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Application of SAW in the Class Leader Selection Decision Support System

[1*]Muhammad Najib Dwi Satria, [2]Mahardika Inra Takandengan
[1]Information System, Universitas Teknokrat Indonesia, Indonesia
[2]Information System, Universitas Sam Ratulangi, Indonesia
[1*]najibmuhammad@teknokrat.ac.id, [2]mahardika@unsrat.ac.id

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Abstract: The election of the class president is one of the activities that is often carried out when students are in school. A class in school can be interpreted as a country that has a government system. So, it is very important for a class to have a leader. Usually the election of the chairman is done by voting from class members. Later as a chairman, you will have various obligations. Simple Additive Weighting (SAW) is a method that is often known as the weighted sum method. Based on the needs gathering, an approach is proposed using a decision support system using the SAW method in selecting class leaders. There are 4 criteria used in selecting class leaders. The purpose of the weighted sum is to find the weighted sum of the ratings in each alternative on all criteria. Based on the calculation results using SAW for the election of the class leader, the 1st rank of the class leader election is Ahmad Jatmiko with a score of 0.99. Ranked 2nd in the class leader election was Muhammad Akbar with a score of 0.9. And ranked 3rd in the class leader election is Siti Setianingsih with a score of 0.8525.
Keywords: Alternative; Class President; Rank; SAW; Voting;

1. INTRODUCING

School is an educational institution that organizes formal education levels. The function of the school is to open minds, hone social skills, to channel students' abilities, and to educate students under the supervision of teachers. Schools also function as a means to socialize with friends of different characters, cultural backgrounds, to socio-economic conditions. This educational environment can help children explore their talents and talents, and hone their gross motor skills.

The election of the class president is one of the activities that is often carried out when students are in school. A class in school can be interpreted as a country that has a government system. So, it is very important for a class to have a leader. Usually the election of the chairman is done by voting from class members. Later as a chairman, you will have various obligations. The problem that occurs in the election of the class president is that there are no indicators in determining the class president, the class leader is chosen based on voting by students from several choices of class president candidates, so the results of the class chair election voting are irrelevant because there are no indicators that determine the eligibility of being class president.

Decision Support System (DSS) is a system capable of providing problem-solving skills and communication skills for problems with semi-structured and unstructured conditions[1]–[3]. This system is used to assist decision making in semi-structured situations and unstructured situations, where no one knows for sure how decisions should

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be made. In making a decision support system we must be able to achieve the goals of the decision support system, which is to provide predictions and direct it to be able to make decisions or help determine or solve problems so that better decisions are taken. This decision support system also has benefits, in addition to making it easier for the user or decision maker to make decisions, another benefit of this decision support system is the Decision Support System[4]. especially various complex and unstructured problems, besides that by using this decision support system it can provide various solutions more quickly and the results can be relied on as well.

Simple Additive Weighting (SAW) is a method that is often known as the weighted sum method[5], [6]. The purpose of the weighted sum is to find the weighted sum of the ratings in each alternative on all criteria. The total result obtained for an alternative is by adding up all the multiplication results between the ratings compared across the attributes and the weight of each attribute. The rating on each of the previous attributes must have gone through the normalization process. This method requires the necessity of making a decision to determine the weight for all its attributes, by adding up all the results of the multiplication between rankings it will produce a value for the total score.

Simple Additive Weighting (SAW) method that proposes prospective workers who are selected based on the highest score[7].

2. METHOD

Research stages are the steps of problem solving in the research process carried out. The stages of the research are depicted in Figure 1. below.

Figure 1. Research Stage

The explanation of the research stages will be described in the following

A. User Requirement
This needs gathering process communicates with students and teachers regarding the process of selecting class leaders. The process that has been going on so far is to vote on the candidate for class president in determining the class president who will lead the class for the next one year. In this process there are no criteria used in selecting class leaders.

B. Define Criteria and Criteria Weight
Based on the needs gathering, an approach is proposed using a decision support system using the SAW method in selecting class leaders. There are 4 criteria used in selecting class leaders. The criteria and weighting of the criteria can be seen in Table 1.

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Table 1. Criteria and Criteria Weight

Code Criteria	Criteria	Weight
C1	Knowledge (Benefit)	30%
C2	Responsibility (Benefit)	25%
C3	Discipline (Benefit)	25%
C4	Leadership (Benefit)	20%

C. Provide Criteria Weight Value
After determining the next criteria determine the value of each criterion used. The value of each criterion can be seen in Table 2.

Table 2. Criteria Weight Value

Criteria	Name	Value
Knowledge	Very Good	5
	Quite Good	3
	Not Good	1
Responsibility	Very Good	5
	Not Good	2
Discipline	Very Good	5
	Not Good	3
Leadership	Very Good	5
	Not Good	2

D. Determine Alternative Match Ratings
In the process of evaluating alternative class leaders, it will be carried out by students based on the value of each criterion that has been determined in the previous stage.

E. Normalization Process
Furthermore, normalizing the X matrix is obtained by calculating the rij normalized performance rating value of the Ai attribute on the Cj attribute based on the equation adjusted to the type of attribute (benefit / cost). Because every weight is n. The value given to each criterion is a match value (the largest value is the best) then all the criteria given are assumed to be criteria for profit or benefit with similarities.

F. Alternative Ranking
After obtaining the normalization results, then accumulate the assessment of each alternative and provide a ranking of each alternative.

3. RESULT AND DISCUSSIONS

In this study, primary data was collected which was obtained by conducting a survey according to the needs and conditions that exist in the organization. In addition to data, it also collects secondary data selected through library research and other literature such as the internet and so on. After the data is obtained, then perform a needs analysis and create a questionnaire model which will later be given to respondents who act as experts. For processing existing data, using the SAW approach to formulate problems and get a rating of each alternative strategy that will be used later as a recommendation. The data for the class president candidate for grade 11 SMP XYZ. Candidate 1: Ahmad Jatmiko, Candidate 2: Siti Setianingsih, Candidate 3: Muhammad Akbar.

Based on the assessment questionnaire for class leaders, the assessment results are obtained as shown in Table 3.

Table 3. Assessment Questionnaire for Class Leaders

Vote Student Name	Candidate	Value Criteria			
		C1	C2	C3	C4
Ahmad Iqbal	Ahmad Jatmiko	3	2	5	5
	Siti Setianingsih	1	2	3	5
	Muhammad Akbar	3	5	3	5
Bella Yunika	Ahmad Jatmiko	5	5	5	2
	Siti Setianingsih	3	5	5	5
	Muhammad Akbar	3	2	5	5

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	Ahmad Jatmiko	5	5	5	5
Choirul Anam	Siti Setianingsih	5	5	5	2
	Muhammad Akbar	2	5	3	5
	Ahmad Jatmiko	5	2	3	2
Nurlita Ningsih	Siti Setianingsih	3	5	3	2
	Muhammad Akbar	5	2	5	5

After getting the value of each alternative, then carrying out this normalization calculation process must pay attention to the type of criteria, whether it is a cost or a benefit. The SAW normalization results are shown in Table 4 below.

Table 4. Normalization SAW

Vote Student Name	Candidate	Normalization Criteria			
		C1	C2	C3	C4
	Ahmad Jatmiko	1	0,4	1	1
Ahmad Iqbal	Siti Setianingsih	0,333333333	0,4	0,6	1
	Muhammad Akbar	1	1	0,6	1
	Ahmad Jatmiko	1,666666667	1	1	0,4
Bella Yunika	Siti Setianingsih	1	1	1	1
	Muhammad Akbar	1	0,4	1	1
	Ahmad Jatmiko	1,666666667	1	1	1
Choirul Anam	Siti Setianingsih	1,666666667	1	1	0,4
	Muhammad Akbar	0,666666667	1	0,6	1
	Ahmad Jatmiko	1,666666667	0,4	0,6	0,4
Nurlita Ningsih	Siti Setianingsih	1	1	0,6	0,4
	Muhammad Akbar	1,666666667	0,4	1	1

After getting the results of SAW normalization then perform a total calculation of all attributes with criteria weights on all alternatives. The results of calculating the value of all criteria weights are shown in Table 5.

Table 5. Total Calculation of All Attributes

Vote Student Name	Candidate	Total Calculation Criteria
	Ahmad Jatmiko	0,85
Ahmad Iqbal	Siti Setianingsih	0,55
	Muhammad Akbar	0,9
	Ahmad Jatmiko	1,08
Bella Yunika	Siti Setianingsih	1
	Muhammad Akbar	0,85
	Ahmad Jatmiko	1,2
Choirul Anam	Siti Setianingsih	1,08
	Muhammad Akbar	0,8
	Ahmad Jatmiko	0,83
Nurlita Ningsih	Siti Setianingsih	0,78
	Muhammad Akbar	1,05

After getting the total value of each candidate, then grouping them based on the overall assessment carried out by students and ranking each candidate for class president. The total calculation results for all candidates and rankings are shown in Table 6.

Table 6. Total Calculation Results for all Candidates and Rankings

Candidate	Total Calculation Criteria	Rankings
Ahmad Jatmiko	0,99	1
Siti Setianingsih	0,8525	3
Muhammad Akbar	0,9	2

Based on the results of calculations using SAW for the election of the class leader, the 1st Rank for the election of the class leader is Ahmad Jatmiko with a score of 0.99. Rank 2 for

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class leader election is Muhammad Akbar with a score of 0.9. As well as Rank 3 for the election of class president Siti Setianingsih with a score of 0.8525.

4. CONCLUSION

From the results of the study, it is concluded that the SAW method can be implemented in selecting class leaders using the criteria of Knowledge, Responsibility, Discipline, and Leadership of each class leader candidate. Based on the calculation results using SAW for the election of the class leader, the 1st rank of the class leader election is Ahmad Jatmiko with a score of 0.99. Ranked 2nd in the class leader election was Muhammad Akbar with a score of 0.9. And ranked 3rd in the class leader election is Siti Setianingsih with a score of 0.8525.

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Muhammad Najib Dwi Satria : *coresponding author