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Decision Support System for Selecting the Best Lecturer Using the Simple Additive Weighting (Saw) Method

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Abstract

The selection of the best lecturer at Politeknik LP3I Medan Marelan has traditionally been conducted manually, lacking clear evaluation criteria. This results in subjective judgments and reduced transparency. This research proposes a decision support system (DSS) based on the Simple Additive Weighting (SAW) method to enhance the objectivity and fairness of the selection process. The system evaluates lecturers using multiple criteria: teaching quality, discipline, and peer assessment. Each criterion is weighted according to its institutional importance, and a final ranking is produced based on aggregated normalized scores. The implementation of the SAW-based DSS demonstrates improved decision accuracy, transparency, and fairness in lecturer evaluation. The system offers an effective solution to support academic decision-making and could serve as a reference model for other higher education institutions.

Keywords: *Decision Support System; Lecturer Performance Evaluation; SAW; Simple Additive Weighting; Teaching Quality*

1. Introduction

In higher education institutions, lecturer quality is a critical factor [1], influencing student outcomes and institutional reputation. Lecturers not only deliver knowledge but also guide academic development and professional skills among students. Therefore, regular and objective performance evaluations are essential.One form of recognition for excellent lecturers is through a “Best Lecturer Award [2]” program. Such programs aim to motivate academic staff to enhance their teaching performance and professionalism. However, at Politeknik LP3I Medan Marelan, the current selection process remains manual and subjective [3], lacking standardized evaluation criteria and transparency.

To address this issue, this research introduces a Decision Support System (DSS) utilizing the Simple Additive Weighting (SAW) method. SAW is effective for multi-criteria decision-making as it calculates a weighted sum of normalized scores, allowing for systematic and fair rankings of alternatives.

Previous studies have applied SAW for similar purposes, such as evaluating lecturers or selecting employees. [2][4]. However, these studies often focus on limited input sources. This research enhances existing approaches by integrating three comprehensive assessment criteria [5][6]: teaching quality (based on student feedback), discipline (based on attendance records), and peer review (colleague assessments).The developed DSS aims to provide a more accurate, objective, and institutionalized mechanism for lecturer selection, ensuring fairness and increasing trust among academic stakeholders. [7]. This system is expected to serve as a practical tool for academic management and a benchmark for similar implementations in other institutions.

2. Methodology

This study employs a Decision Support System (DSS) approach using the Simple Additive Weighting (SAW) method to select the best lecturer based on multiple evaluation criteria.

2.1. Decision Support System (DSS)

A Decision Support System is a computer-based system [8][9] designed to support decision-makers in solving semi-structured or unstructured problems by evaluating multiple alternatives against defined criteria [8]. In this research, the DSS assists academic institutions in evaluating and ranking lecturers based on relevant performance indicators.

2.2. Lecturer Evaluation Criteria

The criteria used to evaluate lecturers are based on three main aspects:

- **C1 – Teaching Quality**: This refers to student questionnaire results collected over the academic year 2023/2024.
- **C2 – Discipline**: This includes attendance data, punctuality, and adherence to teaching schedules.
- **C3 – Peer Assessment**: This is based on colleague feedback via questionnaires, focusing on communication skills, openness to feedback, and collegial interaction.

Each criterion is rated on a scale [6] from 1 (Very Poor) to 5 (Excellent), as shown in Table 1.

Table 1: Rating Scale for Criteria Assessment

Score	Description
1	Very Poor
2	Poor
3	Fair
4	Good
5	Excellent

2.3. Simple Additive Weighting (SAW) Method

The SAW method is a widely used [10] multi-criteria decision-making approach that calculates the weighted sum of normalized values for each alternative. The general formula is as follows:

$$V_i = \sum_{j=1}^{n} W_j \cdot r_{ij} \qquad (1)$$

Where:

- V_i = final score for alternative *i*
- W_j = weight for criterion *j*
- r_{ij} = normalized score of alternative *i* on criterion *j*
- n = total number of criteria

The SAW procedure involves the following steps:

1. **Determine the criteria (C1, C2, C3)** and assign weights based on institutional priorities.
2. **Collect data** from questionnaires and academic records.
3. **Normalize the data** for each criterion.
4. **Calculate scores** by multiplying normalized scores with corresponding weights.
5. **Rank the lecturers** based on the final scores.

2.4. Criteria Weighting and Normalization

Weights were assigned through institutional consensus as follows:

- Teaching Quality (C1): Weight = 4
- Discipline (C2): Weight = 5
- Peer Assessment (C3): Weight = 4

The normalization formula used is:

$$r_{ij} = \frac{x_{ij}}{\max(x_j)} \qquad (2)$$

Where:

- x_{ij} = raw score of alternative *i* on criterion *j*
- max (x_j) = maximum score for criterion *j*
-

2.5. Alternatives and Sample Data

Five lecturers were evaluated as alternatives [11] in this study:

- A1 = Eka Tri Ayu Ningsih, M.Kom
- A2 = Zoelkarnain Rinanda Tembusai, S.Pd., M.Kom
- A3 = Andrysyah, M.Pd
- A4 = Andriyan Syahputra
- A5 = Abdul Meizar, S.Kom., M.Kom

Each was scored using the 3 evaluation criteria. After normalization and applying the weight matrix, final scores were computed for ranking purposes.

3. Results and Discussion

3.1. Criteria Evaluation and Score Mapping

Data were collected for five lecturer candidates based on the three evaluation criteria. Each score was converted into a standard 1–5 rating scale. The summarized evaluation data are presented in Table 2.

Table 2: Evaluation Scores of Lecturer Candidates

Lecturer	C1 – Teaching Quality	C2 – Discipline (Score)	C3 – Peer Assessment
A1	4	100	4
A2	4	65	3
A3	4	70	4
A4	3	59	3
A5	3	45	3

Based on the conversion from raw discipline scores into rating scale:

- 81–100 = 5 (Very Good)
- 61–80 = 4 (Good)
- 41–60 = 3 (Fair)
- and so on...

The converted decision matrix used in SAW is shown in Table 3.

Table 3: Converted Decision Matrix

Lecturer	C1	C2	C3
A1	4	5	4
A2	4	4	3
A3	4	4	4
A4	3	3	3
A5	3	3	3

3.2. Weight Assignment and Normalization

Weights assigned to each criterion are:

- W = {4,5,4} for C1, C2, and C3 respectively.

Using the normalization formula (2), the normalized matrix is shown in Table 4

Table 4: Normalized Matrix (R)

Lecturer	R1 (C1)	R2 (C2)	R3 (C3)
A1	1.00	1.00	1.00
A2	1.00	0.80	0.75
A3	1.00	0.80	1.00
A4	0.75	0.60	0.75
A5	0.75	0.60	0.75

3.3. Preference Score Calculation and Ranking

Each alternative's final preference score was calculated using Equation (2). The weighted normalized scores were summed to determine the total score ViV_iVi for each lecturer.

$V_i = (R1 \cdot W1) + (R2 \cdot W2) + (R3 \cdot W3)$

Table 5: Final Preference Scores and Ranking

Lecturer	Preference Score (V_i)	Rank
A1	9.00	3
A2	11.00	2
A3	12.00	**1**
A4	9.00	3

A5	9.00	3

3.4. Analysis and Interpretation

Based on the final preference scores, **Lecturer A3 (Andrysyah, M.Pd)** achieved the highest score of 12.00 and was therefore selected as the best lecturer. This indicates a strong performance across all criteria. Lecturer A2 also showed good results, while the remaining candidates scored equally but lower.

The SAW method provided a transparent and rational basis for decision-making. It minimized subjectivity by using normalized values and weighted aggregation. The integration of multiple perspectives—students, attendance records, and peer assessments—ensured a comprehensive evaluation.

These findings align with previous research [4][12][13], demonstrating the effectiveness of SAW in academic performance assessment and staff selection tasks.

4. Conclusion

This study developed a Decision Support System (DSS) using the Simple Additive Weighting (SAW) method to assist in selecting the best lecturer at Politeknik LP3I Medan Marelan. The system evaluated lecturers based on three criteria: teaching quality, discipline, and peer assessment. Each criterion was assigned a weight based on its relative importance.

The results showed that the SAW method was effective in supporting multi-criteria decision-making. The final rankings indicated that Andrysyah, M.Pd (A3) was the top-performing lecturer, having the highest preference score among the evaluated candidates.

The implementation of this system improves transparency, reduces subjectivity, and supports fair decision-making in academic institutions. It can be adapted for broader applications in lecturer performance evaluation and institutional reward systems. The proposed DSS may also serve as a reference model [7][14][15] for similar higher education environments aiming to enhance evaluation processes through structured, data-driven methods.

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References

[1] R. Siregar and S. Aisyah, “Evaluasi Kinerja Dosen dengan Sistem Penilaian Berbasis Multikriteria,” *Jurnal Ilmiah Teknologi dan Informatika*, vol. 4, no. 1, pp. 78–85, 2022.

[2] C. A. Gemawaty and Y. Yuliani, “Pemilihan Dosen Terbaik dengan Metode SAW (Simple Additive Weighting),” *Jurnal of Information System, Applied, Management, Accounting and Research (JISAMAR)*, vol. 7, no. 3, pp. 711–717, 2023.

[3] P. P. Rini, D. Dedi, and N. Riyanti, “SPK Pemilihan Dosen Terbaik Berbasis Web Dengan Metode SAW,” *Jurnal Sisfotek Global*, vol. 5, no. 2, 2015.

[4] A. Prasetyo and Y. Nugroho, “Penerapan Metode SAW dalam Penentuan Karyawan Terbaik,” *Jurnal Teknologi dan Sistem Komputer*, vol. 8, no. 2, pp. 120–127, 2020.

[5] E. Ermawita and R. P. Fauzi, “Penerapan Metode Profile Matching pada Sistem Pendukung Keputusan Pemilihan Dosen Terbaik,” *Jurnal Education and Development*, vol. 8, no. 4, p. 561837, 2021.

[6] [6] L. Fauziah and R. Mulyadi, “Analisis Perbandingan Metode SAW dan WP dalam Pemilihan Guru Terbaik,” *Jurnal Informatika dan Komputer*, vol. 7, no. 1, pp. 35–40, 2019.

[7] R. Dwijayanti and S. Hidayat, “Sistem Pendukung Keputusan Pemilihan Siswa Berprestasi,” *Jurnal Teknologi Informasi dan Komunikasi*, vol. 2, no. 3, pp. 201–209, 2020.

[8] M. Yanto, “SPK dengan Menggunakan Metode AHP dalam Seleksi Produk,” *Jurnal Teknologi dan Sistem Informasi Bisnis*, vol. 3, no. 1, pp. 167–174, 2021.

[9] F. Hasibuan and D. R. Gultom, “SPK Pemilihan Minyak Goreng Unggul Menggunakan Metode AHP,” *Jurnal Manajemen dan Perbankan*, vol. 5, no. 2, pp. 97–105, 2023.[10] T. Wibowo and R. Sari, “Implementasi Metode Simple Additive Weighting dalam Sistem Pendukung Keputusan,” *Jurnal Sistem Informasi*, vol. 8, no. 1, pp. 45–52, 2022.

[10] R. Ismail and A. Lestari, “Perancangan SPK Pemilihan Dosen Terbaik Berbasis Web,” *Jurnal Ilmiah Komputer dan Informatika*, vol. 5, no. 2, pp. 90–95, 2019.

[11] A. Halim and S. Rachmawati, “Penilaian Kinerja Dosen Menggunakan Metode SAW,” *Jurnal Teknologi dan Sistem Komputer*, vol. 6, no. 1, pp. 55–63, 2018.

[12] [13] N. Anggraeni and A. Adiwijaya, “Sistem Penunjang Keputusan dengan Metode SAW dalam Evaluasi Akademik,” *Jurnal Informatika*, vol. 10, no. 2, pp. 77–85, 2023.

[13] D. Kartikasari and R. Sugianto, “Penerapan SPK Metode SAW untuk Seleksi Pegawai Terbaik,” *Jurnal Ilmiah Teknologi Informasi Asia*, vol. 15, no. 1, pp. 37–44, 2021.

[14] R. Wahyuni and D. Pramana, “Aplikasi SAW untuk Pemilihan Tenaga Pendidik Terbaik di Universitas,” *Jurnal Penelitian Sistem Informasi*, vol. 6, no. 3, pp. 120–126, 2020.