

Determining The Quality of Lecturer using Fuzzy Simple Additive Weighting (SAW)

Satria Abadi, Sri Hartati, A. Humaidi

STMIK Pringsewu

Jalan Wisma Rini No. 09 Pringsewu, Lampung

e-mail: satria2601@gmail.com, srihartati7121@yahoo.co.id,

ahmad.khumaidi531@gmail.com

Abstract

This research aims to Determining the quality of lecturer at the private university. Based on in Determining the quality of lecturer, it takes a decision support system with the Multiple Attribute Decission Making (MADM) method. MADM method is the method that can find a best alternative from Several alternatives based on criteria - criteria that have been determined. The point is that the method determines the weight on each criterion. This method uses Fuzzy Simple Additive Weighting (SAW) to perform the calculation method MADM. The best alternative in question is eligible to determining the quality of lecturer based on established criteria. Research done by finding the value of weight for each criterion, and then made the process of ranking that will Determine the optimal alternative. The result in this study are affectively this method Determining the quality of lecturer, and the best lecturer will be Considered by decision makers based on this method.

Keywords : *Fuzzy, MADM, Simple Additive Weighting (SAW)*

1 INTRODUCTION

Human Resources (HRD) is the most important factor in a company or organization, almost all aspects contained in an organization, almost all aspects contained in a company requires the involvement of human resources. Mistakes in handling the HRD will lead to serious problems within the company. Needs improving the quality of human resources is the biggest challenge in the era of globalization which is full of competition. In line with the development of quality human resources as Teachers power is preferred, so that the lecturer who will need to be selected based on the ability and the quality is there. Determination of the quality of faculty in each college currently varies and is very competitive to know the quality of the lecturers, the criteria generally used for the assessment is from the last school attended, and the index value perestasi cumulative, it allows'll get lecturers only academically excellent but the lecturer is not capable of transferring knowlage he has so competencies expected of students is not reached, for the researchers mancoba develop the criteria of assessment of

the quality of lecturers private where lecturers are expected to have a higher education, have good value, integrity appropriate and ultimately capable of transferring knowledge that owned to students.

The criteria for determining faculty quality that exists today in which : 1) Index Performance Lecturer, 2) the latest education, 3) Teaching, and 4) personality, but the criteria are apparently not able to represent the quality of the lecturers there. The determination of the quality of lecturers is still possible to assess the relative subjective, so in the end have not been able to determine with certainty the quality of lecturers. Thus, to determine the quality of the lecturers are objectively necessary the determination of the quality criteria of lecturers capable of being used as a measurement to determine the quality of lecturers or as a reference, which in turn is able to produce quality graduates.

In recent years, the development of problem-solving techniques with soft computing which uses an innovative approach to building highly developed computational intelligent systems. In contrast to conventional hard computing, soft computing utilizing tolerance for inaccuracy, uncertainty, and partial trust to achieve tractability (ease of control) robustness, low cost solution, and a better relationship with reality [1]. Terdapat fundamental differences of both the conventional hard computing "thinking time" to get a solution that optimal. One of solution to the problem is to use a soft computing techniques Fuzzy Multiple Attribute Decision Making.

To determine which professors who have the best kualitas, using criteria that is able to represent the quality of the lecturers will require methods Multiple Attribute Decision Making (MADM). MADM which is a method used to find the optimal alternative of a number of alternatives to certain criteria. The essence of MADM is determining the weight value for each attribute, and then continue with the process selection alternatives already given [2] and the researchers will be using FSAW (Fuzzy Simple Additive Waighting) which form part of a method of MADM used to manyeleksi weighting of the criteria of which has determined that the value of the weight is then made to rank.

From the description on the background it can be a formulation of the problem can be resolved, namely What criteria are used in determining the performance of lecturers, and how to rank qualified faculty using FSAW (Fuzzy Simple Additive Fuzzy Waighting).

This study was designed to investigate and me s i stem measuring performance (quality) on lecturers using the concept MADM using Fuzzy SAW method approach, a case study in this research is University X. Questions on this research in the have three parts: 1) How to design and sub criteria of measuring the performance criteria of the faculty?, 2) How big the weigting for each criteria of and sub criteria of, so that in can be a priority of each kariteria and sub criteria of?, and 3) How evaluation of performance measurement models that have been customized priority level are sorted from the most important to lowest for each perspective?

1.1 Decision Support Systems (DSS)

DSS as a computer-based system that helps in the decision making process. DSS as a computer-based information system that is adaptive, interactive, flexible, specifically developed to support the solution of unstructured permasalahan management to improve the quality of decision making. Thus it can be a definition of DSS is a computer-based system that is adaptive, flexible, interactive and used to solve unstructured problems thereby increasing the

value of the decisions taken [3].

According to Mat and Watson, Decision Support System (DSS) is an interactive system that helps decision making through the use of data and decision models to solve problems that are semi-structured and unstructured. Meanwhile, according to Moore and Chang, DSS is a system that can be developed, capable of supporting data analysis and decision modeling, future-oriented planning, and can not be planned intervals (period) of time of use [4]. Bonezek, Hosapple and Whinston defines DSS as a computer-based system that consists of three components that interact with each other [5]: 1) Language system, is a mechanism to bridge (interface) users and other components, 2) Knowledge system, is a repository of knowledge related to specific issues in the form of data and procedures, and 3) Problem processing system, is a second connecting other components, contains one or more manipulation capabilities or provide a general problem, which is required in decision making.

Turban, in his book Decision support system and Intelligent System, Decision Support System applications can be composed by the following subsystems [2]:

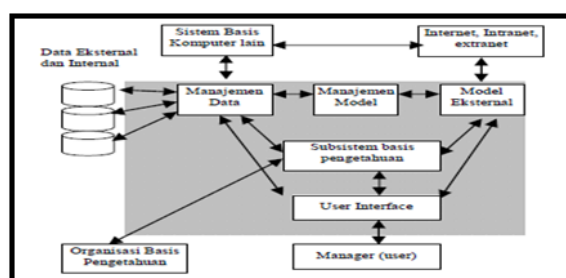


Figure 1: DSS Components

1.2 Fuzzy Multi-Attribute Decision Making (FMADM)

Fuzzy Multiple Attribute Decision Making is a method used to find the optimal alternative of a number of alternatives to certain criteria. The essence of FMADM is determining weights for each attribute value, then proceed with the ranking process that will select an alternative that has been given. Basically, there are three approaches to find the value weights of attributes, namely subjective approach, objective approach and an integrated approach between subjectively and objectively. Each approach has its advantages and disadvantages. In the subjective approach, the weight value is determined based on par subjectivity of decision-makers, so that some of the factors in the ranking process can be determined freely alternative. While on an objective approach, the weight value is calculated mathematically so that ignores the subjectivity of decision-makers [6].

2 RESEARCH METHODOLOGY

2.1 Research Design

This design research that describes a path or steps undertaken by researchers in conducting research from beginning to end.

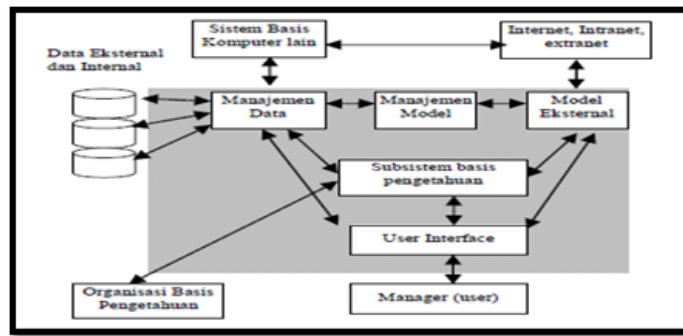


Figure 2: Research Design

2.2 Population

Population in this study is active students and staff in University X which consist from two programs, there Department Information Systems and Computer and Departmen Management Information and Computer. In The study authors take samples taken at random (Random sampling) as measure to determine samples according to [6] a large se 100 respondents or more could taken 10% - 15% or 20% -25%.

3 RESULTS AND DISCUSSIONS

Here are the criteria needed for decision-making, based on the requirements of quality faculty in general. Criteria obtained from a questionnaire given to respondents, the lecturer University X in determining the criteria used in determining the fuzzy method. As for the criteria of predetermined namely Index Performance Lecturer (C1), work Ilmia Lecturer (C2), Social Service (C3), competence Lecturer (C4). From the criteria of these, then created a level of importance criteria of based on the weight of predetermined into fuzzy.rating numbers match any alternatives at every criteria of the following: 1) Very low (sr) = 0, 2) Low (r) = 0.2, 3) Medium (s) = 0.4, 4) Central (t1) = 0.6, 5) High (t2) = 0.8, and 6) Very high (st) = 1. The weight value is made in a graph so more clearly as below.

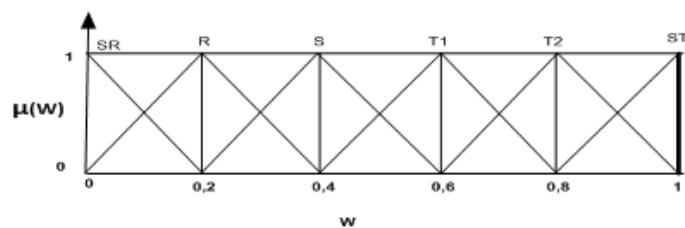


Figure 3: Graph Weight

From this research obtained molded decision matrix X that has been converted with fuzzy numbers, as follows

Table 1: Converted fuzzy numbers

Alternative	Criteria of			
	C1	C2	C3	C4
A1	0:50	0.75	1	0:50
A2	0:25	0:25	0.75	0:25
A3	0.75	0:25	0:50	1

Providing decision-making weight, based on the level of importance of each criteria of the required as follows:

Vector Weight : $W = [0.4, 0.8, 0.6, 1 : 00]$

Make a decision matrix X, made from a match the following table:

$$X = \begin{pmatrix} 0.50 & 0.75 & 1 & 0.5 \\ 0.25 & 0.25 & 0.75 & 0.25 \\ 0.75 & 0.25 & 0.50 & 1 \end{pmatrix}$$

make the normalization matrix R, which is obtained from the decision matrix X with the following results:

$$X = \begin{pmatrix} 1 & 0.33 & 1 & 0.5 \\ 0.33 & 1 & 0.75 & 1 \\ 1 & 1 & 0.5 & 0.25 \end{pmatrix}$$

Next will be made of matrix multiplication $W * R$ and summing the results of multiplication to get the best alternative ranking of the greatest value.

Of matrix multiplication $W * R$ then get the results as follow : $V_1 = 1.6056$, $V_2 = 2.382$, $V_3 = 1.75$, the largest value of the sum matrix above is V_2 , thus the alternative A 2 (Lecturer 2) is lecturer good-quality.

4 CONCLUSIONS

Making the Decision Support System to perform calculations as the data selectors lecturer with the results of the assessment has successfully built. Systems that have made reference to the formulation of the problem that exists is how the criteria used in determining the quality of faculty, and how perangkingan quality of lecturers using FMADM (Fuzzy Multiple Attribute Decision Making) and method of SAW (Simple Additive Waighting) in college University "X". Some of the conclusions that can be described as follows:

1. The system is intended to assist the user in data processing lecturer, to determine the lecturers are very good (quality), good (quality) or unfavorable (quality)
2. The calculation of the system to perform screening using SAW (Simple Additive weight-ing).
3. Stages of system development process in this research is the identification of problems, systems analysis, design, testing and implementation.

4. The result of the calculation system membobotkan all of the criteria of the existing value so that the value to be obtained in intervalkan, whether its value shellfish, good, very good.
5. The system built only as a tool to provide information to the user or the leadership of a high peerguruan as consideration in making a decision whether the professor could teach for the next period.

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