



# Best Class Guard Decision Support System using AHP (Analytical Hierarchy Process) Method in Parulian 2 Medan Education Foundation

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## ABSTRACT

Creating a school that is competitive, of high quality and with achievement is one form of mission and vision that must be implemented in schools, especially in private homeroom teachers. To realize this desire, every school needs to further improve its services both regarding management techniques, assurance, quality so that schools are competitive, high quality and achievers. Therefore, to improve the quality of a school, the Parulian 2 Medan Education Foundation is faced with a problem with the quality of all homeroom teachers at the Parulian 2 Medan Education Foundation according to the criteria desired by the Parulian 2 Medan Education Foundation. And it becomes a burden for the foundation because there are many choices in determining which one is prioritized and must be compared so that it cannot be on time for the completion. For this reason, a decision support system is needed to determine the best homeroom teacher by using the AHP (Analytical Hierarchy Process) method with criteria such as honesty, loyalty, commitment, discipline and cooperation. The determination of the best homeroom teacher can be categorized as a multi-criteria case because there are several factors that give rise to various alternative choices with different values, so a system for determining the best homeroom teacher in the form of a decision support system is needed using the AHP (Analytical Hierarchy Process) method. From the analysis of determining the best class using the AHP (Analytical Hierarchy Process) method, which is stated as the best homeroom teacher for the 2020 period is Dewi Novita Sitorus with a value of 1.05. In building this decision support system using the PHP programming language and MySQL database.

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## 1. INTRODUCTION

Education is a basic and planned effort to create an atmosphere of learning and a learning process for students to actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and society. In the educational process, to improve the quality of education, several factors are supported, one of which is the homeroom teacher. The homeroom teacher is a teacher who helps the principal to guide students in realizing classroom discipline, as a manager and motivator to arouse students' passion / interest in achieving in class. Thus, the homeroom teacher must be given an award from each educational institution in terms of determining the best homeroom teacher for each academic year so

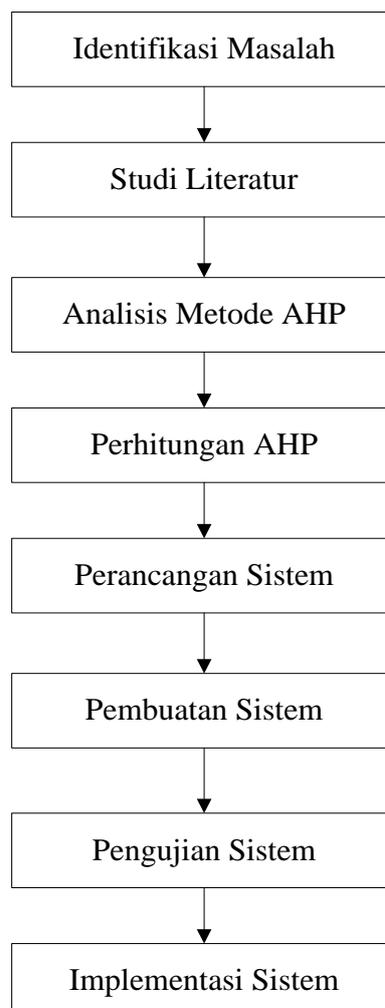
that the performance and quality and quality of a school's education can improve and excel and be able to compete with other schools.

With the development of technology, various management support systems were developed, including computer-based decision support systems (Computer Based Decision Support System). This system is a computer-based system designed to improve the ability of decision makers to solve semi-structured or unstructured problems.

Parulian 2 Medan Education Foundation is one of the educational foundations in Medan City, North Sumatra Province which manages various types of schools such as Kindergarten (Kindergarten), SD (Elementary School), Junior High School (Junior High School), SMA (Middle School). Top and SMK (Vocational High School). The Parulian 2 Medan Education Foundation conducts the selection of the best homeroom teacher from each level every year. The selection is still done manually, which is carried out by the principal using subjective assessments to each homeroom teacher.

## 2. RESEARCH METHOD

The software framework chosen in this study is the waterfall model which is a linear sequential process, the linear sequential model is a sequential software development process, where progress is seen as continuing to flow down like a waterfall through the analysis, design, coding and test phases. This model includes:



**Figure 1.** Research Framework

a. Problem Identification

The initial stage in identifying the problem by describing the problem. The problem in this study is that there is no system that can determine the selection of class teachers using a modern system at the Parulian 2 Medan Education Foundation.

- b. Literature Study  
In the literature study, researchers learn to deepen the theory by looking for reference sources from various books, research e-journals and other sources related to decision support systems using the AHP (Analytical Hierarchy Process) method.
- c. Analysis of AHP (Analytical Hierarchy Process) Method  
The research design determines the best teacher class at the Parulian 2 Medan Education Foundation using a Decision Support System using the AHP (Analytical Hierarchy Process) method.
- d. Calculation of AHP (Analytical Hierarchy Process)  
In carrying out the determination process, it is carried out by using AHP (Analytical Hierarchy Process) calculations, by taking into account several criteria that have been determined by the school in determining the best teacher class at the Parulian 2 Medan Education Foundation.
- e. System Design
- f. In this stage, the design of data structures, software architecture, interfaces and algorithms for the application of the AHP (Analytical Hierarchy Process) method is carried out for problem solving in determining the best teacher class at the Parulian 2 Medan Education Foundation.
- g. System Creation  
In this stage, the flotation is carried out from the planning that has been done previously. This process will create a systematic system in the form of the PHP programming language, to translate the detailed criteria that have been prepared by the school in determining the best teacher class at the Parulian 2 Medan Education Foundation.
- h. System Testing  
In this stage, testing of the data that has been input into the program is carried out to get the results of the design that has been done previously. This process will carry out a systematic system calculation in the form of the PHP programming language, to translate the detailed criteria that have been prepared by the school in determining the best class teachers at the Parulian 2 Medan Education Foundation.
- i. System Implementation  
This stage is an implementation of the system that has been created using the PHP programming language. As well as conducting training and program use guidelines for the Decision Support System using the AHP (Analytical Hierarchy Process) method at the Parulian 2 Medan Education Foundation.

### **2.1. Decision Support System (DSS)**

Decision Support System (DSS), in general, is defined as a system that is able to provide both problem-solving abilities and communication skills for semi-structured problems[1], [2]. In particular, DSS is defined as a system that supports the work of a manager or a group of managers in solving semi-structured problems by providing information or suggestions leading to certain decisions[3]–[6].

### **2.2. Analytical Hierarchy Process (AHP)**

The Analytical Hierarchy Process (AHP), developed by Thomas Saaty in the 1970s, is an alternative research method that performs comparative assessments by conducting simple pairwise comparative assessments used to develop overall priorities based on rankings[7]–[9]. AHP is a mathematically based procedure which is excellent and suitable for the evaluation of qualitative attributes. These attributes are mathematically quantified in a set of comparisons and then used to develop overall priorities for the arrangement of alternatives in a priority ranking order[10]. Analytical Hierarchy Process (AHP) is a method to describe a complex multi-criteria problem into a hierarchy, the hierarchy is defined as a representation of a complex problem in a multilevel structure where the first level is the goal, followed by the factor level, criteria, sub criteria and so on up to the level. the end of the alternative options[11], [12].

### 2.3. The steps and procedures in the AHP method

State that the stages or procedures in the AHP method include the following [10], [13]:

1. Defining the problem and determining the desired solution, then arranging a hierarchy of the problems at hand.
2. Determining Element Priority:
  - a. The first step in determining element priority is to make a pair comparison.
  - b. The pairwise comparison matrix is filled using numbers to represent the relative importance of one element to another.
3. Synthetic  
 Considerations for pairwise comparisons are synthesized to obtain overall priority. The things that are done in this step are:
  - a. Add up all the values from each column on the matrix.
  - b. Divide each value from the column by the total for the column in question to obtain a normalized matrix.
  - c. Add up the values from each row and divide by the number of elements to get the average value.
4. Measure Consistency  
 In making decisions, it is important to know how good the consistency is because we don't want judgmental decisions with low consistency. The things that are done in this step are:
  - a. Multiply each value in the first column by the relative priority of the first element, the value in the second column by the relative priority of the second element, and so on.
  - b. Add up each row.
  - c. The sum of the rows divided by the corresponding relative priority element.
  - d. Add the quotient above with the number of elements present, the result is called  $\lambda$  max.
5. Calculating the Consistency Index (CI) using the formula:

$$CI = \frac{(\lambda \text{ maks} - n)}{n}$$

Information :

n = number of elements

6. Calculating the consistency ratio (CR) using the formula:

$$CR = \frac{CI}{IR}$$

Information :

CR = Consistency Ratio

CI = Consistency Index

IR = Index Random Consistency

7. Checking Hierarchy Consistency

If the score is more than 10%, then the data judgment must be corrected. However, if the consistency ratio (CI / IR) is less or equal to 0.1 then the calculation result can be declared valid.

### 3. RESULTS AND DISCUSSION

Analysis of the AHP (Analytical Hierarchy Process) method is a method for solving a complex unstructured situation into several components in a hierarchical arrangement, by giving subjective values about the relative importance of each variable, and determining which variables have the highest priority in order to influence the results. in that situation.

The decision-making process is basically choosing the best alternative. Such as conducting problem structuring, determining alternatives, assigning likelihood values for alleatory variables, determining values, time preference requirements, and risk specifications. a single criterion.

The main tool of the Analitical Hierarchy Process (AHP) is to have a functional hierarchy with the main input being human perception. With a hierarchy, a complex and unstructured problem is solved into groups and arranged into a hierarchical form. The steps in problem solving in

determining the best homeroom teacher using the AHP (Analytical Hierarchy Process) method at the Parulian 2 Medan Education Foundation are as follows:

The formation of a hierarchical structure aims to solve a complex problem arranged into a hierarchical form. A hierarchical structure itself consists of elements that are grouped into levels. The top level is the target of the overall system. The next level consists of criteria- criteria for assessing or considering existing alternatives and determining these alternatives. Criteria and alternatives are 2 (two) very important components in the AHP (Analytical Hierarchy Process) process.

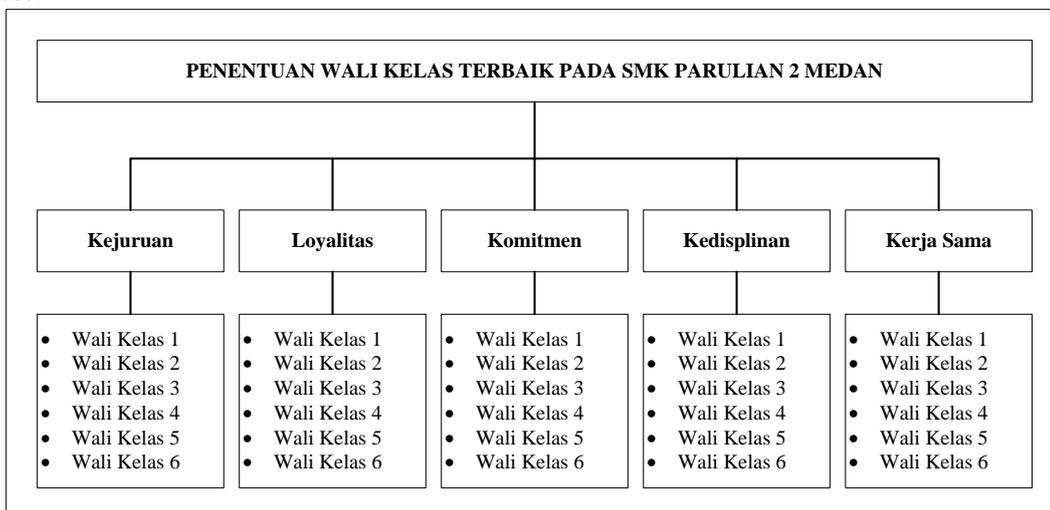


Figure 2. Sample Relationship Between Criteria and Alternatives in AHP

The criteria for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation are determined from the results of document collection that have been carried out at the Parulian 2 Medan Education Foundation, including:

1. Honesty
2. Loyalty
3. Commitment
4. Discipline
5. Cooperation

While the alternatives sampled in this study were 6 (six) homeroom teachers at the Parulian 2 Medan Education Foundation. The six homeroom teachers are as shown in the following figure:

Figure 3. Alternative homeroom teacher

**a. Assessment Criteria and Alternatives (Comparative Judgment)**

Criteria and alternatives are carried out with pairwise comparisons. For various problems using the AHP (Analytical Hierarchy Process) method, the scale used is 1 to 9, which is the best scale for expressing opinions. Criteria assessment is carried out to see the importance of a criterion by comparing one criterion with another. The value and definition of qualitative opinion from the time comparison scale can be measured using an analysis table such as the following.

Table 1. Pairwise Comparison Value

No	Intensitas Kepentingan	Keterangan
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1	1	Kedua elemen sama-sama pentingnya
2	3	Elemen yang satu sedikit lebih penting daripada elemen yang lainnya
3	5	Elemen yang satu lebih penting daripada yang lainnya
4	7	Satu elemen jelas lebih mutlak penting dari pada elemen lainnya.
5	2,4,6,8	Nilai-nilai antara dua nilai pertimbangan-pertimbangan yang berdekatan.
6	Kebalikan	Jika aktivitas i mendapat suatu angka dibandingkan aktivitas j, maka j memiliki nilai kebalikannya dibandingkan dengan i

Comparisons are made based on policies to make decisions by assessing the importance of one element to another. The pairwise comparison process starts at the top level of the hierarchy which is intended to select criteria, for example A, then the elements to be compared are taken, for example A1, A2, and A3. then the arrangement of the elements being compared will look like the pairwise comparison matrix below:

**Table 2.** Criteria Pairwise Comparison Matrix

KRITERIA	C1	C2	C3	C4	C5
Kejujuran (C1)	1	3	4	5	9
Loyalitas (C2)	0.3333	1	3	4	5
Komitmen (C3)	0.2500	0.3333	1	3	4
Kedisiplinan (C4)	0.2000	0.2500	0.3333	1	3
Kerja Sama (C5)	0.1111	0.2000	0.2500	0.3333	1
<b>Jumlah</b>	<b>1.8944</b>	<b>4.7833</b>	<b>8.5833</b>	<b>13.3333</b>	<b>22.0000</b>

The next step is to tabulate each column of criteria then divide by the weighted value, then look for the average of each row of these criteria. The average obtained for each row is the eigen value of the criteria weighting matrix, the results of which can be seen in Table 3. below:

**Table 3.** Matrix Value Criteria (Normalization)

KRITERIA	C1	C2	C3	C4	C5	Eigen Value
Kejujuran (C1)	0.5279	0.6272	0.4660	0.3750	0.4091	0.4810
Loyalitas (C2)	0.1760	0.2091	0.3495	0.3000	0.2273	0.2524
Komitmen (C3)	0.1320	0.0697	0.1165	0.2250	0.1818	0.1450
Kedisiplinan (C4)	0.1056	0.0523	0.0388	0.0750	0.1364	0.0816
Kerja Sama (C5)	0.0587	0.0418	0.0291	0.0250	0.0455	0.0400

After calculating, the criteria for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation use the AHP (Analytical Hierarchy Process) method, namely:

1. Honesty (C1) is (48%)
2. Loyalty (C2) of (25%)
3. Commitment (C3) of (14%)
4. Discipline (C4) of (8%)
5. Cooperation (C5) of (5%)

#### b. Alternative Assessment

An alternative assessment is carried out to compare each alternative choice based on predetermined criteria. The alternative choice for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation is determined by taking 3 (three) homerooms as a sample who has the highest level of discipline among other homeroom teachers. The best alternative homeroom teacher at the Parulian 2 Medan Education Foundation is Psalm Fredy Pangaribuan, Renta Panjaitan and Dewi Novita Sitorus. Before determining the alternative value for each sub-criterion, first determine the range of variable values for each sub-criterion. The range of variable values for each sub-criterion used is as follows:

**Table 4.** Variable Value Range

No	Range Value	Nilai
1	Kurang	41 - < 56
2	Cukup	56 - < 71
3	Baik	71 - < 86
4	Sangat Baik	86 - 100

1. Honesty

The weight value of the best homeroom teacher for the Medan Parulian 2 Education Foundation for the "Honesty" criteria can be seen in Table 5. below:

**Table 5.** Weights of Alternative Honesty

ALTERNATIF	A1	A2	A3
Mazmur Fredy Pangaribuan (A1)	0.7800	0.9200	0.6500
Renta Panjaitan (A2)	0.7500	0.8500	0.9500
Dewi Novita Sitorus (A3)	0.9600	0.9200	0.8400
<b>Jumlah</b>	<b>2.4900</b>	<b>2.6900</b>	<b>2.4400</b>

After determining the weight value for the "Honesty" criterion, the next step is to calculate the eigen value for each of the best homeroom alternatives at the Parulian 2 Medan Education Foundation, for example: The value is 0.7800 (in Column A1 and Row A1) compared to the number of columns A1 (2.4900 ) shown in Table 6. below:

**Table 6.** Examples of Alternative Supermatrix Criteria for Honesty

ALTERNATIF	A1	A2	A3	EV
Mazmur Fredy Pangaribuan (A1)	0.3133	0.3420	0.2664	0.9217
Renta Panjaitan (A2)	0.3012	0.3160	0.3893	1.0065
Dewi Novita Sitorus (A3)	0.3855	0.3420	0.3443	1.0718

Based on the eigenvalues obtained from the calculation results, it is known that the best alternative order of homeroom teacher at the Parulian 2 Medan Education Foundation for the criteria for "Honesty" is Renta Panjaitan (95%), Dewi Novita Sitorus (84%) and Psalm Fredy Pangaribuan (65%) ).

## 2. Loyalty

The weight value of the best homeroom teacher for the Medan Parulian 2 Education Foundation for the "Loyalty" criteria can be seen in Table 7. below:

**Table 7.** Alternative Loyalty Weights

ALTERNATIF	A1	A2	A3
Mazmur Fredy Pangaribuan (A1)	0.9500	0.8000	0.5500
Renta Panjaitan (A2)	0.7000	0.8400	0.9800
Dewi Novita Sitorus (A3)	0.7800	0.8000	0.9600
<b>Jumlah</b>	<b>2.4300</b>	<b>2.4400</b>	<b>2.4900</b>

After determining the weight value for the "Loyalty" criterion, the next step is to calculate the eigen value for each of the best homeroom alternatives at the Parulian 2 Medan Education Foundation, for example: The value is 0.9500 (in Column A1 and Row A1) compared to the number of columns A1 (2.4300 ) shown in Table 8. below:

**Table 8.** Alternative Supermatrix of Loyalty Criteria

ALTERNATIF	A1	A2	A3	EV
Mazmur Fredy Pangaribuan (A1)	0.3909	0.3279	0.2209	0.9397
Renta Panjaitan (A2)	0.2881	0.3443	0.3936	1.0259
Dewi Novita Sitorus (A3)	0.3210	0.3279	0.3855	1.0344

Based on the eigenvalues obtained from the calculation results, it is known that the best alternative order of homeroom teacher at the Parulian 2 Medan Education Foundation for the "Loyalty" criteria is Dewi Novita Sitorus at (100.3%), Renta Panjaitan at (100.2%) and Psalms Fredy Pangaribuan at (93%) ).

## 3. Commitment

The weight value of the best homeroom teacher for the Medan Parulian 2 Education Foundation for the "Commitment" criteria can be seen in Table 9 below:

**Table 9.** Weights of Alternative Commitments

ALTERNATIF	A1	A2	A3
Mazmur Fredy Pangaribuan (A1)	0.8500	0.8000	0.7800
Renta Panjaitan (A2)	0.9600	0.5500	0.6000
Dewi Novita Sitorus (A3)	0.7000	0.7300	0.6800
<b>Jumlah</b>	<b>2.5100</b>	<b>2.0800</b>	<b>2.0600</b>

After determining the weight value for the "Commitment" criterion, the next step is to calculate the eigen value for each of the best alternative homeroom teachers at the Parulian 2 Medan Education Foundation, for example: The value is 0.8500 (in Column A1 and Row A1) compared to the number of columns A1 (2,5100 ) shown in Table 10 below:

**Table 10.** Supermatrix Alternatives to Commitment Criteria

ALTERNATIF	A1	A2	A3	EV
Mazmur Fredy Pangaribuan (A1)	0.3386	0.3846	0.3786	1.1019
Renta Panjaitan (A2)	0.3825	0.2644	0.2913	0.9382
Dewi Novita Sitorus (A3)	0.2789	0.3510	0.3301	0.9599

Based on the eigenvalues obtained from the calculation results, it is known that the best alternative order of homeroom teacher at the Parulian 2 Medan Education Foundation for the "Commitment" criteria is Psalm Fredy Pangaribuan (100.10%), Dewi Novita Sitorus (95%) and Renta Panjaitan at (93%) ).

#### 4. Discipline

The weight value of the best homeroom teacher for the Medan Parulian 2 Education Foundation for the "Discipline" criteria can be seen in Table 11 below:

**Table 11.** Alternative Weights of Discipline

ALTERNATIF	A1	A2	A3
Mazmur Fredy Pangaribuan (A1)	0.6000	0.9300	0.5000
Renta Panjaitan (A2)	0.6400	0.8000	0.7400
Dewi Novita Sitorus (A3)	0.9300	0.6000	0.8000
<b>Jumlah</b>	<b>2.1700</b>	<b>2.3300</b>	<b>2.0400</b>

After determining the weight value for the "Discipline" criterion, the next step is to calculate the eigenvalues for each of the best homeroom alternatives at the Parulian 2 Medan Education Foundation, for example: The value of 0.6000 (in Column A1 and Row A1) is compared to the number of columns A1 (2.1700 ) shown in Table 12 below:

**Table 12.** Supermatrix Alternatives for Discipline Criteria

ALTERNATIF	A1	A2	A3	EV
Mazmur Fredy Pangaribuan (A1)	0.2765	0.3991	0.2451	0.9207
Renta Panjaitan (A2)	0.2949	0.3433	0.3627	1.0010
Dewi Novita Sitorus (A3)	0.4286	0.2575	0.3922	1.0782

Based on the eigenvalues obtained from the calculation results, it is known that the best alternative order of homeroom teacher at the Parulian 2 Medan Education Foundation for the "Discipline" criteria is Dewi Novita Sitorus at (100.7%), Renta Panjaitan at (100%) and Psalm Fredy Pangaribuan at (92%) ).

#### 5. Cooperation

The weight value of the best homeroom teacher for the Medan Parulian 2 Education Foundation for the criteria for "Cooperation" can be seen in Table 13 below:

**Table 13.** Weights of Alternative Cooperation

ALTERNATIF	A1	A2	A3
Mazmur Fredy Pangaribuan (A1)	0.9800	0.8700	0.8800
Renta Panjaitan (A2)	0.8000	0.6700	0.7700
Dewi Novita Sitorus (A3)	0.6000	0.8700	0.9400
<b>Jumlah</b>	<b>2.3800</b>	<b>2.4100</b>	<b>2.5900</b>

After determining the weight value for the "Cooperation" criterion, the next step is to calculate the eigen value for each of the best homeroom alternatives at the Parulian 2 Medan Education Foundation, for example: Value 0.9800 (in Column A1 and Row A1) compared to the number of columns A1 2.3800) which is shown in Table 14 below:

**Table 14.** Alternative Supermatrix of Cooperation Criteria

ALTERNATIF	A1	A2	A3	EV
Mazmur Fredy Pangaribuan (A1)	0.4118	0.3610	0.3398	1.1125
Renta Panjaitan (A2)	0.3361	0.2780	0.2973	0.9114
Dewi Novita Sitorus (A3)	0.2521	0.3610	0.3629	0.9760

Based on the eigenvalues obtained from the calculation results, it is known that the best alternative order of homeroom teacher at the Parulian 2 Medan Education Foundation for the criteria for "Cooperation" is Psalm Fredy Pangaribuan of (100.11%), Dewi Novita Sitorus of (97%) and Renta Panjaitan of (91 %).

#### c. Prioritization

Determination of priority solutions for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation is done by displaying an alternative weight matrix and criteria where the column is filled with the eigen value of each alternative against the criteria and the eigen value value of the previously calculated criteria. The determination of priority solutions for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation is as follows:

**Table 15.** Alternative Weights Matrix and Criteria

ALT/KRI	C1	C2	C3	C4	C5
Mazmur Fredy Pangaribuan (A1)	0.9217	0.9397	1.1019	0.9207	1.1125
Renta Panjaitan (A2)	1.0065	1.0259	0.9382	1.0010	0.9114
Dewi Novita Sitorus (A3)	1.0718	1.0344	0.9599	1.0782	0.9760
<b>EIGEN VALUE KRITERIA</b>	<b>0.4810</b>	<b>0.2524</b>	<b>0.1450</b>	<b>0.0816</b>	<b>0.0400</b>

After the alternative weight matrix and criteria are filled in, the next step is to calculate the total score for the priority solution of the best alternative choice of the best homeroom teacher at the Parulian 2 Medan Education Foundation, switching the eigen value matrix from the alternative with the eigen value of the criteria then totaling each row.

For example:

Column 1 and row 1 are = 0.9217

Multiplied by the EIGEN VALUE KRITERIA = 0.4810

The result = 0.4433

So for the calculation of priority for each column and row of the next matrix, so it can be seen in the following table:

**Table 16.** Matrix of the Results of the Multiplication of Alternative Eigenvalues with Criteria

ALT/KRI	C1	C2	C3	C4	C5	CHOICE
Mazmur Fredy Pangaribuan	0.4433	0.2371	0.1598	0.0751	0.0445	0.9599
Renta Panjaitan	0.4842	0.2589	0.1360	0.0817	0.0365	0.9973
Dewi Novita Sitorus	0.5156	0.2610	0.1392	0.0880	0.0390	1.0428

Based on the calculation of the alternative multiplication and criteria in Table 17, the ranking can be done as follows:

**Table 17.** Ranking

No	Alternatif	Jumlah	Rangking
1	A3 = Mazhmur Fredy Pangaribuan	1.0428 (104,28%)	1
2	A2 = Renta Panjaitan	0.9973 (99,73%)	2
3	A1 = Dewi Novita Sitorus	0.9599 (95,99%)	3

So, the conclusion is that the best homeroom teacher is Dewi Novita Sitorus with a total value of 1.0428 (104.28%).

#### d. Logical Consistency

Consistency measurement to see whether the comparison results entered are appropriate and valid in the real world. The consistency ratio value must be less than 10% for a 6x6 matrix, and less than 5% for a 3x3 matrix. If more than the ratio of the limit, the comparison value of the matrix weight value must be done again.

Based on Table 2, the Pairwise Comparison Matrix Criteria, namely the number of columns from each alternative multiplied by the number of each eigen value in Table 15 in order to obtain or calculate the final result (X Max). The final results (X Max) are as follows:

**Table 18.** Number of Paired Matrices with Eigen Value (EV)

No	Kriteria/Alternatif	Jumlah	Eigen Value (EV)
1	Kejujuran	1.8944	0.4810
2	Loyalitas	4.7833	0.2524
3	Komitmen	8.5833	0.1450
4	Kedisiplinan	13.333	0.0816
5	Kerja Sama	22.000	0.0400

$$\lambda Maks = \frac{\sum \alpha}{n}$$

$$\lambda Maks = (1.8944 \times 0.4810) + (4.7833 \times 0.2524) + (8.5833 \times 0.1450)$$

$$+ (13.333 \times 0.0816) + (22.000 \times 0.0400)$$

$$\lambda Maks = 0.9113 + 1.2071 + 1.2445 + 1.0881 + 0.8802$$

$$\lambda Maks = 5.3312$$

After determining the Max  $\lambda$ , the next step is to determine or calculate the Consistency Index (CI) value. The equation used to calculate the consistency index value is as follows:

$$CI = \frac{(\lambda Maks - n)}{(n - 1)}$$

$$CI = \frac{(5.3312 - 5)}{(5 - 1)}$$

$$CI = \frac{0.3312}{4}$$

$$CI = 0.0828$$

Then to determine the Consistency Ratio (CR) value, which is based on the Ratio Index (RI) value in Table 19 below:

**Table 19.** Order Matrix

Ordo Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ratio Index	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.46	1.49	1.51	1.48	1.56	1.57	1.59

$$CR = \frac{CI}{RI (Random Index)}$$

$$CR = \frac{0.0828}{1.12}$$

$$CR = 0.0739$$

#### 4. CONCLUSION

By applying the AHP (Analytical Hierarchy Process) method, it can be used to build a decision support system for determining the best homeroom teacher at the Parulian 2 Medan Education Foundation based on the assessment criteria that have been determined by the Foundation, namely honesty, loyalty, commitment, discipline, and cooperation. . The results obtained from the AHP calculation, then the best homeroom teacher is Mazmur Fredy Pangaribuan with a score of 1.05.

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