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Decision Support System for WP and MOORA Methods in Determining Performance Assessment of Outstanding Education Personnel

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Abstract−The work performance of employees in this regard education personnel (Tendik) as a determinant of the success of the performance of the Public Service Agency (BLU). Staff who have a good leadership spirit are listed as competencies of outstanding and superior staff who are expected to be able to spur other staff to excel as well. The assessment of outstanding staff is sourced from the provisions of the Minister of Education and Culture number. 30 of 2018. Form F5 in the attachment of the Minister of Education and Culture Number. 30 of 2018 is used as an assessment variable in the assessment support system for outstanding education personnel. The work performance of education personnel is the main factor in the success of university performance. Good work results will have a good impact on universities. Outstanding Education Personnel who are also competent in higher education also support the joint progress of both the Education Personnel and the university. *Rewards* or awards given to Education Personnel can be done by monitoring the performance results of each Education Personnel. *The reward* given to Education Personnel is a form of appreciation for the performance carried out in higher education. The provision of *rewards* to Education Personnel must be based on appropriate and accurate performance assessments. The problem found is that there is no definite reference used to assess the performance of the Education Personnel in giving *rewards*. The performance assessment carried out must be objective, of course, with an objective assessment of the results obtained on the performance assessment of Education Personnel is not a problem for other Education Personnel. Decision Support System is a computer-based information system that is used to assist in decision-making by utilizing certain data and models to support a solution in solving a semi-structural and non-structural problem. The MOORA (Multi Objective Optimization on The Basis of Ratio Analysis) and WP (Weighted Product) methods, are methods in the Decision Support System to provide relatively accurate assessment results against the set assessment criteria. The research with the MOORA and WP procedures used produces and provides assessments so that it can provide decision support for the reward of assessment of outstanding Education Personnel.

Keywords: *Education Personnel; Achievement; Decision Support System; MOOR; WP*

1. INTRODUCTION

The achievement of the goals and vision and mission of an institution engaged in higher education such as public and private universities is inseparable from the role of Education Personnel as human resources. Education Personnel are members of the community who devote themselves and are appointed to support the implementation of education. Education Personnel include Administrative Personnel in universities [1]. Where Education Personnel in higher education have the role of running the academic process, providing services to the academic community, supporting higher education performance and even the success of higher education accreditation [2].

The work performance of Education Personnel is the main factor in the success of university performance. Good work results given by Education Personnel will have a good impact on universities [3]. The better the performance results of the Education Personnel, the faster the success of the goals in higher education will be achieved. Education personnel are also an asset owned by universities. Therefore, Education Personnel who have potential and influence on higher education must be maintained and given appreciation [4].

The appreciation given to Education Personnel can be in the form of a reward or an award. At the time of delivery *Reward* to Education Personnel must be based on an appropriate and accurate performance assessment. This is the fundamental problem in the assessment of the performance of Education Personnel for the provision of *Reward*.

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The problem found is that there is no definite reference used to assess the performance of the Education Personnel in giving rewards. The performance assessment carried out must be objective, of course, with an objective assessment of the results obtained on the performance assessment of Education Personnel is not a problem for other Education Personnel. Indicators used in the assessment of the performance of Education Personnel based on Decision Making, Initiative, Attitude, Communication and Discipline. The problem of the performance assessment process of Education Personnel that still does not have a reference and also objective results can be solved with a decision support system [5].

Decision Support System is a computer-based information system that is used to assist in decision-making by utilizing certain data and models to support a solution in solving a semi-structural and non-structural problem [6]. Some of the methods that can be used in the decision support system include TOPSIS, WASPAS, MOORA, SAW, WP, and others. The following methods that will be used in this study are MOORA (Multi-Objective Optimization on Basis of Ratio Analysis) and WP (Weighted Product) methods. [6]. The MOORA method is a method that has calculations with minimal calculations and is very simple. This method has a good degree of selectivity in determining an alternative. MOORA's approach is defined as a simultaneous process to optimize two or more conflicting constraints [7]. The WP Method is a method that has calculations using multiplication to connect the value of attributes (criteria), where the value of each attribute (criterion) must first be ranked by the weight of the attribute (criterion) concerned The support system to determine the performance of outstanding Education Personnel using the Weighted Product method is chosen because it is able to choose the best alternative from a number of alternatives [8].

Several previous studies have developed decision support systems for the performance assessment of education personnel and educators using various multicriteria decision-making methods. Utomo and Purba (2021) apply the SMARTER method in the decision support system for performance assessment of outstanding education personnel [9]. Meanwhile, Devi and Ichsan (2022) used the MOORA method to assist in the selection process of outstanding educators and education personnel in higher education. In addition, Rahma Y Simanullang et al. (2023) proposed the application of the MOORA method with Rank Order Centroid (ROC) weighting to optimize decision-making results in a multi-objective optimization based system [10].

Based on the discussion above, the research that will be carried out is to conduct a performance assessment of Outstanding Education Personnel for the provision of *rewards* using a decision support system by applying the MOORA (Multi Objective Optimization On The Basis Of Ratio Analysis) and WP (Weighted Product) methods for the performance assessment process of Education Personnel.

2. RESEARCH METHODOLOGY

The methodology of this research is carried out to make it easier to complete the problem solving process in an appropriate and gradual way, methodology is also said to be a theoretical concept of various methods, ranging from methods to data collection, in solving problems involving problem solving methods and algorithms, to theoretical from various sources related to the research being carried out.

2.1 Decision Support System

Decision Support Systems are interactive information systems that provide information, modeling and data manipulation that are used to support decision-making in semi-structured situations and no one knows exactly how decisions should be made. Decision Support System (SPK) is part of a computer-based information system including knowledge-based systems and knowledge management that are used to support decision-making in an organization or industry [11],[12],[13].

2.2 Education Personnel

Education Personnel is a term for members of the population who devote themselves and are appointed to support the Implementation of Education at various levels. Education personnel are tasked with administration, management, development, supervision, and technical services to support the educational process in educational units. Educators are reliable personnel who are in charge of planning and carrying out the learning process, taking into account learning outcomes, conducting guidance and training, and conducting research and community service, especially for educators in higher education [14].

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2.3 Multi-Objective Optimization Ratio Analysis (MOORA) Method

The Multi-Objective Optimization Ratio Analysis (MOORA) method is a method used to make decisions about problems based on several criteria. The nature of MOORA is easy and flexible to understand and apply in the process of selecting the weights of each criterion to make a decision [15],[16],[17]. The level of selectivity in determining alternative solutions in MOORA is quite good based on the provisions of criteria from very important to less important. Therefore MOORA is widely used in several fields of science. The steps to solve the problem using the Multi Objective Optimization On The Basis Of Ratio Analysis (MOORA) method are:

Determination of the value of the result matrix

a. Define objectives to identify the relevant evaluation attributes

$$X_{ij}\begin{bmatrix} X_{11} & X_{12} & X_{13} & X_{1n} \\ X_{21} & X_{22} & X_{23} & X_{2n} \\ X_{31} & X_{32} & X_{33} & X_{3n} \\ X_{m1} & X_{m2} & X_{m3} & X_{mn} \end{bmatrix} \quad (1)$$

The notation (xij) is a decision matrix that represents the value of the second alternative (i) in criterion (j), where (i) indicates the alternative or line, (j) indicates the attribute or criterion, (n) is the sum of attributes or criteria, and (m) is the number of alternatives or lines used in the assessment process.

b. Matrix Normalization

NormalizationThe matrix simply concludes that for the denominator, the best choice is the square root of the sum of the squares and any alternative attributes.

$$X_{ij}^{*} = \frac{x_{ij}}{\sqrt{[\sum_{i=1}^{m} x_{ij^2}]}} \quad (2)$$

The notation (xij) is a decision matrix that describes the value of the second alternative (i) in the (j) criterion, where (i) indicates the alternative or line, (j) indicates the attribute or criterion, and (m) is the number of alternatives or lines used in the assessment process. Meanwhile, (x^{*}_{ij}) represents the normalization matrix of the (i) alternative to the (j) criterion used to standardize the value of each criterion so that it can be compared proportionally.

c. Maximizing attributes For multiobjective optimization, normalized measures are compounded in the case of maximization (for favorable tributes) and subtracted in the case of minimization (for unfavorable attributes).

$$y_i^{*} = \sum_{j=1}^{g} x_{ij}^{*} - \sum_{j=g+1}^{n} x_{ij}^{*} \quad (3)$$

Notation (xij) is a decision matrix that shows the value of the second alternative (i) in criterion (j), where (j) represents the attribute or criterion, and (n) is the total sum of the attributes or criteria (columns) used. The value (g) indicates the number of criteria with the nature of benefit, while (g+1) represents the criteria with the nature of cost or cost. The (y^{*}_{i}) is the optimization value obtained for each alternative to (i) based on the results of the calculation of all the criteria that have been determined.

d. Ranking Yi Value

The Yi value can be positive or negative depending on the optimal and minimum total in the decision matrix.

$$y_i^{*} = \sum_{j=1}^{g} w_j\, x_{ij}^{*} - \sum_{j=g+1}^{n} w_j x_{ij}^{*} \quad (4)$$

The notation (xij) is a decision matrix that represents the value of the alternative (i) to the (j) criterion, where (j) indicates the attribute or criterion, and (n) is the total sum of attributes or criteria (columns) used in the assessment process. The value (g) indicates the number of criteria that are beneficial, while (g+1) represents the criteria that are cost. As for (y^{*}_{i}) is the optimization value obtained for each alternative based on the calculation results of all criteria that have been considered [18],[19].

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2.4 Weighted Product (WP) Method

Weighted Product (WP) is one of the procedures for solving Multiple Attribute Decision Making (MADM) problems that can be used for decision-making [20]. This procedure evaluates some alternatives to a set of attributes or criteria, where each attribute is independent of each other. The Weighted Product (WP) procedure is a decision-making procedure with the multiplication method to connect attribute ratings, where the rating of each attribute must be ranked first by the weight of the attribute in question [21]. The steps to solve the problem use the Weighted Product procedure as follows:

Determination of the value of the result matrix

a. Define the goal to identify the evaluation attributes in question.

$$X_{ij}\begin{bmatrix} X_{11} & X_{12} & X_{13} & X_{1n} \\ X_{21} & X_{22} & X_{23} & X_{2n} \\ X_{31} & X_{32} & X_{33} & X_{3n} \\ X_{m1} & X_{m2} & X_{m3} & X_{mn} \end{bmatrix} \quad (5)$$

Notation (xij) is a decision matrix that describes the value of the second alternative (i) in criterion (j), where (i) indicates an alternative or line, (j) indicates an attribute or criterion, (n) is the number of attributes or criteria used, and (m) is the number of alternatives or lines in the decision-making process.

b. Calculating Vector (Si)

$$S_i = \prod_{j=1}^{n} X_{ij}{}^{w_j} \quad (6)$$

Where $\sum_{wj} = 1$. W is the positive value rank for the profit attribute, and the negative value for the cost attribute.

c. Calculating Preferences (Vi)

$$V_i = \frac{\prod_{j=1}^{n} X_{ij}{}^{W_j}}{\prod_{j=1}^{n} (X_{ij*})^{W_j}} \quad (7)$$

2.5 Research Stages

In conducting research, the author carried out several stages. The data collection methods used to obtain the data that the author urgently needs are as follows:

a. Problem Identification
The first step of this research is to identify the scope of the problem, determined first before arriving at the next stage of discussion so that the discussion of a problem can be directed or focused on a goal.

b. Data Collection
The second step is data collection in an effort to make it easier for researchers to find facts and deviations to the data to be studied, the process of collecting and measuring information about the targeted variables in an established system, which then allows one to answer relevant questions and evaluate the results.

c. Literature Review
The third step is to study literature, to achieve the goals that have been determined, then study some of the literature used. Then the literature studied is selected to be able to determine the literature that will be used in the research.

d. Analysis and Application of Methods
The fourth step is the analysis and application of this method is a discussion of how to apply with 2 methods at once to get the best decision

e. Analysis of MOORA and WP Methods
The sixth step is the analysis of the MOORA and WP methods, a research process in which data is processed in response to the formulation of the problem

f. Conclusion
The sixth step is the process of concluding the results of the research

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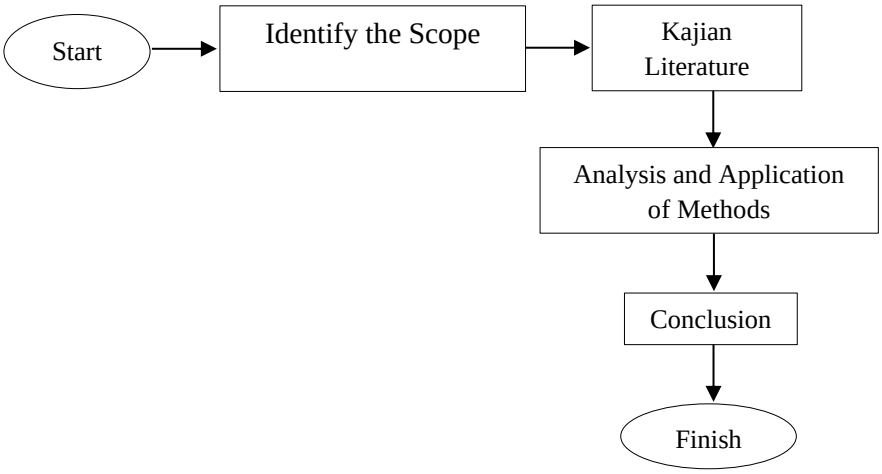

Figure 1. Research Stages

3. RESULTS AND DISCUSSION

3.1 Determination of Alternatives and Criteria

In making a decision in determining the Performance Assessment of Education Personnel, several staff data as well as criteria, weights and alternatives are needed. For this reason, there are 6 alternatives and 5 (five) criteria used in conducting an assessment. Therefore, in various criteria in the selection of weight values where the results are obtained from the weighting of the *Rank Order Centroid* (ROC) method. The following table 1 is a list of employees. In producing a decision in determining the performance assessment of outstanding Education Personnel.

Table 1. Alternatives

Code	Alternatives
A1	Boy Eduardo,S.Kom
A2	Khoirunnas, S.Kom
A3	Muhammad Karel, S.Kom
A4	Khamsah Anugrah, S.Kom
A5	Dimas Hadityo, S.Kom
A6	Perwira, S.Kom

Furthermore, in Table 2, the following are the criteria used.

Table 2. Criteria

Criteria	Remarks	Weight	Type
C1	Decision Makers	0.30	Benefit
C2	Initiatives	0.22	Benefit
C3	Attitude	0.20	Benefit
C4	Communication	0.13	Benefit
C5	Discipline	0.15	Benefit

The following table 3 is a weighting for the criteria for Decision Makers (C1), (C2), (C3), (C4), (C5).

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Table 3. Weighting of Decision Making Criteria

Remarks	Weight
Excellent	4
Good	3
Enough	2
Bad	1

After determining the weighting of criteria for decision-making, an assessment is formed for each alternative based on the criteria. The following can be seen in Table 4.

Table 4. Rating

Alternatives	C1	C2	C3	C4	C5
A1	Excellent	Good	Excellent	Good	Enough
A2	Good	Excellent	Enough	Good	Enough
A3	Enough	Good	Enough	Good	Excellent
A4	Good	Good	Good	Good	Enough
A5	Good	Excellent	Enough	Enough	Good
A6	Excellent	Enough	Good	Enough	Enough

After determining the criteria and alternatives used in the study, the next stage is to provide a match rating for each alternative to each criterion. This match rating serves to assess the extent to which each alternative meets the criteria that have been set, so that it can be the basis for the calculation process and subsequent decision-making.

Table 5. Compatibility Rating Between Alternatives and Criteria

Alternatives	C1	C2	C3	C4	C5
A1	4	3	4	3	2
A2	3	4	2	3	2
A3	2	3	2	3	4
A4	3	3	3	3	2
A5	3	4	2	2	3
A6	4	2	3	2	2

3.2 Calculation Using the MOORA Method

The following are the steps used to obtain a match rating using the MOORA (*Multi Objective Optimization on The Basic of Ratio Analysis*) method:

a. Prepare a Decision Matrix.

$$X_{ij} = \begin{matrix} 4 & 3 & 4 & 3 & 2 \\ 3 & 4 & 2 & 3 & 2 \\ 2 & 3 & 2 & 3 & 4 \\ 3 & 3 & 3 & 3 & 2 \\ 3 & 4 & 2 & 2 & 3 \\ 4 & 2 & 3 & 2 & 2 \end{matrix}$$

b. Normalization of Decision Matrix.

To determine Criterion C1 (Discipline).

$$X^*_{1.1} = \frac{4}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{4}{\sqrt{63}} = \frac{4}{7{,}937} = 0{,}503$$

$$X^*_{2.1} = \frac{3}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$

$$X^*_{3.1} = \frac{2}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{2}{\sqrt{63}} = \frac{2}{7{,}937} = 0{,}251$$

$$X^*_{4.1} = \frac{3}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$

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$$X^*_{5.1} = \frac{3}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$
$$X^*_{6.1} = \frac{4}{\sqrt{4^2+3^2+2^2+3^2+3^2+4^2}} = \frac{4}{\sqrt{63}} = \frac{4}{7{,}937} = 0{,}503$$

To determine Criterion C2 (Initiative).

$$X^*_{1.2} = \frac{3}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$
$$X^*_{2.2} = \frac{4}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{4}{\sqrt{63}} = \frac{4}{7{,}937} = 0{,}503$$
$$X^*_{3.2} = \frac{3}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$
$$X^*_{4.2} = \frac{3}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{3}{\sqrt{63}} = \frac{3}{7{,}937} = 0{,}377$$
$$X^*_{5.2} = \frac{4}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{4}{\sqrt{63}} = \frac{4}{7{,}937} = 0{,}503$$
$$X^*_{6.2} = \frac{2}{\sqrt{3^2+4^2+3^2+3^2+4^2+2^2}} = \frac{2}{\sqrt{63}} = \frac{2}{7{,}937} = 0{,}251$$

For Weighting of C3 Criteria (Attitude)

$$X^*_{1.3} = \frac{4}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{4}{\sqrt{46}} = \frac{4}{6{,}782} = 0{,}589$$
$$X^*_{2.3} = \frac{2}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{2}{\sqrt{46}} = \frac{2}{6{,}782} = 0{,}294$$
$$X^*_{3.3} = \frac{2}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{2}{\sqrt{46}} = \frac{2}{6{,}782} = 0{,}294$$
$$X^*_{4.3} = \frac{3}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{3}{\sqrt{46}} = \frac{3}{6{,}782} = 0{,}442$$
$$X^*_{5.3} = \frac{2}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{2}{\sqrt{46}} = \frac{2}{6{,}782} = 0{,}294$$
$$X^*_{6.3} = \frac{3}{\sqrt{4^2+2^2+2^2+3^2+2^2+3^2}} = \frac{3}{\sqrt{46}} = \frac{3}{6{,}782} = 0{,}442$$

For Weighting of C4 Criteria (Communication)

$$X^*_{1.4} = \frac{3}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{3}{\sqrt{44}} = \frac{3}{6{,}633} = 0{,}452$$
$$X^*_{2.4} = \frac{3}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{3}{\sqrt{44}} = \frac{3}{6{,}633} = 0{,}452$$
$$X^*_{3.4} = \frac{3}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{3}{\sqrt{44}} = \frac{3}{6{,}633} = 0{,}452$$
$$X^*_{4.4} = \frac{3}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{3}{\sqrt{44}} = \frac{3}{6{,}633} = 0{,}452$$
$$X^*_{5.4} = \frac{2}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{2}{\sqrt{44}} = \frac{2}{6{,}633} = 0{,}301$$
$$X^*_{6.4} = \frac{2}{\sqrt{3^2+3^2+3^2+3^2+2^2+2^2}} = \frac{2}{\sqrt{44}} = \frac{2}{6{,}633} = 0{,}301$$

For Weighting of C5 Criteria (Discipline)

$$X^*_{1.5} = \frac{2}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{2}{\sqrt{41}} = \frac{2}{6{,}403} = 0{,}312$$
$$X^*_{2.5} = \frac{2}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{2}{\sqrt{41}} = \frac{2}{6{,}403} = 0{,}312$$
$$X^*_{3.5} = \frac{4}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{4}{\sqrt{41}} = \frac{4}{6{,}403} = 0{,}624$$
$$X^*_{4.5} = \frac{2}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{2}{\sqrt{41}} = \frac{2}{6{,}403} = 0{,}312$$
$$X^*_{5.5} = \frac{3}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{3}{\sqrt{41}} = \frac{3}{6{,}403} = 0{,}468$$
$$X^*_{6.5} = \frac{2}{\sqrt{2^2+2^2+4^2+2^2+3^2+2^2}} = \frac{2}{\sqrt{41}} = \frac{2}{6{,}403} = 0{,}312$$

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So the results obtained from the calculation above produce a ternomalization matrix as follows.X_{ij}^{*}

$$X_{ij} = \begin{matrix} 0{,}503 & 0{,}377 & 0{,}589 & 0{,}452 & 0{,}312 \\ 0{,}377 & 0{,}503 & 0{,}294 & 0{,}452 & 0{,}312 \\ 0{,}251 & 0{,}377 & 0{,}294 & 0{,}452 & 0{,}624 \\ 0{,}377 & 0{,}377 & 0{,}442 & 0{,}452 & 0{,}312 \\ 0{,}377 & 0{,}503 & 0{,}294 & 0{,}301 & 0{,}468 \\ 0{,}503 & 0{,}251 & 0{,}442 & 0{,}301 & 0{,}312 \end{matrix}$$

c. Determine optimization values by weight

$y_1^* = (0{,}30 * 0{,}503) + (0{,}22 * 0{,}377) + (0{,}20 * 0{,}589) + (0{,}13 * 0{,}452) + (0{,}15 * 0{,}312) = 0{,}4572$
$y_2^* = (0{,}30 * 0{,}377) + (0{,}22 * 0{,}503) + (0{,}20 * 0{,}294) + (0{,}13 * 0{,}452) + (0{,}15 * 0{,}312) = 0{,}3881$
$y_3^* = (0{,}30 * 0{,}251) + (0{,}22 * 0{,}377) + (0{,}20 * 0{,}294) + (0{,}13 * 0{,}452) + (0{,}15 * 0{,}624) = 0{,}3694$
$y_4^* = (0{,}30 * 0{,}377) + (0{,}22 * 0{,}377) + (0{,}20 * 0{,}442) + (0{,}13 * 0{,}452) + (0{,}15 * 0{,}312) = 0{,}39$
$y_5^* = (0{,}30 * 0{,}377) + (0{,}22 * 0{,}503) + (0{,}20 * 0{,}294) + (0{,}13 * 0{,}301) + (0{,}15 * 0{,}468) = 0{,}39189$
$y_6^* = (0{,}30 * 0{,}503) + (0{,}22 * 0{,}251) + (0{,}20 * 0{,}442) + (0{,}13 * 0{,}301) + (0{,}15 * 0{,}312) = 0{,}38045$

So, the final result in determining the optimization value and including weights can look like Table 12. below

Table 6. Optimization Value (y_i^*)

Alternatives	Name	Value (y_i^*)	Ratings
A1	Boy Eduardo, S.Kom	0,4572	1
A2	Khoirunnas, S.Kom	0,3881	4
A3	Muhammad Karel, S.Kom	0,3694	6
A4	Khamsah Anugrah, S.Kom	0,39	3
A5	Dimas Hadityo, S.Kom	0,3918	2
A6	Perwira, S.Kom	0,3804	5

3.3 Application of the weighted product (WP) method

The following are also the steps used to obtain a match rating using the WP (*Weighted Product*) method

a. Prepare a decision matrix. The decision matrix is taken from the ROC weighting of the MOORA method decision value, because it has the same decision matrix.

$$X_{ij} = \begin{matrix} 4 & 3 & 4 & 3 & 2 \\ 3 & 4 & 2 & 3 & 2 \\ 2 & 3 & 2 & 3 & 4 \\ 3 & 3 & 3 & 3 & 2 \\ 3 & 4 & 2 & 2 & 3 \\ 4 & 2 & 3 & 2 & 2 \end{matrix}$$

b. Calculating vector ()S_i
To calculate the vector using the equation 2.
$S_1 = (4^{0{,}30})(3^{0{,}22})(4^{0{,}20})(3^{0{,}13})(2^{0{,}15}) = 3{,}2596$
$S_2 = (3^{0{,}30})(4^{0{,}22})(2^{0{,}20})(3^{0{,}13})(2^{0{,}15}) = 2{,}7731$
$S_3 = (2^{0{,}30})(3^{0{,}22})(2^{0{,}20})(3^{0{,}13})(4^{0{,}15}) = 2{,}5575$
$S_4 = (3^{0{,}30})(3^{0{,}22})(3^{0{,}20})(3^{0{,}13})(2^{0{,}15}) = 2{,}8229$
$S_5 = (3^{0{,}30})(4^{0{,}22})(2^{0{,}20})(2^{0{,}13})(3^{0{,}15}) = 2{,}7957$
$S_6 = (4^{0{,}30})(2^{0{,}22})(3^{0{,}20})(2^{0{,}13})(2^{0{,}15}) = 2{,}6702$

c. Calculating the prevalence (V_i)
To calculate the prevalence using equation 3
$V_1 = \frac{3{,}2596}{3{,}2596+2{,}7731+2{,}5575+2{,}8229+2{,}7957+2{,}6702} = 0{,}193116$

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$$V_2 = \frac{2,7731}{3,2596+2,7731+2,5575+2,8229+2,7957+2,6702} = 0,164293$$
$$V_3 = \frac{2,5575}{3,2596+2,7731+2,5575+2,8229+2,7957+2,6702} = 0,15152$$
$$V_4 = \frac{2,8229}{3,2596+2,7731+2,5575+2,8229+2,7957+2,6702} = 0,167243$$
$$V_5 = \frac{2,7957}{3,2596+2,7731+2,5575+2,8229+2,7957+2,6702} = 0,165632$$
$$V_6 = \frac{2,6702}{3,2596+2,7731+2,5575+2,8229+2,7957+2,6702} = 0,158197$$

The final results of the prevalence calculation can be seen in the table as follows

Table 7. Preference Calculation Results

Alternative	Name	V_i	Ratings
A1	Boy Eduardo,S.Kom	0,193116	1
A2	Khoirunnas, S.kom	0,164293	4
A3	Muhammad Karel, S.kom	0,15152	6
A4	Khamsah Anugrah, S.Kom	0,167243	2
A5	Dimas Hadityo, S.Kom	0,165632	3
A6	Perwira, S.Kom	0,158197	5

4. CONCLUSION

From the results of the above research, several conclusions can be drawn as follows. Based on the results of the calculation of the two methods, a comparison was obtained that the performance assessment of outstanding education personnel with the MOORA method showed an A1 alternative on behalf of Boy Eduardo, S.Kom as the recipient of the reward with an optimization value of 0.4572. Meanwhile, using the WP method, the alternative who is entitled to receive the reward is also A1 in the name of Boy Eduardo, S.Kom with a preference value of 0.193116. Both methods, namely MOORA and WP, can be applied in a decision support system for the assessment of the performance of outstanding education personnel. After comparing each weight between the MOORA and WP methods, it can be concluded that the MOORA method is faster, more precise, and easier in producing alternative values, so this method is considered the most effective to solve the case.

REFERENCES

[1] R. Y. Simanullang and M. Mesran, "Application of Multi-Objective Optimization Method on the Basis of Ratio Analysis (MOORA) with Centroid Order (ROC) Rank Weighting in the Best Teacher Selection Decision Support System," *CLICK Review. Ilm. Inform. and Compost.*, vol. 3, no. 5, pp. 466–475, 2023.

[2] A. Juanda *et al.*, "Permanent Employee Election Decision Support System at Trinity Teknologi Nusantara Using the Moora Method," *JIKOMSI*, vol. 3, no. 3, pp. 277–282, 2021, doi: http://ejournal.sisfokomtek.org/index.php/jikom/article/view/131.

[3] S. Rahayu and A. S. Sinaga, "Decision Support System for Teacher Performance Assessment Using the Simple Additive Weighting (SAW) Method," *J. SAINTIKOM (Journal of Management Science. Inform. and Computer)*, vol. 21, no. 1, pp. 16–24, 2022.

[4] P. M. Robaha, H. Sutejo, and N. S. Irjanto, "Decision Support System for Teacher Performance Assessment Using the EDAS Method," *Progressive J. Ilm. Computer.*, vol. 20, no. 2, 2024.

[5] S. Rahayu and A. Sindar, "Decision Support System for Teacher Performance Assessment Using the Simple Additive Weighting Method," *J. Computing Science. and Inform.*, vol. 2, no. 2, pp. 103–112, 2022, doi: 10.54082/jiki.28.

[6] R. F. Wahyu and F. Gea, "Bulletin of Information Technology (BIT) Decision Support System for the Best Employee Selection in Parking Areas Applying the MOORA Method," *J. Techno. Sist. Inf. and Sist. Computer. TGD*, vol. 2, no. 3, pp. 103–113, 2021.

[7] R. D. Arista, "Journal of Business Economics Informatics MOORA as a Decision Support System in Measuring Lecturer Performance Levels," vol. 2, 2020, doi: 10.37034/infeb.v2i4.52.

[8] Y. Mubarok and A. D. Indriyanti, "Decision Support System for Assessment of Outstanding Education Personnel Using the

Website: https://journal.fkpt.org/index.php/Explorer DOI: https://doi.org/10.47065/explorer.v6i1.2587

Saw Method (Simple Additive Weighting) at the State University of Surabaya," vol. 02, no. 01, pp. 15–20, 2021.
[9] D. P. Utomo and B. Purba, "Decision Support System for Performance Assessment of Education Personnel (TENDIK) Using the SMARTER Method," *J. Komtika (Computing and Inform.*, vol. 5, no. 2, pp. 140–152, 2021, doi: 10.31603/komtika.v5i2.5619.
[10] P. A. R. Devi and M. Ichsan, "The Application of the MOORA Method in the Selection of Outstanding Educators and Education in Higher Education," *Jutisi J. Ilm. Tek. Inform. and Sist. Inf.*, vol. 11, no. 1, p. 143, 2022, doi: 10.35889/jutisi.v11i1.817.
[11] S. Sutandi and D. Jollyta, "Combination of Decision Support Methods for the Placement of Higher Education Personnel," *J. Mhs. Apl. …*, vol. 2, no. 1, pp. 24–27, 2020.
[12] A. Apandi, "The Best Teacher Assessment Decision Support System with the Additive Ratio Assessment (ARAS) Method," *Sem. Nas. Technology. Computer. …*, pp. 476–483, 2020.
[13] M. I. Fikri, E. Haerani, I. Afrianty, and S. Ramadhani, "Decision Support System for Teacher Performance Assessment Using Multi Attribute Utility Theory (MAUT) Method," vol. 9, no. 5, pp. 1271–1280, 2022, doi: 10.30865/jurikom.v9i5.4791.
[14] A. Ahyuna, B. Rahman, F. Nugroho, I. W. S. Nirawana, and A. Karim, "Analysis of the Application of the MABAC Method with Entropy Weighting in Lecturer Performance Assessment in the Society 5.0 Era," *Build. Informatics, Technol. Sci.*, vol. 5, no. 1, pp. 29–39, 2023.
[15] D. Febrina and I. Saputra, "The Application of Multiobjective Optimization on the Basis of Simple Ratio Analysis (MOOSRA) in the Selection of the Best Local Content," *J. Comput. Syst. Informatics*, vol. 2, no. 3, pp. 10–19, 2021.
[16] S. Sihombing and A. M. H. Sihite, "The Best Village Head Election Decision Support System in Batang Kuis District Using the MOORA Method," vol. 6, no. November, pp. 151–158, 2022, doi: 10.30865/comics.v6i1.5757.
[17] P. Marpaung, R. F. Siahaan, and ..., "Implementation of the MOORA Method on Decision Support Systems for the Selection of the Best Hotel in Medan City," *J. …*, vol. 7, no. 2, pp. 191–200, 2022.
[18] N. Agustina and E. Sutinah, "Application of the MOORA Method to the Decision Support System for the Selection of Digital Wallet Applications," *InfoTekJar J. Nas. Inform. and Technology. Jar.*, vol. 6, no. 2, pp. 300–304, 2022.
[19] A. T. Hidayat, N. K. Daulay, and Mesran, "Application of the Multi-Objective Optimization Method on The Basis of Ratio Analysis (MOORA) in the Selection of the Best Salesperson," *J. Comput. Syst. Informatics*, vol. 1, no. 4, pp. 367–372, 2020.
[20] A. G. Alwani and D. Avianto, "A Comparison of Product Weight Method and Simple Addition Weight Method in Employee Selection System," *Int. J. Softw. Eng. Comput. Sci.*, vol. 3, no. 3, pp. 365–376, 2023, doi: 10.35870/ijsecs.v3i3.1826.
[21] Y. Laia, I. G. I. Sudipa, D. S. Putra, P. Rosyani, and R. Aryanti, "Decision Support System for Performance Assessment of Honorary Personnel Applying Weighted Product (WP) and Complex Proportional Assessment (COPRAS) Methods with a Combination of Centroid Order Rank Order (ROC) Weighting," vol. 2, no. 1, 2023.