Bit-Tech

Vol.1, No.2, December 2018
Available online at: http://jurnal.kdi.or.id/index.php/bt

Evaluation of Lecturer Teaching Performance Using AHP and SAW Methods

Benny Daniawan

Buddhi Dharma University
Jl. Imam Bonjol No. 41 Karawaci Ilir, Tangerang, Indonesia
b3n2y.miracle@gmail.com

Article history:

Received 3 December 2018;
Revised 4 December 2018;
Accepted 5 December 2018;
Available online 19 December 2018

Keywords:

Evaluation of Lecturer
Teaching Performance
MCDM
AHP
SAW

Abstract

The lecturer performance evaluation activity is the routine of an university in continuously improving internal quality as an evaluation and development of educational institutions. Buddhi Dharma University Tangerang, every semester evaluates lecturers' performance. But the results obtained are not optimal, this is due to the absence of an effective and efficient method in determining the results, especially in the Faculty of Science and Technology, Information System Departement. The assessment process is carried out by distributing questionnaire papers and filled out by students. This study aims to analyze the results of the questionnaire, calculated by combining the Analytical Hierarchy Process (AHP) method for weighting and combined the Simple Addictive Weighting (SAW) method for ranking. The results obtained were the level of criteria weighting accuracy reached 90.39% with 28 lecturers which teaching 47 subjects in the Information Systems Departement.

I. INTRODUCTION

Quality education and the increasing number of students at the Buddhi Dharma University in Tangerang, is a challenge for academics to provide more optimal services by facilitating students to achieve an optimal learning outcome. Lecturers as professional educators and scientists with the main task of transforming, developing, and disseminating Science, technology and art, through education, research, and dedication to community [1].

The activeness of lecturers and students is the main key to the success of teaching and learning process. A lecturer successful in the teaching and learning process, if the performance value obtained is good [2]. The quality of lecturers it's an important role in a university that wants to produce quality graduates [3].

Lecturers are considered good if they have good performance values and are reviewed from several aspects. For this reason, it is very necessary to do an analysis to determine the performance value of lecturers. The lecturer performance evaluation system is one of the benchmarks in knowing the results of the lecturers' performance while teaching in one semester. The performance results of each lecturer will be discussed in a management meeting to be assessed and taken action. The assessment process that is currently running uses a questionnaire filled in manually for assessment [4], and is distributed to each student when going to conduct the Final Semester Exam. The results of filling out the questionnaire, that will be collected by the officer and given to academic staff, staff will immediately input the results of the questionnaire into the system.

The management must be more careful in making decisions because the final results of questionnaire recap are used as a reference. For this reason, we need a calculation method that can measure the results of a questionnaire calculation based on the main criteria that have an influence on performance appraisal, while also being able to assist in decision making for management. One of the decision making methods that can be used is the AHP method [5]. This method is a framework for making decisions by arranging into a hierarchy so that we can weight the 10 assessment criteria in the questionnaire and use the SAW method to rank 28 lecturers teaching 47 subjects in the Information Systems Departement [6].

ISSN 2622-2728 (online) 2622-271X (print)
doi: https://doi.org/10.32877/bt.v1i2.41

II. METHODS

Multi Criteria Decision Making (MCDM) provides strong decisions in domains where the best alternative selection is very complex. In MCDM decision making has been applied in many domains. This method helps choose the best alternative from many criteria that can be obtained by analyzing the scope of the criteria, weighting criteria, and choosing the optimal results using multi criteria decision making techniques [7].

Multi Criteria Decision Making relates to structure and solving decision problems, with involves many criteria to support decision making on the best solution. This is consistent with choosing the "best" alternative from an alternative set.

Analytical Hierarchy Process (AHP) method was developed by Thomas L. Saaty. AHP method is one of several methods that can be used in decision making systems by taking into account factors of perception, preference, experience and intuition. AHP combines personal judgments and values into one logical way. AHP can solve complex multicriteria problems into a hierarchy [8].

According to Saaty, hierarchy is defined as a representation of a complex problem in a multi-level structure where the first level is a goal, followed by a factor level, criteria, sub criteria, and the last level of the alternative. With hierarchy, a complex problem can be broken down into groups which are then organized into a hierarchical form, so that the problems will appear more structured and systematic.

Table I: Saaty Scale of Pairwise Comparisons [5]

The Fundamental Scale for Pairwise Comparisons		
Intensity of Importance	**Definition**	**Explanation**
1	Equal importance	Two elements contribute equally to the objective
3	Moderate importance	Experience and judgment moderately favor one element over another
5	Strong importance	Experience and judgment strongly favor one element over another
7	Very strong importance	One element is favored very strongly over another; its dominance is demonstrated in practice
9	Extreme importance	The evidence favoring one element over another is of the highest possible order of affirmation
Intensities of 2, 4, 6, and 8 can be used to express intermediate values. Intensities of 1.1, 1.2, 1.3, etc. can be used for elements that are very close in importance.		

Steps for AHP method are as follows:

Step 1: A represents n x n Matrix pairwise comparison

$$A = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ a_{21} & 1 & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{n1} & a_{n2} & \dots & 1 \end{bmatrix} \qquad (1)$$

Step 2: Normalize the raw score by Geometric mean as given below:

$r_{ij} = \sqrt[j]{(\boldsymbol{ai1})(\boldsymbol{ai2}) \dots \dots (\boldsymbol{aij})}$ i, j =1,2, …n

$$r = \begin{pmatrix} r1 \\ r2 \\ . \\ . \\ rn \end{pmatrix} \qquad (2)$$

Step 3: Calculate *Priority Vector* or *Eigen Value* dan *Row Matrix*

P.V $= r_{ij} / \Sigma r_{ij}$

Row Matrix $= \sum_{j=1}^{n} \boldsymbol{aij} * \boldsymbol{PVj1}$ (3)

Step 4: Divided all the elements of the *Row Matrix* by their respective *Priority Vector* element to get Consistency Vector.

C.V = *Row Matrix* / *P.V*

Step 5: To avoid inconsistency in the pair wise comparison matrix, Saaty suggested the use of the maximum *Priority Vector* or *Eigen Value* ג max to calculate the effectiveness of judgement. The maximum *Priority Vector or Eigen Value* ג max can be determined as follows:

ג max = Σ C.V / n (4)

Step 6: Estimate Index Consistency
C.I = (ג max – n) / (n -1) (5)

Step 7: Calculate Consistency Ratio (C.R) based on the R.I table. Shown in table 2.
C.R = C.I / R.I (6)
For consistent value, it must: $0 \leq C.R \leq 0.1$

Table II: Random Index

n	1	2	3	4	5	6	7	8
R.I	0	0	0.58	0.9	1.12	1.24	1.32	1.41

n	9	10	11	12	13	14	15
R.I	1.45	1.49	1.51	1.48	1,56	1,57	1,59

Simple Additive Weighting (SAW) method is known as a combination of Linear Weighting or the simplest Scoring technique and is often used as one of the **Multi Criteria Decision Making** (MCDM). The scoring score is calculated based on each alternative by multiplying the value with the weight which determined by the Decision Maker.

Steps for SAW Method are as follows:
Step 1: Looking for the Benefit (+) and Cost (-) value from the criteria
Step 2: Construct a decision matrix (m x n) includes m Alternative and n Criteria. Calculate the normalize decision matrix for benefit:

$r_{ij} = \frac{aij}{\text{Max } aij}$ a = matrix value i= alternative and j= criteria where i, j =1,2, …n (7)

Calculate the normalize decision matrix for cost:

$r_{ij} = \frac{\text{Min aij}}{\text{aij}}$ a = matrix value i= alternative and j= criteria where i, j =1,2, …n (8)

Step 3: evaluate each alternative by Calculate Preference Value (Vi)

$Vi = \sum_{j=1}^{n} Wj * rij$ Wj = Weighted Criteria from AHP and rij = Normalize Decision Matrix (9)

Where rij is the score of the i alternative, Wj is the weighted criteria [9]. With combine two types of methods, it's designed to select the best lecturers in University. The way of the data collection that is by questionnaire and using AHP Comparison Matrix the priority vector or weights of criteria will be computed. After computing weights of criteria, specifying of Consistency Rate will be executed. Consistency of the data is $0 \leq C.R \leq 0.1$, if more than 0.1, the pairwise comparison needs revision. After the data it indicates sufficient consistency, we will use SAW method for ranking personnel.

III. RESULTS AND DISCUSSION

In this study the data used is obtained from student questionnaires. The data taken in the form of an assessment Index from 10 indicators of the teaching learning process that is [3]:

E1) Accuracy of time in teaching and effectiveness in a delivery content
E2) Clarity in a delivery of content and giving examples
E3) Motivate students and encourage participation in the classroom for discussion
E4) Openness in the assessment tasks and exams
E5) Openness in assisting the provision of information to learn
E6) The suitability content with the guidelines of teaching
E7) Utilize another tool like projectors etc
E8) The suitability of content with exam.
E9) Updates and the relevance of content under current conditions
E10) Overall assessment

The parameters of the questionnaire filled out by the students were:

A (Very Good) = 4 B (Good) = 3
C (Enough) = 2 D (Bad) = 1

The accumulated value will show a Lecturer Achievement Index value. By using ten criteria as above, the university wants to rank twenty seven lecturers who have been assessed from fourty seven class and each class has ten to thirty five students. The weights or Priority Vector of criteria is calculated with Comparison Matrix [10], data was gathered from one expert opinion with questionnaire. It shown in Table III indicating the relation of criteria, and Table IV shown the calculate of Row Matrix.

Table III. Priority Vector of Criteria by Pairwise Comparison matrix

Criteria	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	P.V
E1	1	1	1	1	3	0.33333	3	0.33333	1	0.33333	0.0872
E2	1	1	1	1	1	1	3	3	1	1	0.1086
E3	1	1	1	1	1	0.33333	5	3	0.33333	1	0.0962
E4	1	1	1	1	1	0.33333	3	3	0.33333	1	0.0895
E5	0.33333	1	1	1	1	0.33333	3	3	0.33333	0.33333	0.0758
E6	3	1	3	3	3	1	3	1	1	1	0.1552
E7	0.33333	0.33333	0.2	0.33333	0.33333	0.33333	1	0.33333	0.33333	0.33333	0.0316
E8	3	0.33333	0.33333	0.33333	0.33333	1	3	1	1	0.33333	0.0801
E9	1	1	3	3	3	1	3	1	1	1	0.1416
E10	3	1	1	1	3	1	3	3	1	1	0.1342
Total	**14.6667**	**8.6667**	**12.5333**	**12.6667**	**16.6667**	**6.6667**	**30.0000**	**18.6667**	**7.3333**	**7.3333**	1.0000

Table IV. Calculate Row Matrix

Criteria	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10		P.V		Row Matrix
E1	1	1	1	1	3	0.33333	3	0.33333	1	0.33333		0.0872		0.9684
E2	1	1	1	1	1	1	3	3	1	1		0.1086		1.2234
E3	1	1	1	1	1	0.33333	5	3	0.33333	1		0.0962		1.0886
E4	1	1	1	1	1	0.33333	3	3	0.33333	1		0.0895		1.0255
E5	0.33333	1	1	1	1	0.33333	3	3	0.33333	0.33333	×	0.0758	=	0.8779
E6	3	1	3	3	3	1	3	1	1	1		0.1552		1.7605
E7	0.33333	0.33333	0.2	0.33333	0.33333	0.33333	1	0.33333	0.33333	0.33333		0.0316		0.3416
E8	3	0.33333	0.33333	0.33333	0.33333	1	3	1	1	0.33333		0.0801		0.9013
E9	1	1	3	3	3	1	3	1	1	1		0.1416		1.5861
E10	3	1	1	1	3	1	3	3	1	1		0.1342		1.5495

We will get Consistency Vector by divided Row Matrix with Priority Matrix. It shown in Table V.

Table V. Calculate Consistency Vector

Row Matrix		P.V		C.V
0.9684		0.0872		11.1060
1.2234		0.1086		11.2676
1.0886		0.0962		11.3217
1.0255		0.0895		11.4599
0.8779	/	0.0758	=	11.5742
1.7605		0.1552		11.3401
0.3416		0.0316		10.8236
0.9013		0.0801		11.2482
1.5861		0.1416		11.2005
1.5495		0.1342		11.5450

$$\lambda \text{ Max} = \frac{11.1060 + 11.2676 + 11.3217 + 11.4599 + 11.5742 + 11.3401 + 10.8236 + 11.2482 + 11.2005 + 11.5450}{10} = 11.2887$$

$$\text{C.I} = \frac{11.2887 - 10}{10 - 1} = 0.1432$$

$$\text{R.I (10)} = 1.49$$

$$\text{C.R} = \frac{0.1432}{1.49} = 0.0961 \text{ (Consistent)}$$

The Consistency Rate calculated was 0.0961 that is less than 0.1, indicating sufficient consistency [11]. Fig. 3 shows the developed hierarchical structure of the problem in which the first level has the goal of selecting the best lecturer performance evaluation in teaching learning. The second level consist of ten criteria. And the last level of the hierarchy comprises of the alternatives.

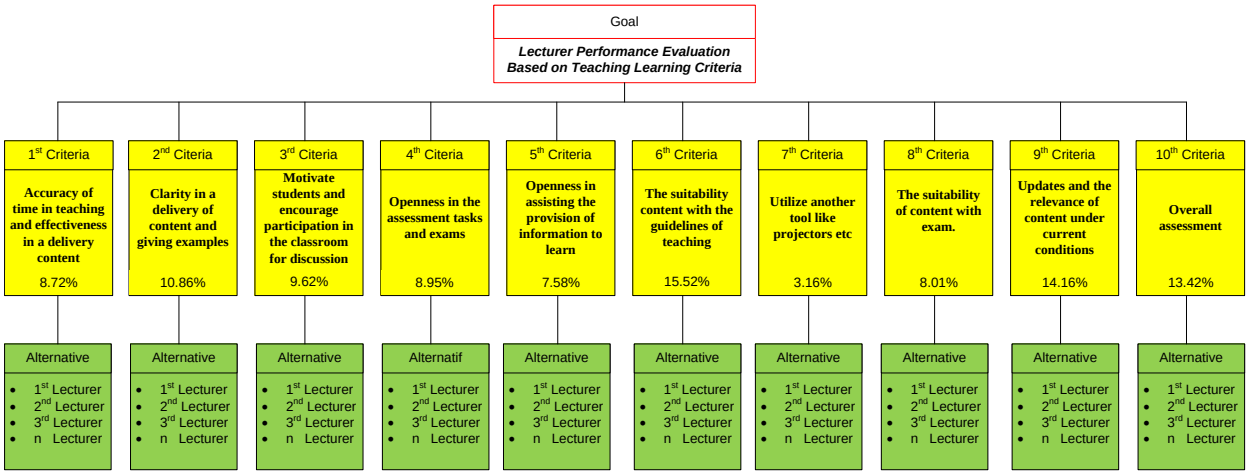

Fig. 3 Hierarchy structure of lecturer performance evaluation

Based on scale values 1-4 from the students, we have calculate the average value from each alternative by initial, it shown in table VI. After computing priority vector of criteria in Table III, we will show procedure of SAW method:

Table VI. Collected Data based on scale 1-4

No	Courses	Alternative	Criteria									
			E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
1	Database Management System	A.B	3.21	2.86	2.86	3.14	3.12	3.00	3.14	3.14	2.86	3.00
2	Entrepreneurship and Motivation	A.L	3.43	3.64	3.68	3.32	3.43	3.50	3.57	3.54	3.54	3.57
3	Database Management System	Alb	3.29	2.81	3.06	2.97	2.97	2.97	3.06	2.90	2.94	2.97
4	Human Computer Interaction	A.H	3.15	3.00	3.08	3.00	2.92	3.08	3.08	2.85	3.00	3.00
5	English Language 2	A.P	3.77	3.85	3.54	3.62	3.77	3.62	3.46	3.69	3.62	3.85
6	English Language 4	A.P	3.50	3.50	3.50	3.60	3.40	3.40	3.20	3.50	3.30	3.40
7	Strategic Information System	And	2.77	2.88	3.00	2.92	2.88	2.92	2.96	2.96	3.04	2.92
8	E-Business	And	3.11	3.11	2.89	2.89	3.00	3.22	3.22	3.11	3.00	3.11
9	TroubleShooting	Ams	3.58	3.62	3.54	3.54	3.58	3.58	3.58	3.54	3.58	3.50
10	Mandarin Language	B.D	3.12	3.00	2.84	3.08	3.00	3.16	3.24	3.16	3.04	3.12
11	Management Information Systems	D.W	2.81	3.00	2.96	3.15	3.07	3.11	3.26	3.11	3.07	3.11
12	Entrepreneurship and Motivation	D.L	3.25	3.19	3.56	2.88	3.25	3.31	3.44	3.13	3.13	3.38
13	Management	D.L	3.53	3.40	3.47	3.47	3.20	3.40	3.33	3.33	3.47	3.40
14	Entrepreneurship and Motivation	D.L	3.44	3.53	3.47	3.38	3.44	3.50	3.50	3.31	3.47	3.50
15	Object Oriented Programming	D.S	3.56	3.44	3.50	3.44	3.56	3.50	3.63	3.38	3.50	3.44
16	Lab. Object Oriented Programming	D.S	3.59	3.47	3.47	3.47	3.47	3.53	3.59	3.35	3.47	3.35
17	Web Programming	D.S	3.26	3.09	2.91	3.13	3.00	3.30	3.48	3.17	2.96	3.22
18	Lab. Web Programming	D.S	3.21	3.00	3.05	3.00	3.16	3.16	3.32	3.16	3.16	3.21
19	Network Security	D.S	3.10	3.06	2.77	2.87	2.94	3.03	3.03	2.90	3.00	3.03
20	IT Budgetting	Ed	3.50	3.50	3.50	3.50	3.50	3.50	3.75	3.50	3.50	3.50
21	English Language 1	H.M	3.70	3.65	3.70	3.65	3.65	3.65	3.48	3.61	3.65	3.57
22	Data warehouse & Data Mining	H.W	3.29	3.14	3.14	3.29	3.00	3.14	3.14	3.00	3.00	3.29
23	Web Programming	Hen	2.94	2.78	2.67	2.67	2.61	2.72	2.89	2.83	2.72	2.83
24	Manajemen Information Systems	K.W	3.11	2.67	2.94	2.72	2.72	2.86	3.11	2.86	2.89	2.78
25	Programming	P.Y.C	3.18	3.09	2.77	2.86	2.77	3.09	3.14	3.18	2.91	3.09
26	Lab. Programming	P.Y.C	3.39	3.22	3.05	3.07	2.93	3.46	3.39	3.37	3.15	3.29
27	Research Information Technology	R.A	3.49	3.56	3.49	3.44	3.44	3.56	3.56	3.56	3.49	3.51
28	Management Information Systems	R.A	3.71	3.79	3.71	3.71	3.58	3.67	3.71	3.79	3.63	3.75
29	Leadership	R.A	3.60	3.60	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
30	Mandarin Language	R.A	3.61	3.61	3.43	3.61	3.70	3.57	3.52	3.70	3.61	3.74
31	Business Process and Informations	Rin	3.15	3.38	3.08	3.08	3.31	3.46	3.23	3.23	3.31	3.31
32	Human Computer Interaction	Rin	3.50	3.10	3.10	3.30	3.20	3.30	3.40	3.40	3.40	3.40
33	Business Introduction	Rin	3.47	3.47	3.20	3.27	3.27	3.33	3.33	3.33	3.33	3.40
34	English Language 2	R.P	3.17	3.02	2.98	3.00	3.26	3.19	2.94	3.07	3.09	3.07
35	English Language 4	R.P	3.26	3.45	3.32	3.42	3.42	3.39	3.19	3.55	3.39	3.45
36	Business Process and Informations	Rik	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89
37	E-Commerce	Rik	3.20	3.00	2.80	3.40	3.00	3.20	3.00	3.20	3.20	3.00
38	Leadership	S.W	3.43	3.38	3.43	3.29	3.29	3.38	3.38	3.24	3.52	3.19
39	Project Management	S.K	3.04	2.91	2.88	2.91	2.91	2.96	3.00	2.93	2.89	2.89
40	TroubleShooting	Sud	3.75	4.00	3.50	3.50	3.75	4.00	4.00	4.00	3.75	3.75
41	Web Programming	S.A	3.40	3.20	3.00	3.00	3.20	2.80	3.20	2.60	2.80	3.00
42	Lab. Programming	S.A	3.47	3.20	3.33	3.20	3.40	3.20	3.27	3.27	3.20	3.27
43	Web Programming	S.A.P	3.18	3.18	3.24	3.41	3.00	3.06	3.29	3.06	3.29	3.06
44	Lab. Web Programming	S.A.P	3.39	3.34	3.22	3.44	3.28	3.33	3.33	3.33	3.39	3.33
45	System Information Audit	T.S	2.92	3.00	2.88	3.04	2.92	2.92	3.00	3.00	2.96	3.04
46	Data Structure	T.S	2.68	2.68	2.77	2.82	2.73	2.77	2.86	2.68	2.77	2.64
47	Network Security	Y.C.G	3.44	3.26	3.48	3.37	3.52	3.44	3.52	3.26	3.41	3.44

Table VII. The Weighted Criteria

E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
0.0872	0.1086	0.0962	0.0895	0.0758	0.1552	0.0316	0.0801	0.1416	0.1342

Calculate the normalized decision matrix for benefit criteria:

$$r_{ij} = \frac{aij}{\text{Max } aij} \qquad i=1,\ldots.47 \quad j=1,\ldots.10 \qquad (10)$$

and for cost criteria:

$r_{ij} = \frac{\text{Min aij}}{\text{aij}}$ i=1,….47 j=1,….10 (11)

In this case of study, benefit criteria is E1, E2, E3, E5, E6, E7, E9, and E10, others is Cost criteria. The result as shown in Table VIII.

Table VIII. The Normalize Decision Matrix

Alternative	Criteria									
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
A.B	0.8252	0.7150	0.7352	0.8503	0.8021	0.7500	0.7850	0.8280	0.7352	0.7712
A.L	0.8817	0.9100	0.9460	0.8042	0.8817	0.8750	0.8925	0.7345	0.9100	0.9177
Alb	0.8458	0.7025	0.7866	0.8990	0.7635	0.7425	0.7650	0.8966	0.7558	0.7635
A.H	0.8098	0.7500	0.7918	0.8900	0.7506	0.7700	0.7700	0.9123	0.7712	0.7712
A.P	0.9692	0.9625	0.9100	0.7376	0.9692	0.9050	0.8650	0.7046	0.9306	0.9897
A.P	0.8997	0.8750	0.8997	0.7417	0.8740	0.8500	0.8000	0.7429	0.8483	0.8740
And	0.7121	0.7200	0.7712	0.9144	0.7404	0.7300	0.7400	0.8784	0.7815	0.7506
And	0.7995	0.7775	0.7429	0.9239	0.7712	0.8050	0.8050	0.8360	0.7712	0.7995
Ams	0.9203	0.9050	0.9100	0.7542	0.9203	0.8950	0.8950	0.7345	0.9203	0.8997
B.D	0.8021	0.7500	0.7301	0.8669	0.7712	0.7900	0.8100	0.8228	0.7815	0.8021
D.W	0.7224	0.7500	0.7609	0.8476	0.7892	0.7775	0.8150	0.8360	0.7892	0.7995
D.L	0.8355	0.7975	0.9152	0.9271	0.8355	0.8275	0.8600	0.8307	0.8046	0.8689
D.L	0.9075	0.8500	0.8920	0.7695	0.8226	0.8500	0.8325	0.7808	0.8920	0.8740
D.L	0.8843	0.8825	0.8920	0.7899	0.8843	0.8750	0.8750	0.7855	0.8920	0.8997
D.S	0.9152	0.8600	0.8997	0.7762	0.9152	0.8750	0.9075	0.7692	0.8997	0.8843
D.S	0.9229	0.8675	0.8920	0.7695	0.8920	0.8825	0.8975	0.7761	0.8920	0.8612
D.S	0.8380	0.7725	0.7481	0.8530	0.7712	0.8250	0.8700	0.8202	0.7609	0.8278
D.S	0.8252	0.7500	0.7841	0.8900	0.8123	0.7900	0.8300	0.8228	0.8123	0.8252
D.S	0.7969	0.7650	0.7121	0.9303	0.7558	0.7575	0.7575	0.8966	0.7712	0.7789
Ed	0.8997	0.8750	0.8997	0.7629	0.8997	0.8750	0.9375	0.7429	0.8997	0.8997
H.M	0.9512	0.9125	0.9512	0.7315	0.9383	0.9125	0.8700	0.7202	0.9383	0.9177
H.W	0.8458	0.7850	0.8072	0.8116	0.7712	0.7850	0.7850	0.8667	0.7712	0.8458
Hen	0.7558	0.6950	0.6864	1.0000	0.6710	0.6800	0.7225	0.9187	0.6992	0.7275
K.W	0.7995	0.6675	0.7558	0.9816	0.6992	0.7150	0.7775	0.9091	0.7429	0.7147
P.Y.C	0.8175	0.7725	0.7121	0.9336	0.7121	0.7725	0.7850	0.8176	0.7481	0.7943
P.Y.C	0.8715	0.8050	0.7841	0.8697	0.7532	0.8650	0.8475	0.7715	0.8098	0.8458
R.A	0.8972	0.8900	0.8972	0.7762	0.8843	0.8900	0.8900	0.7303	0.8972	0.9023
R.A	0.9537	0.9475	0.9537	0.7197	0.9203	0.9175	0.9275	0.6860	0.9332	0.9640
R.A	0.9254	0.9000	0.8740	0.7853	0.8740	0.8500	0.8500	0.7647	0.8740	0.8740
R.A	0.9280	0.9025	0.8817	0.7396	0.9512	0.8925	0.8800	0.7027	0.9280	0.9614
Rin	0.8098	0.8450	0.7918	0.8669	0.8509	0.8650	0.8075	0.8050	0.8509	0.8509
Rin	0.8997	0.7750	0.7969	0.8091	0.8226	0.8250	0.8500	0.7647	0.8740	0.8740
Rin	0.8920	0.8675	0.8226	0.8165	0.8406	0.8325	0.8325	0.7808	0.8560	0.8740
R.P	0.8149	0.7550	0.7661	0.8900	0.8380	0.7975	0.7350	0.8469	0.7943	0.7892
R.P	0.8380	0.8625	0.8535	0.7807	0.8792	0.8475	0.7975	0.7324	0.8715	0.8869
Rik	1.0000	0.9725	1.0000	0.6864	1.0000	0.9725	0.9725	0.6684	1.0000	1.0000
Rik	0.8226	0.7500	0.7198	0.7853	0.7712	0.8000	0.7500	0.8125	0.8226	0.7712
S.W	0.8817	0.8450	0.8817	0.8116	0.8458	0.8450	0.8450	0.8025	0.9049	0.8201
S.K	0.7815	0.7275	0.7404	0.9175	0.7481	0.7400	0.7500	0.8874	0.7429	0.7429
Sud	0.9640	1.0000	0.8997	0.7629	0.9640	1.0000	1.0000	0.6500	0.9640	0.9640
S.A	0.8740	0.8000	0.7712	0.8900	0.8226	0.7000	0.8000	1.0000	0.7198	0.7712
S.A	0.8920	0.8000	0.8560	0.8344	0.8740	0.8000	0.8175	0.7951	0.8226	0.8406
S.A.P	0.8175	0.7950	0.8329	0.7830	0.7712	0.7650	0.8225	0.8497	0.8458	0.7866
S.A.P	0.8715	0.8348	0.8278	0.7762	0.8432	0.8325	0.8325	0.7808	0.8715	0.8560
T.S	0.7506	0.7500	0.7404	0.8783	0.7506	0.7300	0.7500	0.8667	0.7609	0.7815
T.S	0.6889	0.6700	0.7121	0.9468	0.7018	0.6925	0.7150	0.9701	0.7121	0.6787
Y.C.G	0.8843	0.8150	0.8946	0.7923	0.9049	0.8600	0.8800	0.7975	0.8766	0.8843

The Simple Additive Weighting method evaluate each alternative Preference Value (Vi).

$Vi = \sum_{j=1}^{n} Wj * rij$ i=1,….47, j=1,….10 (12)

By calculate the preference value from normalize decision matrix with weighted criteria we get the result, shown in Table IX and fig. 4

Tabel IX. The Ranked Personnel

No	Courses	Alternative	Preference Value	Rank
1	Database Management System	A.B	0.772367149	42
2	Entrepreneurship and Motivation	A.L	0.880388589	8
3	Database Management System	Alb	0.784752267	38
4	Human Computer Interaction	A.H	0.79439309	34
5	English Language 2	A.P	0.904876924	3
6	English Language 4	A.P	0.846790828	18
7	Strategic Information System	And	0.770865894	44
8	E-Business	And	0.800598742	32
9	TroubleShooting	Ams	0.880419684	7
10	Mandarin Language	B.D	0.790070552	35
11	Management Information Systems	D.W	0.785753548	37
12	Entrepreneurship and Motivation	D.L	0.846485667	19
13	Management	D.L	0.852848933	16
14	Entrepreneurship and Motivation	D.L	0.869922029	11
15	Object Oriented Programming	D.S	0.870761638	9
16	Lab. Object Oriented Programming	D.S	0.866355291	13
17	Web Programming	D.S	0.803801954	30
18	Lab. Programming Web	D.S	0.810573056	27
19	Network Security	D.S	0.788672798	36
20	IT Budgetting	Ed	0.869591039	12
21	English Language 1	H.M	0.892958831	5
22	Data warehouse & Data Mining	H.W	0.806506749	28
23	Web Programming	Hen	0.746368039	46
24	Manajemen Information Systems	K.W	0.765228996	45
25	Programming	P.Y.C	0.78392675	40
26	Lab. Programming	P.Y.C	0.824765074	26
27	Research Information Technology	R.A	0.870575398	10
28	Management Information Systems	R.A	0.90014334	4
29	Leadership	R.A	0.86014931	14
30	Mandarin Language	R.A	0.885095426	6
31	Business Process and Informations	Rin	0.839551631	22
32	Human Computer Interaction	Rin	0.831266282	24
33	Business Introduction	Rin	0.844491179	20
34	English Language 2	R.P	0.803153056	31
35	English Language 4	R.P	0.843181283	21
36	Business Process and Informations	Rik	0.937244366	1
37	E-Commerce	Rik	0.784088955	39
38	Leadership	S.W	0.850528115	17
39	Project Management	S.K	0.771724306	43
40	TroubleShooting	Sud	0.925303696	2
41	Web Programming	S.A	0.798734949	33
42	Lab. Programming	S.A	0.830919898	25
43	Web Programming	S.A.P	0.804385338	29
44	Lab. Programming Web	S.A.P	0.835988413	23
45	System Information Audit	T.S	0.772673422	41
46	Data Structure	T.S	0.738962579	47
47	Network Security	Y.C.G	0.859148512	15

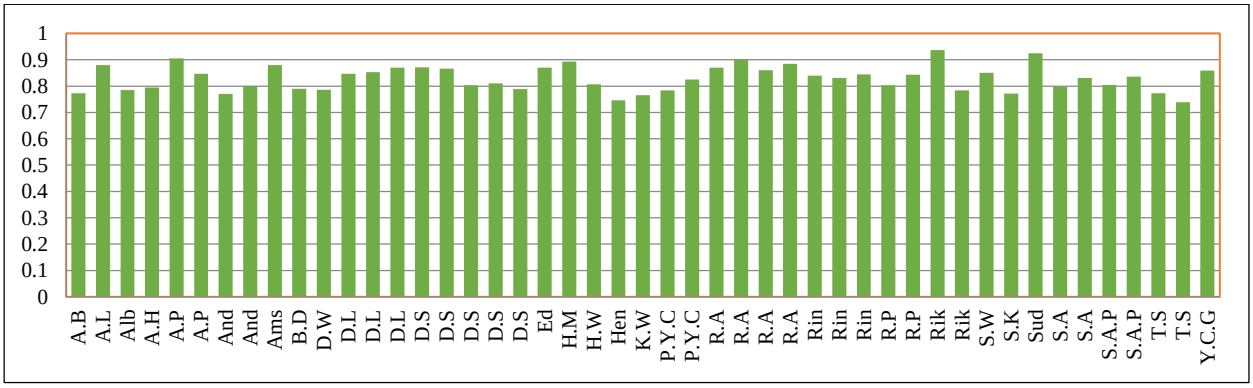

Fig.4 Lecturer Performance Evaluation Chart

IV. CONCLUSIONS

Multi Criteria Decision Making for evaluation of lecturer performance using the AHP and SAW methods can provide a level of consistency 90.39% from 10 indicators of criteria. With 28 lecturers for alternative, who taught 47 subjects, we rank from 28 lecturers and get the best it's Rik, followed by Sud, A.P, R.A, H.M and the others. The result of these, will be more effective and efficient in giving an assessment to management. So the management can make a decision. In this study we use data questionnaire from Faculty of Science and Technology, Information Systems Department at Buddhi Dharma University.

REFERENCES

[1] Departemen Pendidikan Nasional, "Undang undang No. 14 tahun 2005 Tentang Guru dan Dosen, Depdiknas Jakarta", 2005.

[2] D, Sundani, "Perangkat Lunak SPSS Sebagai Alat Untuk Analisa Hubungan Kerja Dosen Dengan Keberhasilan Belajar", *Jurnal Informatika,* vol.13, 2008.

[3] B. Daniawan, "Evauasi Hasil Kinerja Pengajaran Dosen Menggunakan Metode TOPSIS: Studi Kasus Prodi Sistem Informasi Fakultas Sains dan Teknologi, Universitas Buddhi Dharma Tangerang", *Akselerator,* vol. 2 no. 2, hal. 11-18, Des. 2017.

[4] M.T. Joshua, A.M. Joshua. and W.A. Kritsonis, "Use of Student Achievement Scores as Basis for Assessing Teacher's Instructional Effectiveness", *National forum of teacher education journal*, vol. 17, no. 3, pp. 1-13, 2006.

[5] T.L, Saaty, "The Analytic Hierarchy Process" McGraw-Hill, New York, 1980.

[6] A. Afshari, M. Mojahed and R.M. Yusuf, "Simple Additive Weighting approach to Personnel Selection problem", *International Journal of Innovation, Management and Technology*, vol. 1, no. 5, December 2010 .

[7] D. Dalalah, F. Al-Oqla, and M. Hayajneh, "Application of the Analytic Hierarchy Process (AHP) in MultiCriteria Analysis of the Selection of Crane", *Jordan Journal of Mechanical and Industrial Engineering,* vol 4, no. 5, pp. 567 – 578, Nov. 2010.

[8] S. Nursari and V. Sciorra, "Decision Support System for Final Assignment with Analytical Hierarchy Process (AHP) Method. Case Study: Informatics Engineering Faculty of Engineering, Pancasila University", *bt,* vol. 1, no. 1, pp. 19-25, Sep. 2018.

[9] Marimin, "Sistem Pendukung Pengambilan Keputusan dan Sistem Pakar" IPB Press, Bogor, 2017.

[10] Abidin, "Pemilihan Strategi Hijau (*Green Strategy*) Pengembangan Agroindustri (Studi kasus: Agroindustri Berbasis Kelapa)", *Akselerator,* vol. 3 no. 1, hal. 1-13, Jun. 2018

[11] M.J. Asgharpour, "Multiple Criteria Decision Making", University of Tehran press-Iran, 2008, pp.232, 6th Edition.

[12] A. Yani and L.D. Bakti "Competence Making on Computer Engineering Program by Using Analytical Hierarchy Process (AHP)", (IJACSA) International Journal of Advanced Computer Science and Applications, vol. 6, no. 9, 2015.

[13] T.L, Saaty, and G.V. Luis, 'Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process'. *The Analytic Hierarchy Process*, Vol. 6, 2000.