service is fulfilled then user will feel satisfied and if not fulfilled then the user will feel dissatisfied (one-dimensional).
- 2) There are 5 service attributes that enter into the second priority to be upgraded (U2) which means 5 attributes have high service gap (UP) and affect user satisfaction where student preference to attribute if service is not fulfilled hence user will feel dissatisfied and if fulfilled then the user will feel normal because it considers the attribute is already should be (must-be).
- 3) There is one service attribute that goes into the third priority to be upgraded (U2) which means that the attribute has a high service gap (UP) and affects user satisfaction where the student preference for the attribute if the service is fulfilled then user will feel satisfied and if not fulfilled then the user will not feel disappointed (Attractive).
- 4) There are 4 service attributes that fall into the first priority that must be maintained (H1) which means that the attribute has a low service gap (HOLD) and affects user satisfaction where the student preference for the attribute if the service is satisfied then the user will be satisfied and if not fulfilled then the user will feel dissatisfied (one-dimensional).
- 5) There is one service attribute that belongs to the second priority that should be maintained (H2) which means that the attribute has a low service gap (HOLD) and affects user satisfaction where the student preference for the attribute if the service is not satisfied then the user will feel dissatisfied and if fulfilled then the user will feel normal because it considers the attribute must already exist (must-be).
- 6) There is one service attribute that belongs to the fourth priority that must be maintained (H2) which means that the attribute has a low service gap (HOLD) and the student preference for that attribute is that the attribute

does not affect user satisfaction if there is or not (Indifferent).

6. Limitation and Suggestion

This study has some limitation to improve in future research. The respondents in this studies only student in one department do not all department in STT Wastukencana. In the future research would be all user including student, lecturers and staff. The Suggestions of this study are the attribute each dimension of quality service more reproduced in accordance with the object under study so that the results of the research has a more comprehensive value and this study model evaluation is expected to be applied in several different academic information systems.

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Author Profile



Dayan Singasatia, received Bachelor of Computer (S.Kom) degree majoring in Information System from Bina Nusantara University in 1998 and Master of Computer (M.Kom) degree majoring in Information System from STMIK LIKMI Bandung in 2014.

Presently active as Lecturer in Informatics Engineering at STT Wastukencana Purwakarta.



Irsan Jaelani, received Bachelor of Engineering (S.T) in Informatics Engineering from STT Wastukencana Purwakarta in 2012 and Master of Computer (M.Kom) degree majoring in Information System from STMIK LIKMI Bandung in 2016.

Presently active as Lecturer in Informatics Engineering at STT Wastukencana Purwakarta.