

Application of Fuzzy Service Quality Method in Student Satisfaction Analysis of School Service Quality at SMAN 1 Simanindo, Samosir Regency

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Abstract. To improve the quality of service, it is necessary to know the extent to which the level of consumer assessment of service quality, whether the service received is in accordance with consumer expectations or not. This research was conducted to determine student satisfaction with the service quality of SMAN 1 Simanindo School. The method used in this study is the Fuzzy Service Quality method which aims to determine the gap that occurs between the services received and student expectations. The results of data processing indicate that the attribute that is the main concern to be prioritized by the school so that improvements can be made is the completeness of extracurricular support with a gap (-15.370). Based on the value of the gap per dimension, the dimension that has the largest gap value is the dimension that needs to be prioritized by the school for improvement. The dimension that has the largest gap value is the physical dimension (tangible) with a gap value of -12.98. Based on the Cartesian diagram, the attributes that require priority treatment from the school are the completeness of books and reference sources in the library and the school's ability to produce quality alumni. The attributes of the question are located in quadrant I. Based on the Fuzzy Service Quality analysis, the overall attributes have a negative gap value. This shows that the quality of service provided by the school is unsatisfactory and still in dire need of improvement.

Keyword: Fuzzy Service Quality, Gap, Expectations, Reality

Abstrak. Untuk meningkatkan kualitas pelayanan, maka perlu untuk mengetahui sejauh mana tingkat penilaian konsumen terhadap kualitas pelayanan, apakah pelayanan yang diterima telah sesuai dengan harapan konsumen atau tidak. Penelitian ini dilakukan untuk mengetahui kepuasan siswa terhadap kualitas pelayanan Sekolah SMAN 1 Simanindo. Metode yang digunakan dalam penelitian ini adalah metode Fuzzy Service Quality yang bertujuan untuk mengetahui gap yang terjadi antara layanan yang diterima dengan harapan siswa. Hasil dari pengolahan data menunjukkan bahwa atribut yang menjadi perhatian utama untuk diprioritaskan oleh pihak sekolah agar dilakukan perbaikan adalah kelengkapan pendukung ekstrakurikuler dengan gap (-15,370). Berdasarkan nilai gap per dimensi, dimensi yang memiliki nilai gap terbesar merupakan dimensi yang perlu diprioritaskan oleh pihak sekolah untuk dilakukan perbaikan. Dimensi yang memiliki nilai gap terbesar adalah dimensi fisik (tangible) dengan nilai gap sebesar -12,98. Berdasarkan diagram kartesius, atribut yang memerlukan penanganan prioritas dari pihak sekolah adalah kelengkapan buku dan sumber rujukan di Perpustakaan serta kemampuan sekolah untuk menghasilkan alumni yang berkualitas, keberadaan atribut-atribut pertanyaan tersebut dinilai penting bagi para siswa namun pada pelaksanaannya belum memuaskan. Atribut-atribut pertanyaan tersebut terletak pada kuadran I. Berdasarkan analisis Fuzzy Service Quality secara keseluruhan atribut memiliki nilai gap negative. Hal ini menunjukkan bahwa kualitas pelayanan yang diberikan pihak sekolah kurang memuaskan dan masih sangat memerlukan perbaikan.

Kata Kunci: Fuzzy Service Quality, Gap, Harapan, Kenyataan

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1. Introduction

Service quality is determined by two things, namely service expectations and service perceptions [1]. Service is perceived as good if it matches or exceeds consumer expectations, on the contrary if the reality is less than expected then the service can be said to be unsatisfactory. Service quality must start from customer needs and end with customer satisfaction and positive perceptions of service quality [2]. Wilkins and Balakrishnan in David Wijaya's book (2012: 74) state that "Student satisfaction is not determined solely by student teaching or learning experiences, but is also determined by their overall experience as customers of the school" [3]. Therefore, it is very important for the school to know the level of service quality that has been provided by the school to students.

SMAN 1 Simanindo is a school in Samosir Regency which has a state status under the auspices of the Ministry of Education and Culture with the establishment decree number 0887/0/1986 and has been accredited "B", with 2 majors namely Science and Social Sciences. As an educational institution, SMAN 1 Simanindo must continue to strive to improve the quality of school services. However, so far the school does not know how students assess the quality of services that have been provided, whether the services provided are in accordance with the expectations and needs of students as customers. This is because no research or survey has been conducted on student assessments of the quality of services provided by the school.

Fuzzy Service Quality is a method that can be used as a means to represent uncertainty and is a modeling tool for uncertainty related to ambiguity and uncertainty to measure service quality. Service Quality which aims to find out the gap between the services received and student expectations, to understand how service quality can be improved. Where expectations are students' estimates or beliefs about service quality, while perceptions are students' assessments of matters relating to service quality. The Service Quality method consists of five dimensions, namely tangible, reliability, responsiveness, assurance, empathy. These dimensions are used to measure service quality quantitatively in the form of a questionnaire.

Schools can be said to be of high quality if they are successful or able to provide services in accordance with the expectations and needs of students. Therefore, the quality of school services is interesting to study so that the school can pay more attention to any services that have been provided or that must be provided by the school to improve the quality of school services.

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2. Literature Review

2.1. Service Quality

Service quality is a comparison between the service received (perception) of consumers compared to consumer expectations. Service quality and service orientation is the fulfillment of customer satisfaction/wants and needs [4]. The service will be said to be of high quality and satisfactory if the perceived service is equal to or exceeds the quality expected by consumers. The difference between perception and expectation is called the “gap” or service quality gap, which is formulated as follows:

$$Gap = Perception - Hope \quad (1)$$

1. If the gap is positive (perception > expectation) = the service is said to be surprising and satisfying.
2. If the gap is zero (perception = expectation) = the service is said to be of high quality and satisfactory.
3. If the gap is negative (perception < expectation) = the service is said to be of poor quality and unsatisfactory.

2.2. Dimensions of Service Quality

Several marketing experts such as Parasuraman, Zeithaml, and Berry conducted special research on several types of services and succeeded in identifying ten main factors that determine service quality. In a further development, namely in 1988, Parasuraman and colleagues found that the ten dimensions that can be summarized into only five main dimensions include tangible, reliability, responsiveness, assurance and empathy [2].

2.3. Validity Test

Validity comes from the word validity which means the extent to which the accuracy and accuracy of a measuring instrument (test) in carrying out its measuring function [5]. The formula for calculating validity is as follows [6]:

$$r_{xy} = \frac{n \sum XY - \sum X \sum Y}{\sqrt{\{n \sum X^2 - (\sum X)^2\} \{n \sum Y^2 - (\sum Y)^2\}}} \quad (2)$$

2.4. Reliability Test

Reliability has meanings such as trustworthiness, reliability, stability, consistency, and so on, but the main idea contained in the concept of reliability is the extent to which the results of a measure-

ment can be trusted [5].The formula for calculating reability is as follows [6]:

$$r = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum s_i^2}{s_t^2} \right) \tag{3}$$

The test criteria is if the value of Cronbach’s Alpha ≥ 0.6 then the attribute is said to be reliable.

2.5. Fuzzy Service (Service quality)

Fuzzy set theory can be used as a means of presenting uncertainty and modeling uncertainty related to ambiguity or lack of information about certain elements of a problem at hand. In measuring the value of the gap between perceptions and expectations, the results of the questionnaire need to be processed using the fuzzy-servqual method. Fuzzy-Servqual is useful for giving a more precise value to researchers because of the subjectivity of respondents in filling out the questionnaire.

2.6. Membership Functions

The membership function (membership function) is a curve that shows the mapping of data input points into their membership values (often also called membership degrees) which has an interval between 0 to 1 ([7]. One way that can be used to get the membership value is through the function approach. One of the membership functions is the representation of the curve of the shoulder shape.

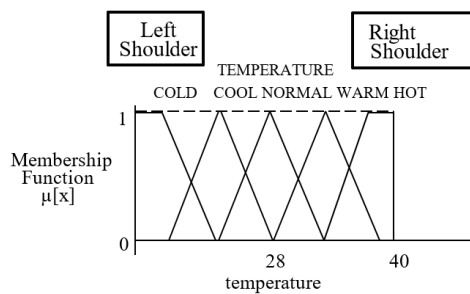


Figure 1. 'Shoulder' Area on Variable Temperature

membership functions:

$$\mu[x, a, b] = \begin{cases} 0 & ;x \leq b \\ (b-x)/(b-a) & a \leq x \leq b \\ 1 & ;x \geq a \\ 0 & ;x \leq a \\ (x-a)/(b-a) & ;a \leq x \leq b \\ 0 & ;x \geq a \end{cases} \tag{4}$$

Information:

- a = smallest domain value that has zero membership degree
- b = the smallest domain value that has a membership degree of one
- x = input value to be converted into fuzzy numbers

2.7. Cartesian Diagram

Perceived values and expectations can be mapped into a Cartesian diagram to identify indicators that need to be improved first. In this Cartesian diagram, the perception value is on the axis and the expectation value is in the ordinate. So that there will be coordinate points of the perception and expectation scores. Furthermore, the average of perceptions and the average of expectations will divide the Cartesian diagram into four quadrants [8]:

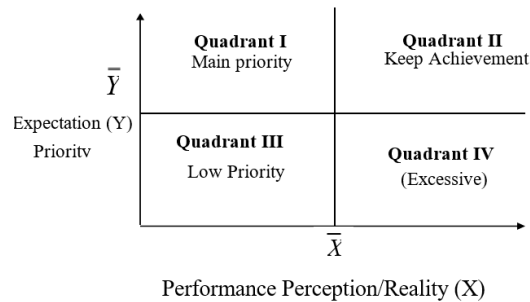


Figure 2. Concept of Cartesian Diagram Perception Score and Expectation Score

2.8. Fuzzification and Defuzzification

Fuzzification is a process that is carried out to change real variables into fuzzy variables, this is intended so that the input fuzzy controller can be mapped to the appropriate type according to fuzzy. Defuzzification is a fuzzification process that produces a Triangular Fuzzy Number (TFN) value [7]. TFN is a fuzzy expressed in the form of intervals that can be used to express human subjective judgments because the arithmetic used is intuitive and is the same as that used in real numbers. The calculation of the fuzzification of the respondent's perception data is carried out using the initial step, which is to find the value for each criterion in the following way:

$$b_i = \frac{x_{i2}n_1 + x_{i3}n_2 + x_{i4}n_3 + \dots + x_{ik}n_k}{n_1 + n_2 + \dots + n_{k-1}} \quad (5)$$

$$a_i = \frac{x_{i1}n_1 + x_{i2}n_2 + x_{i3}n_2 + \dots + a_{ik}n_k}{n_1 + n_2 + \dots + n_k} \quad (6)$$

$$c_i = \frac{x_{i1}n_1 + x_{i1}n_2 + x_{i2}n_3 + \dots + x_{i(k-1)}n_k}{n_1 + n_2 + \dots + n_k} \quad (7)$$

where b_i is the lower limit, a_i is the middle value and c_i is the upper limit. The average values of a_i, b_i, c_i are defuzzification values which are formulated as follows:

$$\text{defuzzification} = \frac{a_i + b_i + c_i}{3} \quad (8)$$

3. Methodology

The procedure in this study is described by a flowchart as shown is Figure 3.

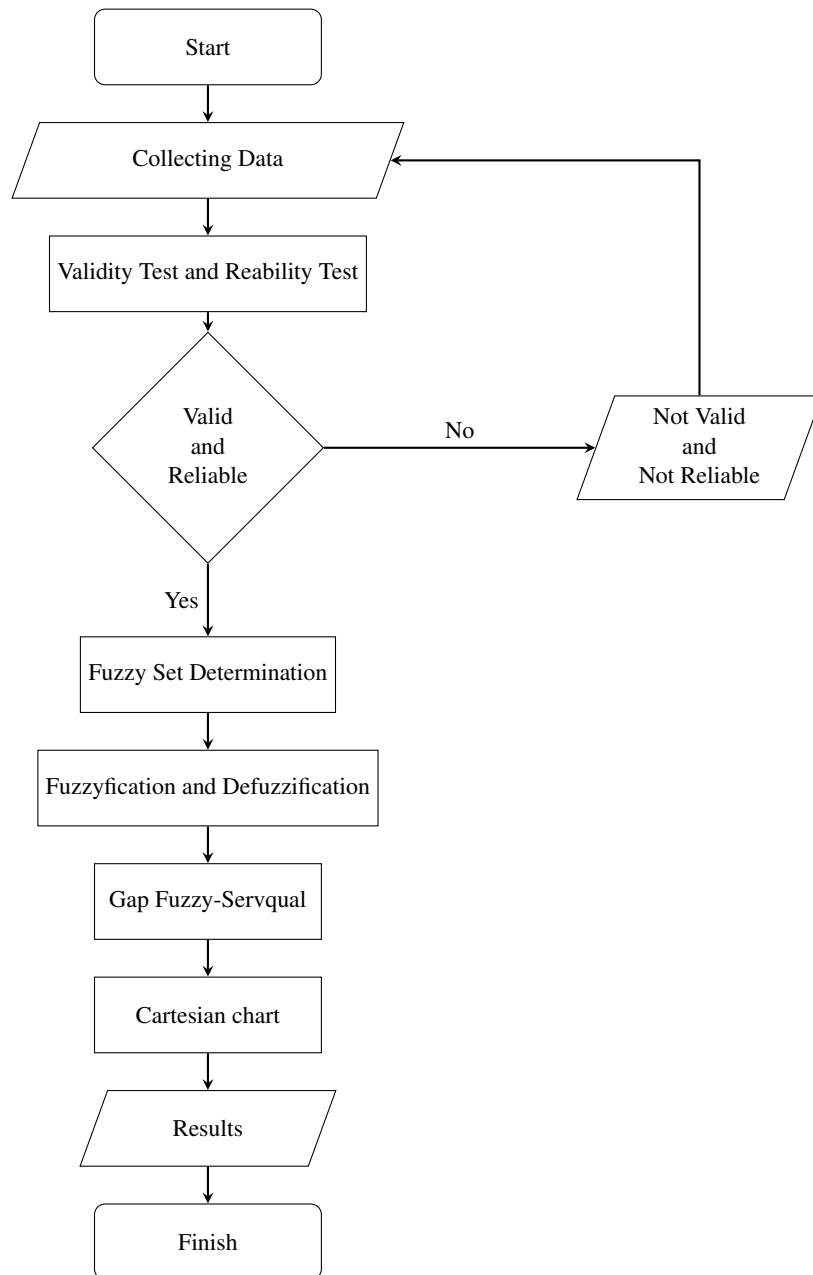


Figure 3. Flowchart

Figure 3 above is an overview of the research methodology. The first step is data collection. The population in this study were students of SMAN 1 Simanindo for the academic year 2020/2021, which were 742 students. Then tested with validity and reliability tests. If it is not valid and reliable, then data retrieval is carried out again. The next stage is the integration of fuzzy service quality. In the integration of Fuzzy service quality there is a gap value of service quality per attribute which is the difference between students' perceptions and expectations. It aims to measure the extent to which the school has provided services in accordance with the wishes of the students, which is then formed into a cartesian diagram.

4. Result and Discussion

4.1. Validity Test

The results of the expected service validity test scores can be seen in the following:

Table 1. Validity test on expected service (Hope)

No	Attribute	r_{count}	r_{table}	Validity
Physical (Tangible)				
1	Cleanliness of Classrooms and school environment.	0.560	0.2072	valid
2	Completeness of Books and Reference Sources in the Library.	0.522	0.2072	valid
3	Availability and completeness of tools and materials lab work.	0.611	0.2072	valid
4	Extracurricular Support Equipment (Rooms, Equipment, Instructors, etc).	0.652	0.2072	valid
5	Fields and equipment that support Sports activities	0.506	0.2072	valid
6	Availability of tools that support learning (LCD, Speaker, etc).	0.624	0.2072	valid
7	Ease of Accessing the Internet.	0.517	0.2072	valid
Reliability				
8	Teachers are able to convey Learning material clearly.	0.675	0.2072	valid
9	The teacher teaches according to a set schedule.	0.675	0.2072	valid
10	The scoring system is given objectively.	0.753	0.2072	valid
11	Produce Qualified Alumni.	0.739	0.2072	valid
Responsiveness				
12	Educators are able to answer student questions accurately and clearly about the learning material.	0.732	0.2072	valid
13	Administration services are carried out quickly and precisely.	0.589	0.2072	valid
14	The attitude of the school in responding and responding to student complaints	0.751	0.2072	valid
Assurance				
15	School Environment Safety	0.764	0.2072	valid
16	Abilities and Skills of Educators and Education	0.741	0.2072	valid
17	Easy to get information about education.	0.694	0.2072	valid
Empathy				
18	Communication between parents, students and the school went well.	0.719	0.2072	valid
19	Educational Personnel (Employees and Staff) serve in a friendly and courteous manner.	0.801	0.2072	valid
20	Friendliness of guidance and counseling teachers.	0.796	0.2072	valid

After getting the validity test variable data on the service received, then the validity test on the service received (Perception) will be carried out in the same way as in the validity test on the expected service (Hope). So that the results of the validity test on the services received are obtained in Table 2.

Table 2. Test the validity of the service received (Perception)

No	Attribute	r_{count}	r_{table}	Validity
Physical (Tangible)				
1	Cleanliness of Classrooms and school environment.	0.415	0.2072	valid
2	Completeness of Books and Reference Sources in the Library.	0.524	0.2072	valid
3	Availability and completeness of tools and materials lab work.	0.468	0.2072	valid
4	Extracurricular Support Equipment (Rooms, Equipment, Instructors, etc).	0.445	0.2072	valid
5	Fields and equipment that support Sports activities	0.616	0.2072	valid
6	Availability of tools that support learning (LCD, Speaker, etc).	0.624	0.2072	valid
7	Ease of Accessing the Internet.	0.416	0.2072	valid
Reliability				
8	Teachers are able to convey Learning material clearly.	0.630	0.2072	valid
9	The teacher teaches according to a set schedule.	0.523	0.2072	valid
10	The scoring system is given objectively.	0.605	0.2072	valid
11	Produce Qualified Alumni.	0.674	0.2072	valid
Responsiveness				
12	Educators are able to answer student questions accurately and clearly about the learning material.	0.527	0.2072	valid
13	Administration services are carried out quickly and precisely.	0.523	0.2072	valid
14	The attitude of the school in responding and responding to student complaints	0.751	0.2072	valid
Assurance				
15	School Environment Safety	0.673	0.2072	valid
16	Abilities and Skills of Educators and Education	0.705	0.2072	valid
17	Easy to get information about education.	0.763	0.2072	valid
Empathy				
18	Communication between parents, students and the school went well.	0.715	0.2072	valid
19	Educational Personnel (Employees and Staff) serve in a friendly and courteous manner.	0.736	0.2072	valid
20	Friendliness of guidance and counseling teachers.	0.785	0.2072	valid

The results of the validity test of 20 question attributes on reality and expectation (perception), all question attributes are declared valid because the r_{count} value of the expectation and reality data is greater than the r_{table} value so that it can be concluded that the value of each attribute has a correlation with the overall question attribute.

4.2. Reliability Test

The results of the data reliability test are as follows:

Table 3. Cronbach’s Alpha Value on Services that hope (hope)

Cronbach’s Alpha	N of Items
0.967	20

Based on the results of the reliability test on student expectations carried out using SPSS 22 software, it can be seen that Cronbach’s Alpha = 0.967 so that the attributes on the patient’s perception are said to be reliable.

Table 4. Cronbach’s Alpha Value on Services that accepted (Perception)

Cronbach’s Alpha	N of Items
0.967	20

Based on the results of the reliability test on the students’ reality which was carried out using SPSS 22 software, it can be seen that Cronbach’s Alpha = 0.941 so that the attribute on the patient’s perception is said to be reliable.

4.3. Processing Fuzzy Service quality

There are three stages in the Triangular Fuzzy Number Theory, namely the determination of fuzzy sets, fuzzyfication, and defuzzification. The processing steps are as follows:

1. Determination of fuzzy set

Linguistic variables are variables that have the value of words/sentences, while those used for the expected service are:

Table 5. Fuzzy system for expected service (Hope)

Speaker Universe	Fuzzy Set Names	Domains	Range	Units
0-100	Very Unimportant(VUI)	[0-25]	0;0;25	People
0-100	Less Important(LI)	[0-50]	0;25;50	People
0-100	Fairly Important(FI)	[0-75]	25;50;75	People
0-100	Important(I)	[50-75]	50;75;100	People
0-100	Very Important(VI)	[75-100]	75;100;100	People

The membership function used for the expected service/interest is shown in Figure 4.

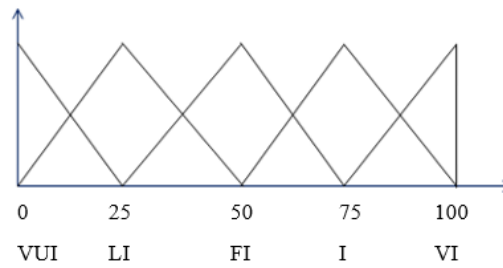


Figure 4. Diagram of the expected service membership function

The linguistic variables used for the service received (reality) are:

Table 6. Fuzzy system for services received (Perception)

Speaker Universe	Fuzzy Set Names	Domains	Range	Units
0-100	Very Dissatisfied	[0-25]	0;0;25	People
0-100	Unsatisfied	[0-50]	0;25;50	People
0-100	Quite Satisfied	[0-75]	25;50;75	People
0-100	Satisfied	[50-75]	50;75;100	People
0-100	Very Satisfied	[75-100]	75;100;100	People

The membership function used for the realit service/interest is shown in Figure 5.

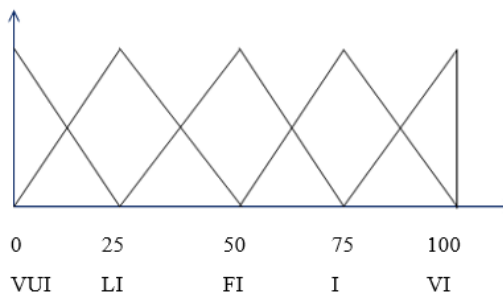


Figure 5. Service membership function diagram received (Perception)

2. Fuzzyfication and Defuzzification

The calculation of the fuzzification of the respondent’s expectation data is carried out using the initial step of finding the value for each criterion with b_{xi} is the lower limit, a_{xi} is the middle value and c_{xi} is the upper limit in the following way:

$$\begin{aligned}
 b_i &= \frac{x_{i2}n_1 + x_{i3}n_2 + x_{i4}n_3 + \dots + x_{ik}n_k}{n_1 + n_2 + \dots + n_{k-1}} \\
 &= \frac{24(3) + 50(0) + 75(10) + 100(27) + 100(50)}{3 + 0 + 10 + 27 + 50} \\
 &= 94.72
 \end{aligned}$$

$$\begin{aligned}
 a_i &= \frac{x_{i1}n_1 + x_{i2}n_2 + x_{i3}n_3 + \dots + a_{ik}n_k}{n_1 + n_2 + \dots + n_k} \\
 &= \frac{0(3) + 25(0) + 50(10) + 75(27) + 100(50)}{3 + 0 + 10 + 27 + 50} \\
 &= 83.61 \\
 c_i &= \frac{x_{i1}n_1 + x_{i2}n_2 + x_{i3}n_3 + \dots + x_{i(k-1)}n_k}{n_1 + n_2 + \dots + n_k} \\
 &= \frac{0(3) + 0(0) + 25(10) + 50(27) + 75(50)}{3 + 0 + 10 + 27 + 50} \\
 &= 59.44
 \end{aligned}$$

Defuzzification of manual calculation of attribute values from the results of the questionnaire recapitulation for the expected service (x_1) are:

$$\begin{aligned}
 \text{Defuzzification} &= \frac{a_{x1} + b_{x1} + c_{x1}}{3} \\
 &= \frac{83.61 + 94.72 + 59.44}{3} \\
 &= 79.26
 \end{aligned}$$

For further calculations calculated using Microsoft Excel. Then the results obtained as in Table 7.

Table 7. Result of Value Recap on Expected Service and Defuzzification

No.	Question Attributes	Fuzzyfication			Defuzzification
		a	b	c	
1	Cleanliness of Classrooms and school environment	83,611	94,722	59,444	79,259
2	Completeness of Books and Reference Resources in Libraries	85,556	97,222	60,556	81,111
3	Availability and completeness of tools and practicum materials in the laboratory.	78,333	92,778	54,167	75,093
4	Extracurricular Support Equipment (Room, Equipment, Supervisor, etc.)	80,556	95,556	55,556	77,222
5	Fields and equipment that supports Sports activities.	80,278	95,278	55,556	77,037
6	Availability of tools that support learning (LCD, Speaker, etc.)	79,444	94,444	55,000	76,296
7	Ease of Accessing the Internet.	79,167	93,056	54,722	75,648
8	The teacher is able to convey the learning material clearly.	88,056	97,500	63,056	82,870
9	The teacher teaches according to a set schedule.	87,778	97,778	62,778	82,778
10	The scoring system is given objectively.	85,833	97,500	60,833	81,389
11	Produce Qualified Alumni	87,778	97,778	62,778	82,778
12	Educators are able to answer students' questions accurately and clearly regarding learning materials.	88,333	98,333	63,333	83,333
13	Administration services are carried out quickly and accurately.	85,833	97,778	60,833	81,481
14	The attitude of the school in responding and responding to student complaints.	86,389	97,500	61,389	81,759
15	School Environment Safety	86,111	96,667	61,111	81,296
16	Abilities and Skills of Educators and Education Personnel	86,389	97,778	61,389	81,852
17	Ease of obtaining information about education.	84,167	95,278	59,167	79,537
18	Communication between parents, students and school is running well.	84,722	97,500	59,722	80,648
19	Education Personnel (Employees and Staff) serve in a friendly and courteous manner.	88,611	97,778	63,611	83,333
20	Friendliness of guidance and counseling teachers.	85,000	95,556	60,556	80,370

The same thing is also done to find the value of fuzzyfication and defuzzification on the services received (Perception). Then the results are obtained in Table 8.

Table 8. Result of Value Recap on Services Received (Perception) and Defuzzification

No.	Question Attributes	Fuzzyfication			Defuzzification
		a	b	c	
1	Classroom and school environment cleanliness	65,000	94,722	40,000	66,574
2	Completeness of Books and Reference Resources in the Library	64,722	97,222	40,278	67,407
3	Availability and completeness of tools and practicum materials in the laboratory.	55,556	92,778	32,222	60,185
4	Extracurricular Support Equipment (Rooms, Equipment , Instructors, etc.)	57,222	95,556	32,778	61,852
5	Fiels and equipment that supports Sports activities.	57,500	95,278	33,611	62,130
6	Availability of tools that support learning (LCD, Speaker, etc.)	68,889	94,444	45,000	69,444
7	Ease of Accessing the Internet.	60,278	93,056	36,389	63,241
8	The teacher is able to convey the learning material clearly.	73,611	97,500	48,611	73,241
9	The teacher teaches according to a set schedule.	76,667	97,778	51,944	75,463
10	The scoring system is given objectively.	78.056	97.500	53.056	76.204
11	Produce Qualified Alumni	66,667	97,778	41,667	68,704
12	Educators are able to answer student questions correctly and clearly regarding learning materials.	72.222	98.333	47,222	72.593
13	Administration services are carried out quickly and precisely.	71.389	97.778	46,389	71.852
14	The attitude of the school in responding and responding to student complaints.	70,833	97,500	46,389	71.574
15	School Environment Safety	73,889	96.667	48,889	73.148
16	Abilities and Skills of Educators and Education Personnel	76,944	97,778	51,944	75,556
17	Ease of obtaining information about education.	73.333	95,278	48,333	72,315
18	Communication between parents, students and the school went well.	72.222	97,500	47,222	72,315
19	Education Personnel (Employees and Staff) serve in a friendly and courteous manner.	76,389	97,778	51,389	75,185
20	Friendliness of guidance and counseling teachers.	77,778	95,556	53,333	75,556

4.4. Calculation of the Service Quality Gap value

The value of the service quality gap is the difference between the value of perception and expectation. It aims to measure the extent to which the library has provided services according to the wishes of students. Gap plays a role in providing evaluation, to how far these attributes provide satisfaction in providing services. For manual calculation, the gap value per attribute is.

$$\begin{aligned}
 \text{Gap} &= \text{Perception} - \text{Hope} \\
 &= 66.574 - 79.259 \\
 &= -12.685
 \end{aligned}$$

The results of the calculation of the gap value for each attribute are as follows:

Table 9. Gap value per attribute

No.	Question Attributes	Defuzzification		Gap	Rank
		Perceptions	Expectations		
1	Cleanliness of Classrooms and school environment	66,574	79,259	- 12,685	6
2	Completeness of Books and Reference Resources in the Library	67,407	81,111	- 13,704	5
3	Availability and completeness of tools and practicum materials in the laboratory.	60,185	75,093	- 14,907	2
4	Extracurricular Support Equipment (Room, Equipment, Instructor, etc.)	61,852	77,222	- 15,370	1
5	Field and equipment that supports Sports activities.	62.130	77.037	- 14,907	2
6	Availability of tools that support learning (LCD, Speaker, etc.)	69,444	76,296	- 6,852	17
7	Ease of Accessing the Internet.	63,241	75,648	- 12,407	7
8	The teacher is able to convey the learning material clearly.	73,241	82,870	- 9,630	11
9	The teacher teaches according to a set schedule.	75,463	82,778	- 7,315	15
10	The scoring system is given objectively.	76.204	81,389	- 5,185	19
11	Produce Qualified Alumni	68,704	82,778	- 14,074	4
12	Educators are able to answer student questions correctly and clearly regarding learning materials.	72.593	83,333	- 10,741	8
13	Administration services are carried out quickly and accurately.	71,852	81,481	- 9,630	10
14	The attitude of the school in responding and responding to student complaints.	71.574	81.759	- 10.185	9
15	School Environment Safety	73.148	81,296	- 8.148	13
16	Abilities and Skills of Educators and Education Personnel	75,556	81,852	- 6,296	18
17	Ease of obtaining information about education.	72,315	79,537	- 7,222	16
18	Communication between parents, students and the school went well.	72,315	80,648	- 8,333	12
19	Education Personnel (Employees and Staff) serve in a friendly and courteous manner.	75,185	83,333	- 8,148	13
20	Friendliness of guidance and counseling teachers.	75,556	80,370	- 4,815	20

The service quality gap value per dimension is the difference between the perception and patient expectations of the 5 dimensions of service quality. It aims to measure the extent to which the school has provided services in accordance with the wishes of its students. The gap per dimension plays a role in evaluating the extent to which these dimensions have provided satisfaction in providing services. The calculation results can be seen in Table 10.

Table 10. Gap value per dimension

Dimension	Expectations	Perceptions	Gaps	Ranking
Tangible	64.40	77.38	-12.98	1
Reliability	73.40	82.45	-9.05	3
Responsiveness	72.01	82.19	-10.19	2
Assurance	73.67	80.90	-7.22	4
Empathy	74.35	81.45	-7.10	5

4.5. Cartesian Diagram

The points on the Cartesian diagram, are generated based on the calculation of the average between perceptions and expectations. The following is a Cartesian diagram of students' perceptions and expectations of the quality of school services is.

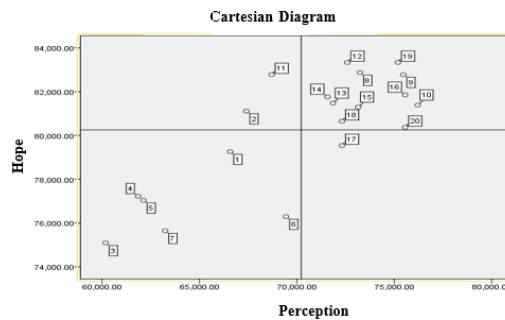


Figure 6. Cartesian Diagram of Perception and Expectation

In the Cartesian diagram of perceptions and expectations, it can be seen that the location of the elements that affect patient satisfaction are divided into four parts. The presentation of the Cartesian diagram can be explained as follows:

1. Quadrant I, shows that this area contains variables that are considered important by respondents, but in fact these variables are not in line with respondents' expectations (the level of satisfaction obtained is still low). The variables that fall into this quadrant must be increased. The question attributes included in quadrant I are attributes (2) and (11)
2. Quadrant II, shows that this area contains variables that are considered by the respondents as being in accordance with what is expected so that the level of satisfaction is relatively higher. The variables that fall into this quadrant must be maintained because it makes the quality of service quite superior in the eyes of the respondents. The question attributes included in quadrant II are attributes (8), (9), (10), (12), (13), (14), (15), (16), (18), (19) and (20)
3. Quadrant III, shows that this region contains variables that have less important influence on respondents and their implementation by companies should be mediocre. The increase in the variables included in this quadrant can be reconsidered because the effect is very small on the respondents. The question attributes included in quadrant III are attributes (1), (3), (4), (5), (6) and (7)
4. Quadrant IV, shows that this area contains variables that are considered less important by respondents but whose implementation is excessive. The question attributes included in quadrant IV are attributes (17).

Based on the previous Figure 6 it was found that the question attributes included in quadrant I, are attributes that require priority handling by the school because the existence of these question attributes is considered important for students, but the implementation is not satisfactory. The

attributes of the question are the completeness of books and reference sources in the library and the school's ability to produce quality alumni.

5. Conclusions

Based on the results of above, it was found from value of the gap per attribute, the attribute that needs to be prioritized by the school for improvement is the completeness of extracurricular support (rooms, equipment, mentors, etc.) which has the highest gap value of -15.37, which indicates that the school has not provided complete extracurricular support in accordance with student expectations. While the lowest gap is the friendliness of guidance and counseling teachers with a value of -4.815 which indicates that the school has provided guidance and counseling services well so that students are satisfied. Based on the value of the gap per dimension, the dimension that has the largest gap value is the dimension that needs to be prioritized by the school for improvement. The dimension that has the largest gap value is the physical dimension (tangible) with a gap value of -12.98. Meanwhile, the lowest gap is found in the empathy dimension with a gap value of -7.10.

The attributes located in quadrant I, are attributes that require priority treatment from the school because the existence of these question attributes is considered important for students but in practice it is not satisfactory. The attributes of the question are the completeness of books and reference sources in the library and the school's ability to produce quality alumni. Fuzzy service quality analysis, it can be seen that the level of service quality of SMAN 1 Simanindo schools as a whole has a negative gap value, so the service is said to be of poor quality and unsatisfactory. This shows that the quality of service provided by the school still needs improvement.

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