Decision Support of System Performance Appraisal of Education Services Using Servqual And Analytical Hierarchy Process Method

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Abstract: The growth of tertiary institutions is overgrowing. The area of West Java and Banten currently stands as many as 465 universities. This condition triggers increasingly fierce competition between universities to get the attention of consumers; in this case, prospective students — the purpose of the study to find criteria and sub-criteria. Moreover, those values obtained in each of the criteria and sub-criteria. Then, it can be used to evaluate the performance evaluation of Education services at FT-UMT. The method used in this study starts from the Scope Definition Determine the criteria and sub-criteria with Servqual, calculates with AHP, determines the number of each sub-criteria excellent, good, average, satisfactory and poor). Servqual and AHP methods used in this study consist of 5 main criteria, such as tangibles, reliability, responsiveness, assurance, and empathy. An average bag value must be obtained if employees have excellent value> = 0.3880, good value> = 0.2491 and value <0388, Average value> = 0.1170 and value <0.2491, Satisfactory value> = 0.0885 and value <0.1170 and Poor value < 0.0885.

1. Introduction

The growth of tertiary institutions is overgrowing. The area of West Java and Banten currently stands as many as 465 universities. This condition triggers increasingly fierce competition between universities to get the attention of consumers, in this case, prospective students. Quality of service is the key to competition between universities. For each university competing with one another in service improvement.

The Muhammadiyah Tangerang University (UMT), as one of the tertiary institutions in Banten, cannot remain silent in dealing with this condition. Quality of service must always improve by going through an evaluation process that carried out continuously. For this reason, UMT established a particular body, the National Quality Assurance Agency (BPMU), which ensured that the service process and quality process within the institution worked effectively. BPMU prepares SPMI, which consists of the quality policy, quality standards, and quality manuals as a guideline for Institutional quality processes.

The Faculty of Engineering in UMT in the academic year 2019-2020 has 5 study programs, namely Informatics Engineering, Mechanical Engineering, Industrial Engineering, Electrical Engineering, and Civil Engineering. From the five study programs, there were 108 permanent lecturers, 160 non-permanent lecturers, and 3961 active students.

If seen from the development of student admissions in the Faculty of Engineering starting from 2009, there were 39 students and in the development of 10 years to 3961. It is extraordinary; this is inseparable from some of the advantages possessed by UMT, including the strategic location in the centre of Education, adequate facilities, various choices of faculties and study programs, professional teaching staff, and affordable Education costs.

With the number of lecturers getting more and more as the number of students also increases, it means that more people believe in the Faculty of Engineering to develop knowledge and knowledge. Therefore, the Faculty of Engineering continuously reminds the quality of employee performance services as well as the facilities used.

The service process is an effort to meet customer expectations, both internal and external customers. Internal customers are processes in internal services such as study program services for lecturers and education staff services for study programs. External customers, in this case, are students and users of graduates. The service process always evaluated so that existing problems in the service sector can minimize so that there is no decline in service by staff or lecturers as well as the quality of facilities and infrastructure provided to students. Because if this happens, it feared the number of students would decrease.

Currently, many studies are using the Servqual and Analytical Hierarchy Process (AHP) methods used for the performance appraisal process. Both methods widely used for agencies engaged in service to consumers. Whereas at the Faculty of Engineering, University of Muhammadiyah Tangerang (FT-UMT) in conducting the performance evaluation process, they still do not use Servqual or AHP or the combination of the two methods.

The purpose of this study to find the criteria and sub-criteria. Those values obtained in each of the criteria and sub-criteria so that it can be used to evaluate the performance evaluation of Education services at FT-UMT.

2. The Review of Previous Literature

The previous literature researched developing decision support systems in performance appraisal using the Analytical Hierarchy Process (AHP) model using five criteria: personal skills, initiative, teaching quality, teaching methods, and research where each criterion has sub-criteria[1]. Meanwhile, it conducted research using a method using the Human Resources Scorecard based on the Analytical Hierarchy Process (AHP) to design an Employee Performance Appraisal System, primarily through the development of the Human Resource Performance Assessment System and the Profile Matching model[2]. The aim of this study was carried out to identify and analyze the need to apply the Employee Based Human Resources Performance Evaluation System models. Besides, another study conducted research using AHP, AHP used because it can make complex problems simpler to speed up the decision making the process by using a hierarchy and comparison of paired values on each criterion [3].

Definition of Analytic Hierarchy Process (AHP) is a measurement theory through pairwise comparisons and relies on the judgment of experts to derive priority scales[4]. These scales measure intangibles in relative terms. The comparisons are created using a scale of absolute judgment that represents how much more, one element dominates another concerning a given attribute.

The process of organizing the performance appraisal [5] divided into several phases of activities that showed in the figure below:
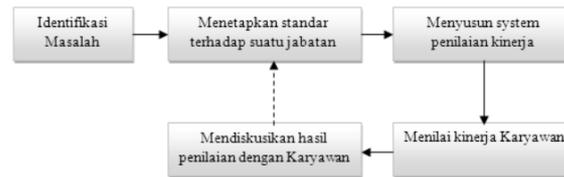
Figure 1. The framework of performance appraisal preparation

The primary objectives of performance evaluations are double: firstly, it is used to reward employees for meeting organizational objectives[6]. Secondly, it is used to identify which objectives are not met and to develop action plans to ensure they achieved in the future. The present paper uses the analytic hierarchy process (AHP) to evaluate employees' performances based on the criteria: quantity/quality of the work, planning/organization, initiative/commitment, teamwork/cooperation, communication, and external factors.

Service quality is a general opinion the client forms regarding its delivery, which is constituted by a series of successful or unsuccessful experiences[7] — Moreover, the Servqual as a criterion for measuring service performance[8]. Initially, Servqual measured ten aspects of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding, or knowing the customer and tangibles. By the early nineties, it was simplified into five aspects or criteria by the acronym RATER: Reliability, Assurance, Tangibles, Empathy, and Responsibility.

Patient safety variables measured by patient indicator, identification, effective communication, drug safety, assurance procedures, the risk of infection, the risk of patient falls — the marketing mix variable measured through indicators. There are the product, price, promotion, place, participant, process, and physical evidence — service quality variable measured through indicators reliability, assurance, tangibles, empathy, responsiveness. The patient satisfaction variable measured through some indicators, such as suitability of hope, fulfilment, and the fulfilment of desires. The patient loyalty variable measured through indicators of repeat purchase, retention, referrals [9].

3. Method

There are several steps undertaken in this study, which described in the flowchart (figure 2).

The first step in this research is Scope Definition, which is communicating with the management of the Faculty of Engineering to discuss how the performance appraisal procedure is, what methods used, what goals expected, what criteria needed.

The second step is determining the criteria and sub-criteria; by using Servqual, the criteria used are tangibles, reliability, responsiveness, assurance, empathy, while each criterion has subcriteria that have adjusted to the management needs of the Faculty of Engineering.

The third step is to create a hierarchy, determine synthesis of priority, measure consistency, calculate consistency index (CI), calculate consistency ratio (CR), check the consistency of the hierarchy. The procedures performed in this step use the Analytical Hierarchy Process (AHP) method.

The fourth step, which is to determine the assessment standards for employees who evaluate by using sub-criteria excellent, good, average, satisfactory, and unsatisfactory. What value must obtain if the employee wants to get an excellent rating and so on?

The fifth step is making conclusions, from this conclusion, obtained several benefits by using this method and making it easy for decision-makers in terms of evaluating the performance of staffing Education services in the UMT Faculty of Engineering.
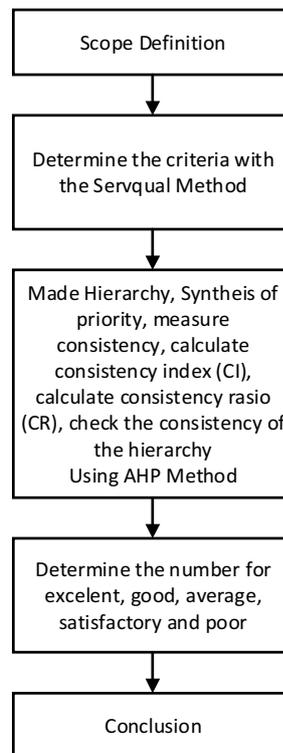
Figure 2. Research Method

4. Results of Data Analysis and Discussion

This research conducted at the Faculty of Engineering, Muhammadiyah Tangerang University; this needs to be done because, when viewed from the number of students since its establishment in 2009 until now, it continues to increase significantly. Figures obtained from the Dikti FORLAP can access through (https://forlap.ristekdikti.go.id/prodi) on September 2019, the number of 2009 students is 39 students and continues to grow so that in 2018 it will 3961 students, so also the number of educators and education continues to grow.

To improve service quality, we need a tool that can be used to evaluate service performance and to do the evaluation using Servqual combined with Analytical Hierarchy Process (AHP).

Stages are carried out by determining the criteria with Servqual, which process by using AHP. The steps taken are as follows:

4.1 Determine Criteria and Subcriteria.
The criteria consist of:
1. Tangibles: Physical appearance, personnel equipment, educational materials
2. Reliability: it is the ability to carry out the promised service accurately and reliably.
3. Responsiveness: it is the ability to help service users and provide fast service.

4. Assurance: Knowledge and courtesy of employees and their ability to gain trust from service users.
5. Empathy: attitude, individual attention given by the company[8].

4.2 Create Hierarchy

What do in this step is to describe the performance appraisal hierarchy and the criteria and sub-criteria used in the evaluation process.
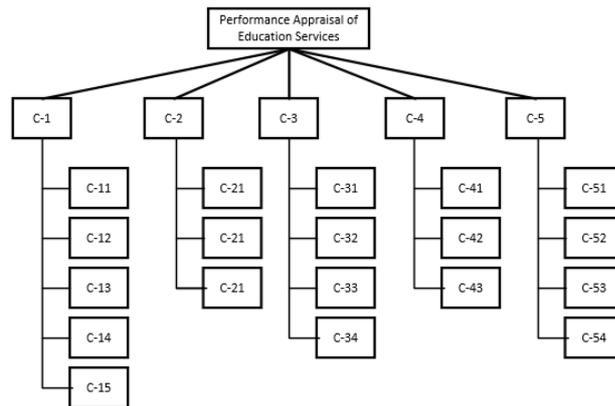

Figure 3. The Hierarchy of the Criteria and Subcriteria of Performance Appraisal Education Services
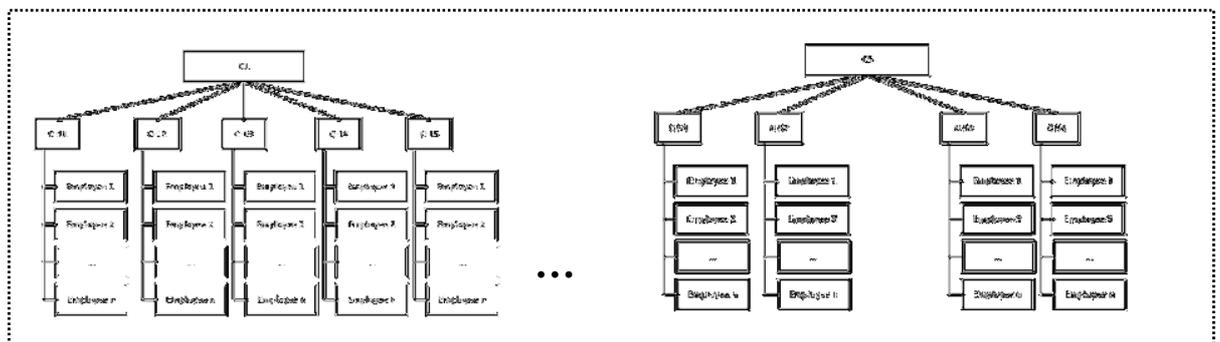
Figure 4. The partial hierarchy consisting of the employees

Table 1. Criteria and subcriteria of the performance appraisal

Criteria	Meaning	Subcriteria
Tangibles (C-1)	Describe physical facilities, equipment, and appearance of personnel and the presence of users	- Physical Facilities - Information System - Communication - Employee Appearance - Service Room
Reliability (C-2)	It refers to the ability to provide the promised service accurately and reliably.	- Discipline - Ability - Consistent
Responsiveness (C-3)	Willingness to help customers and provide proper attention.	- Perceptive - Speed of Service - Easy to Find

Assurance (C-4)	It is a polite and knowledgeable employee who gives a sense of trust and confidence.	-	Knowledge
		-	Politeness
		-	Confidently
Empathy (C-5)	Includes individual care and attention to users	-	Friendly
		-	Interest
		-	Respect
		-	Sensitive

4.3. Determining the Criteria and Subcriteria weights

The weight entered is the result of the discussion of the TEAM Faculty of Engineering, Muhammadiya Tangerang University, by adjusting to the existing conditions, as well as the sub-criteria also being weighted following the reality at the Faculty of Engineering. Value comparison calculation technique using Expert Choice 2000 software.

Table 2. Criteria weights

	Tangibles (C-1)	Reliability (C-2)	Responsiveness (C-3)	Assurance (C-4)	Empathy (C-5)	Weights
Tangible	1	4,0	5,0	6,0	7,0	0,528
Reliability		1	3.0	4.0	6.0	0,239
Responsiveness			1	2.0	3.0	0,109
Assurance				1	4.0	0,084
Empathy					1	0,040
CR = 0,07						

Table 3. Sub criteria – tangibles (C-1)

	Physical Facilities (C-11)	Information System (C-12)	Communication (C-13)	Employee Appearance (C-14)	Service Room (C-15)	Weights
Physical Facilities	1	3,0	5,0	6,0	7,0	0,507
Information System		1	3,0	4,0	5,0	0,253
Communication			1	4,0	3,0	0,115
Employee Appearance				1	3,0	0,081
Service Room					1	0,045
CR = 0,04						

Table 4. Sub criteria – reliability (C-2)

	Discipline (C-21)	Ability (C-22)	Consistent (C-23)	Weights
Discipline	1	4,0	6,0	0,691
Ability		1	3,0	0,218
Consistent			1	0,191
CR = 0,05				

Table 5. Sub criteria – responsiveness (C-3)

	Perceptive (C-31)	Speed of Service (C-32)	Accessible to Fine (C-33)	Weights
Perceptive	1	4,0	6,0	0,691
Speed of Service		1	3,0	0,218
Easy to Fine			1	0,191
CR = 0,05				

Table 6. Sub criteria – assurance (C-4)

	Knowledge (C-41)	Politeness (C-42)	Confidently (C-43)	Weights
Knowledge	1	4,0	5,0	0,683
Politeness		1	2,0	0,200
Confidently			1	0,117
CR = 0,02				

Table 7. Sub Criteria – empathy (C-5)

	Friendly (C-51)	Interest (C-52)	Respect (C-53)	Sensitive (C-54)	Weights
Friendly	1	4,0	5,0	6,0	0,599
Interest		1	2,0	3,0	0,199
Respect			1	3,0	0,135
Sensitive				1	0,067
CR = 0,06					

To be able to conduct employee evaluation, we need another variable, namely excellent (E), good (G), average (A), satisfactory (S) end poor (P). The results of the comparison of the criteria for evaluation sub-criteria are as follows:

Table 8. Intensities

	Excellent	Good	Average	Satisfactory	Poor	Weights
Excellent	1	3,0	5,0	6,0	7,0	0,509
Good		1	3,5	3,0	5,0	0,240
Average			1	2,0	4,0	0,124
Satisfactory				1	3,0	0,084
Poor					1	0,043
CR = 0,05						

4.4. Global weights of the intensities

After each criterion and sub-criteria weighted, the next step is to determine the Global Priority. The steps used to calculate are as follows:

Global Weights = Weights (C-1) x Weights (C-11) x Weights (Excellent)

Table 9. Global Weights of the Intensities

Intensities	C-1					C-2		
	C-11	C-12	C-13	C-14	C-15	C-21	C-22	C-23
Excellent	0.1362	0.0680	0.0309	0.0218	0.0121	0.0841	0.0265	0.0232
Good	0.0642	0.0326	0.0146	0.0103	0.0057	0.0396	0.0125	0.0111
Average	0.0332	0.0075	0.0075	0.0053	0.0029	0.0205	0.0057	0.0057
Satisfactory	0.0225	0.0112	0.0051	0.0036	0.0036	0.0139	0.0044	0.0038
Poor	0.0115	0.0057	0.0026	0.0018	0.0010	0.0071	0.0022	0.0020

Table 10. Global Weights of the Intensities (Continued)

Intensities	C-3			C-4		
	C-31	C-32	C-33	C-41	C-42	C-43
Excellent	0.0383	0.0121	0.0106	0.0292	0.0086	0.0050
Good	0.0181	0.0057	0.0050	0.0138	0.0040	0.0023
Average	0.0093	0.0026	0.0026	0.0071	0.0012	0.0012
Satisfactory	0.0063	0.0020	0.0017	0.0048	0.0014	0.0008
Poor	0.0033	0.0010	0.0009	0.0025	0.0008	0.0004

Table 11. Global Weights of the Intensities (Continued)

Intensities	C-5			
	C-51	C-52	C-53	C-54
Excellent	0.0122	0.0041	0.0027	0.0014
Good	0.0058	0.0019	0.0013	0.0006
Average	0.0030	0.0007	0.0007	0.0003
Satisfactory	0.0020	0.0007	0.0005	0.0002
Poor	0.0010	0.0003	0.0002	0.0001

4.5. Standard values used

This standard serves to determine how much value an employee must get if he wants excellent, good, average, satisfactory, and poor results. This standard can use as a reference for decision making.

Excellent	>= 0,3880
Good	>= 0,2491 dan < 0388
Average	>=0,1170 dan < 0,2491
Satisfactory	>= 0,0885 dan <0,1170
Poor	< 0,0885

5. Conclusion and Implication

From the above discussion, it can conclude that the criteria used are Tangibles, which are denoted by (C-1), Reliability (C-2), Responsiveness (C-3), Assurance (C-4), and Empathy (C-5). Each of these criteria has sub-criteria. It has adjusted to the needs of the Faculty of Engineering, University of Muhammadiyah Tangerang.

The method used in the process of calculating AHP is by creating a hierarchy, then entering the comparison of criteria weights, calculating local criteria, calculating global criteria. From these global criteria, it can use as a reference for the employee appraisal process, with the final result being excellent, good, average, satisfactory, and poor. The value that must be obtained by employees if they want excellent is> = 0.3880, good> = 0.2491 and <0388, Average> = 0.1170 and <0.2491, Satisfactory> = 0.0885 and <0.1170 and Poor <0.0885.

The implications obtained from this study for decision-makers are more accessible, faster, and more precise in the performance evaluating process of employees in the Faculty of Engineering. Easily, quickly, and precisely the information obtained, the time required is much faster when compared with the manual method. The assessment results can be used by decision-makers to provide rewards for those who excel and punishment for those who have low values continuously.

Further research that can do from this research is to develop a web-based decision support system so that it can facilitate the process of evaluation and evaluation, and the information generated can be real-time.

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