ACCURACY ANALYSIS OF WP, AHP-WP, ENTROPY-TOPSIS METHODS IN DETERMINING MAJORS

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Abstract
Determination of majors at SMK AR Rahma is still manual and Excel is only used to find average scores. On the other hand, the number of students is around 140 students, so the majors can cause inaccuracies. In this study, the accuracy of the WP, AHP-WP, and ENTROPY-TOPSIS methods was analysed in determining the majors of SMK AR Rahma's students. So that it will be known which method is more accurate in producing student majors. In the process of student majors, data are needed in the form of report cards, academic test scores, major test scores and health scores. The result is that the majors produced by the AHP-WP method are more accurate than those produced by the other two methods, respectively by 70.71%, 64.29%, and 62.86%.

Keywords: computerized system, decision, decision support system, recommendation

INTRODUCTION

The majors available at SMK AR Rahma Mandiri Indonesia Pasuruan include Medical Laboratory Engineering, Software Engineering, Online Business and Marketing, Electrical Power Installation Engineering, and Motorcycle Business and Engineering. The process of determination of majors carried out at SMK AR Rahma is still manual and Excel is only used to find the average score. Meanwhile, the number of students is around 140 students. If the number of students in the SMK increases, then the student's majoring process can cause inaccuracies.

Therefore, a computerized system/application is needed to help determine students' majors. A computerized system can help produce an appropriate, accurate, and quick decision in making student majoring decisions. This system is known as a decision support system. A decision support system uses knowledge in processing decisions. Knowledge is formed from data. To be useful, data will be processed to change into information and later the knowledge [1]. Thus, knowledge should be managed and it is better to collaborate socio aspects and technical ones to yield better decisions [2].

Previous research is related to the AHP-TOPSIS and AHP-WP methods [3]. This research focuses on applying for PMW (Entrepreneurial Student Program) loans at UNSEC (UNNES Student Entrepreneurship Center). The results of

the study obtained Hamming distance of 86%, an execution time of 31.601 seconds for the AHP-TOPSIS combination method, and Hamming distance of 58% and an execution time of 17.946 seconds for the AHP-WP method combination.

Another research is related to the combination of AHP-SAW and AHP-WP methods [4]. This research focuses on the best E-commerce in Indonesia which is determined based on the weight of the criteria. The results of this study indicate that the alternative "bukalapak" is the best e-commerce with an AHP-SAW preference value of 0.8543 and AHP-WP of 0.1711.

Furthermore, research related to Culinary Business Recommendation Application Using Promethee-II Method [5]. This research focuses on an Android-based mobile application platform using GPS sensors to determine the location of new businesses. This research resulted in alpha testing and user acceptance tests; it was concluded that the successfully built application could provide information to prospective business people regarding the recommended culinary types.

Next is research related to the combination of AHP and WP methods [6]. This research focuses on determining the performance evaluation of teaching assistants. The results of testing the AHP and WP methods produce the best alternative ranking through WP calculations with a final preference value of

0.0107 as the best alternative while a96 with a final preference value of 0.0034 as the lowest alternative with an execution time of 1.27 seconds.

Further research related to the combination of the TOPSIS-ENTROPY method [7]. This research focuses on determining student achievement scholarship recipients based on objective criteria. This research found that the achievement record criterion is the main criterion in determining students receiving this scholarship and all criteria are valid. The output of this system is the ranking of students based on their preference scores.

Next is research related to the combination of the ENTROPY-TOPSIS method [8]. This research focuses on the usability analysis of university websites in Indonesia. The results of the comparison of the ranking of academic websites of five universities in Indonesia calculated based on the usability value using the TOPSIS method have a significant value equal to the ranking based on the Webometrics release.

Then research related to the comparison of C5.0 and Naïve Bayes classification methods [9]. This research focuses on determining the majors of high school students. This research produces an accuracy value of 60.87% for the C5.0 algorithm while for Naïve Bayes it is 56.52%. From the results obtained, the C5.0 algorithm is the best method compared to Naïve Bayes as evidenced by the higher accuracy rate obtained.

Other research relates to the comparison of Electre and K-NN similarity methods [10]. This research focuses on choosing the concentration of vocational students' majors. The results of testing the 2 methods show that the use of KNN is better than Electre, it is proven that K-NN produces 75% accuracy and 66% precision, while the use of the Electre algorithm produces 75% accuracy and 50% precision.

The next research is related to the profile matching method, SAW, and a combination of both [11]. This research focuses on recommending the specialization of new students in the K-13 curriculum. This study's results indicate that the SPK application can help PPDB activities with an accuracy of 79.2%. In determining students' interests, the combination method is the most dominant with a percentage of 78%. The application of SPK not only helps the specialization process to be faster but also accurate. This is evidenced by only 6 out of a total of 122 students who choose a specialization based on SPK recommendations to get scores below the KKM.
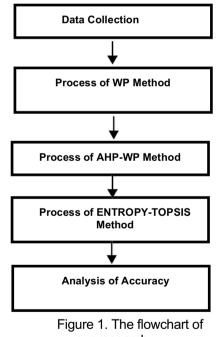
Furthermore, research related to AHP-WP Method Comparison [12]. This research focuses on the majors of vocational students. This study resulted in an accuracy rate of 83.33% obtained from 84 Class X students of SMK Al-Khoeriyah.

In [13], TOPSIS was found as the sensitive method compared to SAW method. The more sensitive method is hoped to obtain better recommendation result.

Meanwhile, the authors did the research to analyze the accuracy level of the WP, AHP-WP, and ENTROPY-TOPSIS methods. This research focuses on the accuracy level of the three methods. This research provides recommendations for methods with the best accuracy in determining majors at SMK AR Rahma, and we found that the AHP-WP method gave the highest results compared to the WP and ENTROPY-TOPSIS methods.

METHOD

The method of this research is shown in Figure 1.

Figure 1. The flowchart of our research

Data Collection

The data used in this study are all students in Class X at SMK AR Rahma Mandiri Indonesia Pasuruan, totaling 140 students. Data were taken from the results of the school majors test at SMK AR Rahma Mandiri Indonesia.

The data obtained in the interview at SMK AR Rahma Mandiri Indonesia Pasuruan was then analyzed. Data analysis produces criteria and alternatives used in the selection of majors. The criteria are then sorted based on the Saaty scale

[14], to find out which criteria are the most important to the less important. The following criteria are obtained. 1) Majoring Test, 2) Health test, 3) Academic test 4) Report card score

Process of WP Method
Calculation Method

This method is a calculation with criteria and alternatives so that it can help decision-making with accurate calculations [15]. It uses multiplication as a benefit to connect attribute ratings, where the rating of each attribute must first be multiplied by the corresponding weight. This process is the same as the normalization process. Preferences for alternative S_i are given in Equation (1)-(3) below:

$$W_j = \frac{w_j}{\sum w_j} \tag{1}$$

$$S_i = \prod_{j=1}^{n} X_{i_j}^{W_j} \tag{2}$$

$$V_i = \frac{S_i}{\sum S_i} \tag{3}$$

Where:
V = Alternative preferences analogized as vector *V*
W = Weight of criteria/sub-criteria
j = Criteria
i = Alternative
n = Number of criteria
S = Alternative preference analogized as *S* vector

The steps in calculating the Weighted Product method are:
1. Transferring all attributes for all alternatives with weights as positive powers for cost attributes.
2. The multiplication results are summed to produce a value for each alternative.
3. Divide the *V* value for each alternative by the value of each alternative.
4. Find the best alternative sequence that will be the decision.

Process of AHP-WP Method

This research uses the AHP method to determine the objective weight value. Then use the WP method to perform ranking.
a. The steps for determining the weight of criteria and sub-criteria using the AHP method are as follows:
  1. Define the problem and present the desired solution.
  2. Create an introductory hierarchical structure with the main goal.

3. Create a pairwise comparison matrix for each criterion using the pairwise comparison rating scale table.
4. Use the priorities from the pairings to calculate the priority weights. Do this for all elements.
5. Repeat steps 3, 4, and 5 for all levels of the hierarchy.
6. Consistency measure to test the consistency of decision makers when performing pairwise comparisons. The consistency measure has a Consistency Ratio, which is useful for knowing whether it is necessary to revise the pairwise comparison matrix that has Equation (4), and Equation (5).

$$CI = \frac{\lambda\max - n}{n-1} \tag{4}$$

$$CI = \frac{CI}{R} \tag{5}$$

where,
   CI: Consistency Index
   RI: Random Index
   The *RI* value is based on

The value of λ is obtained from the product of each column in the original pairwise matrix with the relative weight (priority) of the decision element that corresponds to that column and summing the results.
- The λ value is obtained by multiplying each column of the original pairwise matrix by the relative weight (priority) of the decision element that corresponds to that column and summing the results.
- The λmax value is the average value of all λ criteria values.
- If the value of λmax=*n* then the assessment is consistent while λmax>*n* then there is inconsistency in the assessment so it is necessary to see the consistency ratio value.
- If the *CR* value ≤ 0.1 then it is consistent, if the *CR* value > 0.1 then it is inconsistent.

b. The steps of evaluating decision alternatives using the WP method are as follows:
Calculate the value/score for alternatives with the formula in Equation (6)

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

With

S_i = Alternative preferences analogized as a vector

X_{i_J} = Criteria value

w_j = Weight of criteria

n_j = Number of criteria

W_j is a positive rank for the profit attribute and a negative for the cost attribute.

Determine the best alternative priority of each alternative using Equation (7).

$$V_i = \frac{S_i}{\sum S_i} \quad\quad (7)$$

Sorting the best alternatives based on the V_i value from the largest to the smallest value. The largest V_i value is the best alternative.

Process of ENTROPY-TOPSIS Method

1. The length of time that can be emailed using the Entropy method is as follows:

Step 1: Data normalization

Entropy's first step in processing data is to normalize the data. Several normalization technique formulas can be used to normalize data depending on the data to be lost. The data has a range between the normalization result of 0 and 1.

Step 2: Calculate the number of normalized data values. The formula for the number of normalized data values is shown in Equation (8):

$$d_i = \sum_{k-1}^{m} dik \quad\quad (8)$$

Description:

d_i = number of normalized data values

d_i^k = normalized data value

Step 3: Entropy measurement for each i-th attribute. The formula for measuring Entropy is given in Equation (9) and Equation (10):

$emax$ = In m, where m is the number of alternatives (universities).

In 20 = 2.996

K = 1/$emax$

$$K = \frac{1}{2.996} = 0.3338 \quad\quad (9)$$

Step 4:

$$e(di) = -k \sum_{k=1}^{m} \frac{d_i^k}{D_i} In \frac{d_i^k}{D_i} \quad\quad (10)$$

After obtaining $e(di)$ for all criteria, it is possible to obtain the total entropy for all criteria, and the underlying assumption is that this is the case:

$$\begin{array}{l} m \\ E = \sum e(di) \\ I = 1 \end{array}$$

Step 5: Calculate the weight using the following formula:

n = number of criteria, namely 4

So that the weight is obtained with the following formula on Equation (11):

$$\lambda i = \frac{1}{n-E}[1 - e(d_{i)}] \quad\quad (11)$$

If the sum of the weights is determined by the above criteria, it is 1.

2. TOPSIS Ranking Method

The TOPSIS method has been recognized as a valid method in decision-making and is widely used in some decision-making. The TOPSIS method ranking concept is widely used in several Multi-Criteria Decision Making (MCDM) models in decision making because the concept is clear and the process is easy to understand. In addition, this computational method is quite effective and has the ability to reduce work alternatives.

When composing a case using the TOPSIS method with a big clear voice, it can be grouped into five stages:

a. Creating a normalized decision matrix

b. Creating a weighted normalized decision matrix

c. Determine the positive ideal solution matrix and negative ideal solution matrix

d. Determining the distance between the value of each alternative with a positive ideal solution matrix and a negative ideal solution matrix.

e. Determining the preference value for each alternative.

RESULTS AND DISCUSSION

Results of WP Method

The calculation of the WP method aims to determine student majors and serves as a means to accelerate decision-making at

vocational high schools, the following are the steps in calculating the WP method**.**

1. Determining Variables In the calculation of student major selection using the WP method. The following is a grouping of criteria for the assessment of student major selection shown in Table 1.

Table 1. Student Assessment Table

NO	Name	Marks			
		K1	**K2**	**K3**	**K4**
1	A1	55.4	64	55	95
2	A2	51	80	77	95
3	A3	41.71	75	73	95
4	A4	45.57	66	63	95
5	A5	45.35	56	61	95

2. Determining Criteria and Criteria Weights. Criteria weights are used to determine the value of *W*. The criteria data and criteria weights are as follows:

Table 2. Determination of Criteria Weight (*W* Value)

	Criteria		Weight
C1	Marks of Report	3	0.20
C2	Marks of Academic	4	0.27
C3	Marks of Majors	5	0.33
C4	Health	3	0.20

3. Determining criteria categories of all the criteria in the selection of outstanding students, it is determined that all of them are beneficial, because the higher the value of the criteria the better / more profitable.

4. Fix the weight value first so that $\sum W$=1. The weight value of the criteria (W) is to be corrected as listed in Table 2 above. The calculation of weight improvement obtained the following results:

$$w1 = \frac{w1}{w1 + w2 + w3 + w4}$$
$$= \frac{0.20}{0.20 + 0.27 + 0.33 + 0.20}$$
$$= \frac{0.20}{1} = 0.20$$
$$w1 = \frac{w1}{w1 + w2 + w3 + w4}$$
$$= \frac{0.27}{0.20 + 0.27 + 0.33 + 0.20}$$
$$= \frac{0.27}{1} = 0.27$$

$$w1 = \frac{w1}{w1 + w2 + w3 + w4}$$
$$= \frac{0.33}{0.20 + 0.27 + 0.33 + 0.20}$$
$$= \frac{0.33}{1} = 0.33$$
$$w1 = \frac{w1}{w1 + w2 + w3 + w4}$$
$$= \frac{0.20}{0.20 + 0.27 + 0.33 + 0.20}$$
$$= \frac{0.20}{1} = 0.20$$

5. Calculating the vector *S* Multiplying all attributes for an alternative with weights as follows:
    X_{ij} In the above comparison, numerical criteria are expressed for each attribute, while for each criterion, w_j is the numerical threshold

$S_1 =(55.4^{0.20})(64^{0.27})(55^{0.33})(95^{0.20}) = 63.97577$
$S_2 = (51^{0.20})(80^{0.27})(77^{0.33})(95^{0.20}) =74.71015$
$S_3 = (41.71^{0.20})(75^{0.27})(73^{0.33})(95^{0.20}) = 69.29736$
$S_4= (45.57^{0.20})(66^{0.27})(63^{0.33})(95^{0.20}) = 64.90414$
$S_5 = (45.35^{0.20})(56^{0.27})(61^{0.33})(95^{0.20}) = 61.9791$

6. Preferential Treatment (V_i) for Ranking Obtain results by performing calculations with the ratios of the values of each multiplication. The V_i value is used by ignoring the initial result. of each vector value *S* (S_i) with the total number of vector values *S*

$$V1 = \frac{63.97577617}{9954.514071} = 0.00643$$
$$V2 = \frac{74.10159}{9954.51407} = 0.00751$$
$$V3 = \frac{69.29736}{9954.51407} = 0.00696$$
$$V4 = \frac{64.90414}{9954.51407} = 0.00652$$
$$V5 = \frac{61.39791}{9954.51407} = 0.00617$$

Results of AHP-WP Method

A. The AHP method is used for Weight Criteria Calculation to produce a pairwise comparison matrix of each criterion and to determine the threshold at which each criterion is considered, with the aim of cutting weights based on Eigen Vector. In the first step, enter the data for each criterion and alternative, as in Table 3 and Table 4.

Table 3. Criteria Values for Each Alternatives

Marks			
K1	**K2**	**K3**	**K4**

A1	55.4	64	55	95
A2	51	80	77	95
A3	41.71	75	73	95
A4	45.57	66	63	95
A5	45.35	56	61	95

Table 4. Importance Ratio

NO	Criteria	Level of Importance
1	Marks of report	5
2	Marks of Academic	4
3	Marks of Majors	3
4	Health of Values	2

Then do a pairwise comparison matrix as shown in Table 5 as follows:

Table 5. Pairwise Comparison Matrix

	K1	K2	K3	K4
K1	1	3	5	2
K2	0.33	1	3	2
K3	0.2	0.33	1	0.33
K4	0.5	0.5	3	1

Then normalizing the pairwise matrix can be seen in Table 6 below.

Table 6. Pairwise Matrix Normalization Results

	K1	K2	K3	K4	Sum	Preferences
K1	0.49180	0.6207	0.41666	0.375	1.90416	0.47603
K2	0.16393	0.20689	0.25	0.375	0.99583	0.24896
K3	0.09836	0.06896	0.08333	0.0625	0.31316	0.07829
K4	0.24590	0.1034	0.25	0.1875	0.78685	0.19671

Calculation of *CR* (Consistency Ratio)
The steps to calculate the *CR* value are as follows:

a) Calculating the weight vector (Table 7)

Table 7. Criteria Weight Vector

	K1	K2	K3	K4	Weight Vector
K1	0.47603	0.7468	0.39144	0.39342	2.00778
K2	0.15868	0.24895	0.23487	0.39342	1.03593
K3	0.09520	0.08298	0.07829	0.06557	0.32205
K4	0.23801	0.12447	0.2348	0.19671	0.79408

b) Calculating the maximum lambda value. in the following way:

$$\lambda \max = \frac{2.00778}{0.47603} + \frac{1.03593}{0.24895} + \frac{0.32205}{0.07828}$$
$$+ \frac{0.79408}{0.19671}/4 = 4.13228$$

c) Calculating the *CI* (Consistency Index) value

Ci. $\frac{4.13228-4}{4-1} = 0.04409$

d) Calculating the *CR* (Consistency Ratio) value

Based on Table 3, the *RI* value used for matrix size (n) = 4 is 0.90. By using equation (2), the *CR* value is obtained as follows:

$CR.\dfrac{0.04409}{0.9} = 0.04899$

The resulting *CR* is 0.04899 or *CR* <0.1. then the pairwise matrix used is declared consistent.

The next step is to reduce the threshold value of the criteria by using the same strategy used to reduce the threshold value of the criteria so that the threshold is reached by the criteria. Criteria *p* are resented in Table 8.

Table 8. Criteria

Criteria	Final Weight
K1	0.4760
K2	0.2489
K3	0.0780
K4	0.1970

B. WP calculation

Calculating the alternative value or vector *S* using Equation (3). Some are given on Table 9.

$S = (6.75943)^{0.4760}(2.81551)^{0.2489}$
$(1.36693)^{0.0780}(2.45251)^{0.1970}$
$= 63.8012$

Table 9. Calculation Value of Total *S* Vector

	K1	K2	K3	K4	Total Vector S
A1	6.75943	2.81551	1.36693	2.45251	63.8012
A2	6.49835	2.97631	1.40328	2.45251	66.5641

A3	5.905 19	2.928 88	1.397 45	2.4525 14	59.27 72
A4	6.159 29	2.837 16	1.381 49	2.4525 1	59.20 74
A5	6.145 12	2.723 47	1.378 02	2.4525 1	56.56 16

The calculation of the preference value V_i of alternative information is the S vector value that has been obtained for each alternative, by dividing it by the total value of the S vector as a whole, and the results can be seen in the following Table 10.

$$V_I = \frac{63.8012}{9675.08302} = 0.0066$$

Table 10. Total Preference Calculation Value V_i

Alternatives	Preferences Values Vi
A1	0.00659
A2	0.00688
A3	0.00613
A4	0.00612
A5	0.00585

Result of the ENTROPY-TOPSIS Method
A. Process with Entropy

The data that has been collected cannot be processed into the Entropy process directly. Since each criterion to be evaluated here has a very different range of data, it is necessary to normalize the data faster to make it more reliable. The data normalization technique that will be used for this round of operations is shown by one example of data in the calculation below. Table 11 shows the results.

$$\frac{55.40}{83.05} = 0.00639$$

Table 11. Data Normalization

	K1	K2	K3	K4
A1	0.00639	0.00672	0.00575	0.00714
A2	0.00588	0.00840	0.00805	0.00714
A3	0.00481	0.00787	0.00763	0.00714
A4	0.00525	0.00693	0.00659	0.00714
A5	0.00523	0.00588	0.00638	0.00714

To further find the weighted normalized as depicted in Table 12. One example of the calculation of data is shown below:

$$\frac{0.00639}{104.36785} = 0.00639$$

Table 12. Weighted Data Normalization

	K1	K2	K3	K4
A1	0.00639	0.00672	0.00575	0.00714
A2	0.00588	0.00840	0.00805	0.00714
A3	0.00481	0.00787	0.00764	0.00714
A4	0.00525	0.00693	0.00659	0.00714
A5	0.00523	0.00588 0	0.00638	0.00714

In Table 13, we can see the value of $\ln\frac{d_i^k}{D_i}$

Table 13. Table $\ln\frac{d_i^k}{D_i}$

	K1	K2	K3	K4
A1	-5.05278	-5.00258	-5.15748	-4.94164
A2	-5.13553	-4.77943	-4.82101	-4.94164
A3	-5.33662	-4.84397	-4.87436	-4.94164
A4	-5.24811	-4.97181	-5.02168	-4.94164
A5	-5.25295	-5.13611	-5.05394	-4.94164

From Table 11 and Table 12, they are then multiplied so as to obtain values such as the following Table 14.

$$\frac{0.00639}{-5.05278} = -0.03229$$

Table 14. Table $\frac{d_i^k}{D_i} \ln \frac{d_i^k}{D_i}$

	K1	K2	K3	K4
A1	-0.03229	-0.03362	-0.02968	-0.03529
A2	-0.03021	-0.04015	-0.03885	-0.03529
A3	-0.02568	-0.03814	-0.03724	-0.03529
A4	-0.02759	-0.03445	-0.03311	-0.03529
A5	-0.02748	-0.03020	-0.03226	-0.03529

Table 15 below shows the value of $e(d_i)$ for each criterion.

$$0.20236 / -4.79610 = 0.98877$$

Table 15. Table $e(d_i)$

	K1	K2	K3	K4
e(di)	0.98877	0.98880	0.98937	0.99157
1- e(di)	0.01122	0.01119	0.01062	0.00842

Finding the Entropy weight using the formula below is the next step.

$$\frac{0.01122}{0.04146} = 0.27070$$

The results of the Entropy weight calculation for each criterion can be seen in Table 16 below.

Table 16. Entropy Weight Table

Criteria	Weight
K1	0.27070
K2	0.27003
K3	0.25618
K4	0.20307

From the results of the calculation, it is obtained that the highest weight is the most dominant in the report card criteria, which is worth 0.27070 and it has the smallest weight in the health score criteria with a weight of 0.20307.

B. Ranking with TOPSIS Method

The normalized data and weights for each criterion are obtained from the two processes described above. The data from the paragraphs will then be used with the TOPSIS method to produce higher precision.
The ranking processing process with the TOPSIS method is carried out in the following way:

1. Calculation of the normalized decision matrix. This formula is used to determine the normalized decision matrix:

$$\frac{55.4}{74.81379} = 0.07458$$

From the calculation results, a normalized decision matrix table is obtained which is shown in Table 17 below:

Table 17. Normalized decision matrix table

	K1	K2	K3	K4
A1	0.07458	0.07846	0.06737	0.08451
A2	0.06865	0.09807	0.09432	0.08451
A3	0.05615	0.09194	0.08942	0.08451
A4	0.06134	0.08091	0.07717	0.08451
A5	0.06105	0.06865	0.07472	0.08451

2. Calculating the weighted normalized decision matrix. To get the normalized metric for the weights, one has to apply the metric for the weights obtained from the weight search using the Entropy method. The formula used is:

$$\frac{0.00639}{0.27070} = 0.00173$$

The results are as shown in Table 18 below:

Table 18. Weighted Normalized Decision Matrix Table

	K1	K2	K3	K4
A1	0.00173	0.00181	0.00147	0.00145
A2	0.00159	0.00226	0.00206	0.00145
A3	0.00130	0.00212	0.00195	0.00145
A4	0.00142	0.00187	0.00168	0.00145
A5	0.00141	0.00158	0.00163	0.00145

3. Give examples of positive and negative ideal solutions. Positive and negative ideal solutions are determined by identifying the significant values and boundary values of the model statements. weighted normalized. The ideal solution matrix can be seen in Table 19 below.

Table 19. Positive and negative ideal solution matrix table

	K1	K2	K3	K4
A+	0.00259	0.00259	0.00235	0.00145
A-	0.00130	0.00127	0.00128	0.00145

4. Establishes a clear distinction between positive and negative ideal mathematical solutions for each alternative. The formula calculates the distance between the value of each alternative and the positive ideal solution matrix:

$(0.0017-0.00259)^2 + (0.00181-0.00259)^2 + (0.00147-0.00235)^2 + (0.00145-0.00145)^2 = 0.00141$

Alternatively, to reduce the gap between the ideal mathematical solution of each alternative and the ideal mathematical solution, use the following example:

$(0.00173-0.00127)^2 + (0.00181-0.00127)^2 + (0.00147-0.00128)^2 + (0.00145-0.00145)^2 = 0.00325$

The results of the interaction with the two formulas above will be displayed in Table 20 below.

Table 20. Distance Table between the Values of Each Alternative

Di+	Di-
0.00141	0.00325
0.00106	0.00374
0.00140	0.00348
0.00148	0.00323
0.00165	0.00305

5. Calculate the preference value for each

alternative. The preference value for each alternative to be considered is based on the following calculation:

$$\frac{0.00325}{0.00325 + 0.00141} = 0.69726$$

The results of the preference calculation can be seen in Table 21 below.

Table 21. Preference Table

Student Name	*Vi*
A1	0.69727
A2	0.77827
A3	0.71325
A4	0.68542
A5	0.64852

Accuracy Level Analysis

Analysis of the level of accuracy between the comparison of AHP-WP and WP methods that stand alone with the same case study, namely about majors, the accuracy rate is 70.71% for the accuracy rate of the AHP-WP method. While the accuracy rate of the WP method stands alone, it has a percentage of 64.29%.

As for the accuracy level of the AHP-WP and ENTROPY-TOPSIS method comparison, the accuracy level is 62.86% for the ENTROPY-TOPSIS method accuracy level. While the AHP-WP method accuracy level has an accuracy level of 70.71%.

So, it can be concluded from the above analysis that the WP, AHP-WP, and ENTROPY-TOPSIS methods are suitable and those with a large level of accuracy can be recommended for student majors in vocational schools. the method that has a large percentage accuracy rate is the AHP-WP method of 70.71%.

CONCLUSION

Based on the results and analysis of the previous section, the possible conclusions are as follows. Experiments that have been conducted to determine the accuracy of the results of using the WP method, AHP-WP, and ENTROPY-TOPSIS, for the combination of AHP-WP methods has better accuracy results than with either stand-alone WP or ENTROPY-TOPSIS calculations. The AHP-WP method got a percentage of 70.71% while the calculation of ENTROPY-TOPSIS calculation got a percentage of 62.86%, and the calculation of WP got a percentage of 64.29%. Then the findings of this research are presented in a broader format, i.e., the method that the authors can recommend is the AHP-WP method

because it proved to be much accurate compared to the other two methods. Furthermore, the usage of the AHP-WP method in the recommendation of students' majors could accelerate the determination of those majors compared to the manual process.

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