International Journal of Basic and Applied Science 9 (1) (2020) 1-5

Published by:IOCSCIENCE

International Journal of Basic and Applied Science

Journal homepage:www.ijobas.pelnus.ac.id

Decision Support System Determining Majors at Islam Kader Bangsa Vocational School using the SAW Method

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Article Info

Article history:

Received Apr 01, 2020
Revised Apr 18, 2020
Accepted May 16, 2020

***Keywords*:**

Decision Support System (DSS);
Determination of Majors;
SAW method.

ABSTRACT

Decision Support System (DSS) is a computer-based system that can be used to assist someone in improving performance in making decisions. By using SPK, it is hoped that it can help decision making in solving problems to determine majors at the Kader Bangsa Islamic Vocational School. In this study, a decision support system will be developed using a method that can solve the Multiple Attribute Decision Making (MADM) problem which is proven to have very effective performance on data whose values are in the form of a range within a certain value range. The DSS method used in this research is Simple Additive Weighting (SAW). This method determines the weight value for each attribute, which is followed by a ranking process. So that it will produce the best alternative from many alternatives with fairly precise calculations. The alternative is prospective new students at the Kader Bangsa Islamic Vocational School who will be selected based on predetermined criteria.

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1. INTRODUCTION

Every year, the Islam Kader Bangsa Vocational High School continues to try to improve the quality of its education in the hope that graduating students will have more expertise than other vocational schools. This is done to improve the quality of SMK graduates so that they are ready to compete in the world of work.

The enthusiasm of junior high school graduates to enter the Islam Kader Bangsa Vocational School is quite large, but many students are not mature enough to choose majors that match their abilities, as a result, many students fail in the middle of the road when they have been accepted into the vocational school, as well as many cases of students who do not match the majors chosen when they have received lessons at school.

The number of majors in the Islam Kader Bangsa Vocational School consists of two majors, namely Accounting and Marketing Management majors. The selection of majors for each major is based on the provisions of the required grades. Each department has the same value criteria. For accounting majors, the value of calculation is preferred, such as mathematics with an average value of seventy-five (75) and for marketing management majors must have an average value of seventy

(70) for all subject values. From the results that will be taken into consideration in the research majors and these criteria are used in the calculation process later. The students' interest can be seen from the final results of the previous tests, with an interview session that will be conducted by the head of the department.

2. RESEARCH METHODS

2.1 Identification of problems

Identifying a problem is an early stage in the research process. This stage is built based on the formulation of the problem based on the background of the problem.

2.2 Data collection technique

This stage is a way of collecting data which is carried out in two (2) ways, namely observation and interviews with the Islam Kader Bangsa Vocational School regarding the parameters for determining majors in SMK. Data analysis in this study uses the Simple Additive Weighting (SAW) method, which is used quantitatively, namely the research method that is descriptive and uses more analysis. This research was conducted by collecting data and analysis results to obtain information that must be concluded.

2.3 Decision Support System

Decision Support System (DSS) or Decision Support System (DSS) is a system that is able to provide problem solving and communication skills for problems with semi-structured and unstructured conditions [1] [2] [3]. This system is used to assist decision making in semi-structured and unstructured situations, where no one knows for sure how decisions should be made [4].

DSS is the implementation of decision-making theories that have been introduced by sciences such as operations research and management science, the only difference is that in the past, to find a solution to the problem at hand, iteration calculations had to be done manually (usually to find the minimum, maximum, or maximum value). optimum), currently PC computers have offered their ability to solve the same problems in a relatively short time [5] [6] [7].

2.4 SAW method

The SAW (Simple Additive Weighting) method is often also known as the weighted addition method of the performance rating on each alternative on all attributes [8] [9]. The SAW method requires the normalization process of the decision matrix (X) to a scale that can be compared with all existing alternative ratings [10] [11]. This method requires the decision maker to determine the weight for each attribute or criterion.

2.5 Fuzzy Multiple Attribute Decision Making (FMADM)

Fuzzy Multiple Attribute Decision Making (FMADM) is a method used to find the optimal alternative from a number of alternatives with certain criteria [12] [13]. The essence of FMADM is to determine the weight value for each attribute, then proceed with a ranking process that will select the alternatives that have been given [14] [15].

3. RESULTS AND DISCUSSION

3.1 Problem analysis

The reference in the development of the Decision Support System (DSS) is based on an assessment that is generally carried out in the process of determining majors. Where in this assessment each student will be assessed based on criteria and alternatives, below is a table of criteria and alternatives that will be tested using the Simple Additive Weighting (SAW) method.

Simple Additive Weighting (SAW) requires criteria and weights to do the calculations so that the best alternative will be obtained, in this case the alternative in question is prospective students of SMK Islam Kader Bangsa who are accepted into the Department of Accounting and Marketing. Case Example: Kader Bangsa Islamic Vocational School will start majors for grade 10 from the beginning of the acceptance of new students, therefore students must determine which major they want, which is

judged by students there are several criteria such as the value of Mathematics , Indonesian, English, Natural Sciences, and the results of the Psychological Test.

3.2 Data processing

At this testing stage, this test will be carried out on the system built using the Simple Additive Weighting (SAW) method which is used for data processing to determine majors at the Kader Bangsa Islamic Vocational School.

3.3 Data processing

Table 1. Math Score

Math Score	Fuzzy Numbers	Mark
60-69	Low (R)	2
70-79	Enough (C)	3
80-85	Height (T)	4
>86	Very High (ST)	5

Table 2. Indonesian Value

Language Value. Indonesia	Fuzzy Numbers	Mark
60-69	Low (R)	2
70-79	Enough (C)	3
80-85	Height (T)	4
>86	Very High (ST)	5

Table 3. English Grade

Language Value. English	Fuzzy Numbers	Mark
60-69	Low (R)	2
70-79	Enough (C)	3
80-85	Height (T)	4
>86	Very High (ST)	5

Table 4. IPA value

IPA value	Fuzzy Numbers	Mark
60-69	Low (R)	2
70-79	Enough (C)	3
80-85	Height (T)	4
>86	Very High (ST)	5

3.4 The final result

The final result obtained from the calculation of SAW with excel is the alternative that gets the highest score is A7, which is 18.4.

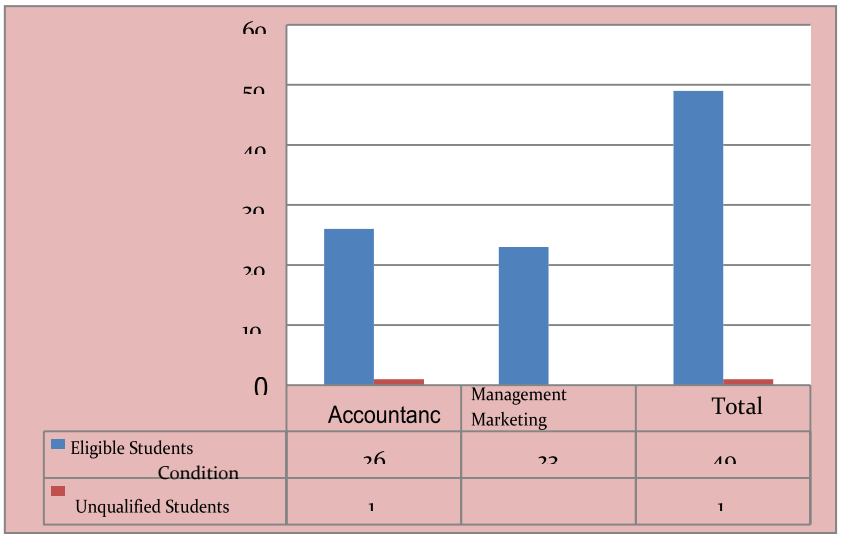

Figure 1. Diagram of the Results of Determining Majors at the Kader Bangsa Islamic Vocational School

Explanation:

a. Based on the diagram above, prospective students who meet the requirements to enter the accounting department based on the results of the calculation of SAW above the value of 20 are 26 students.
b. Based on the diagram above, prospective students who meet the requirements to enter the marketing management department based on the results of the SAW calculation above the value of 13 are 23 students.
c. And one (1) student who does not meet the requirements based on the calculation of SAW.

From the diagram above, it can be seen that from a sample of 50 students who were data and calculated to determine the majors at the Kader Bangsa Islamic Vocational School, the one with the most students was accounting majors as many as 26 students.

4. CONCLUSION

Based on the results of the research and discussion that have been described previously, the following conclusions can be drawn: the Simple Additive Weighting (SAW) method can provide the best decision alternatives in making decisions. The process of determining student ranking is carried out through calculations using the Simple Additive Weighting (SAW) method starting with assigning a criterion value for each criterion, weighting, compatibility rating, normalization and ranking so as to produce a value for each criterion. The result of the system calculation is the ranking of the highest to the lowest value and the highest value is the result that is needed as a consideration by the user to determine the selection of majors in SMK.

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