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Teacher Performance Assessment Decision Support System Using Topsis Method

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ABSTRACT

Decision Support System is a means of assisting in making decisions accurately, and quickly. In the Decision Support System, several methods can be applied including the TOPSIS method. The TOPSIS (Technique For Order Preference by Similarity to Ideal Solution) method is a multi-criteria decision-making method or alternative choice which is the alternative that has the smallest distance from the positive ideal solution and the largest distance from the negative ideal solution from a geometric point of view using Euclidean distance. The results of the TOPSIS (Technique For Order Preference by Similarity to Ideal Solution) method based on data and criteria determined by the Deli Serdang Education Office, an assessment was made of teacher performance at SD Negeri 105336 Rantau Panjang.

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1. INTRODUCTION

The development of technology is advancing rapidly, so that all matters related to data management are easy and without taking a long time to complete. The establishment of a computerized system to find the best results. This computerized system has been used by various government and educational institutions. The goal is to improve performance and time efficiency.

To determine the level of professionalism of a teacher, an assessment is made of the teacher's ability to carry out the education and teaching process. The assessment is carried out by measuring the work of each teacher in carrying out their duties and obligations according to existing competency standards [1].

Teachers are educators and teachers who guide students in realizing class discipline and as a motivator to arouse students' interest in achieving in class [2]. The decision-making system (DSS) is a process of monitoring teacher performance, it will be easier for school principals to carry out evaluation processes related to with teacher performance.

Decision-Making Systems are tools for managerial decision-making, but decision-making has a variety of different contexts [3] [4]. Decision making does not only satisfy one party but must be satisfactory to all parties.

Teacher performance appraisal is a way of measuring individuals in the agency that is carried out on the organization. The important value of teacher performance appraisal is related to determining the level of individual contribution or performance carried out in completing the tasks that are the responsibility of the teacher [5] [6]. SD Negeri 105336 Rantau Panjang is located at Kelambir Village, Pantai Labu District, Deli Serdang Regency. This State Elementary School has thirteen teachers, this State Elementary School was established in 1977.

Problems in making a decision Teacher performance appraisal is a long and complicated process because SD Negeri 105336 is still doing it manually, this does not allow teacher performance assessments to reach the desired standard. So the author will build a computerized system to facilitate the school in making decisions . This system aims to make it easier to manage the data in the SD Negeri in an easy, fast, and accurate way.

The source of the complexity of decision problems is only due to uncertainty or imperfect information. However, there are still other causes such as factors that influence the existing choices, with the variety of selection criteria and also the weight value of each criterion is a form of solving a very complex problem [7] [8] [9]. At present, multi-criteria problem solving methods have been widely used in various fields. After establishing the objectives of the problem, the criteria by which to measure and possible alternatives, decision makers can use one or more methods to solve their problems. The method that can be used to overcome multi-criteria problems is the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) method. The Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) was first introduced by Yoon and Hwang in 1981 to be used as a method for solving multi-criteria problems.

Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) is a multi-criteria decision-making method or alternative choice which is the alternative that has the smallest distance from the positive ideal solution and the largest distance from the negative ideal solution from a geometric point of view using Euclidean distance [10] [11] [12]. However, the alternative which has the smallest distance from the positive ideal solution, does not necessarily have the largest distance from the negative ideal solution. Therefore, the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) considers both the distance to the positive ideal solution and the distance to the negative ideal solution simultaneously. The optimal solution in the Technical For Order Preference by Similarity to Ideal Solution (TOPSIS) method is obtained by determining the relative proximity of an alternative to a positive ideal solution. The Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) will rank alternatives based on the priority value of the relative proximity of an alternative to the positive ideal solution. The alternatives that have been ranked are then used as a reference for decision makers to choose the best desired solution [13] [14] [15].

2. RESEARCH METHODS

2.1 Research methods

In this study, the researcher used a Research and Development approach, the research methods were as follows: library research; observation; interview.

2.2 Description of TOPSIS

The steps for completing the TOPSIS method are:

a. Create a normalized decision matrix. Alternative performance rating A1 on each normalized C1 criteria

$$[X_i]_= \sqrt{\sum_{i=1}^{m} X_{ij}^2} \quad \text{.....(1)}$$

where i = 1,2,... ,m and j = 1,2,..., n

$$r_{ij=} \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad \text{.....(2)}$$

b. Create a weighted normalized decision matrix. The positive ideal solution and the negative ideal solution can be determined based on the normalized weight rating (y):

$$y_{ij} = w_i r_{ij} \quad \text{.....(3)}$$

$A^+ = (, \dots, y_1^+, y_2^+ y_n^+$
$A^- = (, \dots, y_1^-, y_2^- y_n^-$
$Yj^+ = \begin{cases} \max 1\ Yij \\ \min i\ Yij \end{cases}$
$Yj^- = \begin{cases} \max\ i\ Yij \\ \min i\ Yij \end{cases}$

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

$$D_i^+ = \sqrt{\sum_{j=1}^{n}(y_i^+ - y_{ij})^2} \quad \dots\dots (4)$$

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

$$D_i^- = \sqrt{\sum_{j=1}^{n}(y_{ij} - y_i^-)^2} \quad \dots\dots (5)$$

e. Determine the preference value for each alternative.

$$V = \frac{Di^-}{Di^- + Di^+} \quad \dots\dots (6)$$

f. A larger value of V indicates the chosen alternative is the best

3. RESULTS AND DISCUSSION

3.1. System Implementation

Implementation is a step that is built to operate the system to be built. The following are the results of the implementation of the Teacher Performance Assessment Decision Support System with the Topsis Method.

a. Login Form Display
The login menu is an initial menu display from the program where the user or admin will fill in the user name and password to be able to enter or login to the next menu, the login form display image can be seen in the image below:

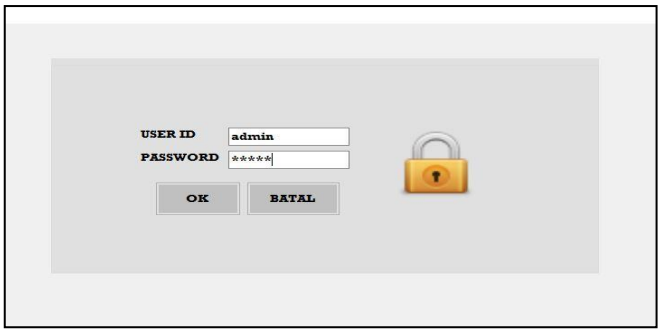

Figure 1. Login Form Display

b. Main Menu Display
The main menu is the next display after the user or admin logs in, on the main menu there are several sub menus, the main menu form can be seen in the following picture:

Figure 2. Main Menu Display

c. Criteria Data Form Display
Which in this menu contains data from each teacher to be tested. In this menu the user or admin can add new data, delete, and change the existing data on this menu. The image of the teacher data form can be seen in the following image.

Figure 3. Teacher Data Form Display

d. Appraisal Data Form Display
This form is to enter Assessment data to determine Teacher Performance. This form will appear when the data sub menu is selected and the admin can fill in the data that has been listed. The form can be seen in the following image:.

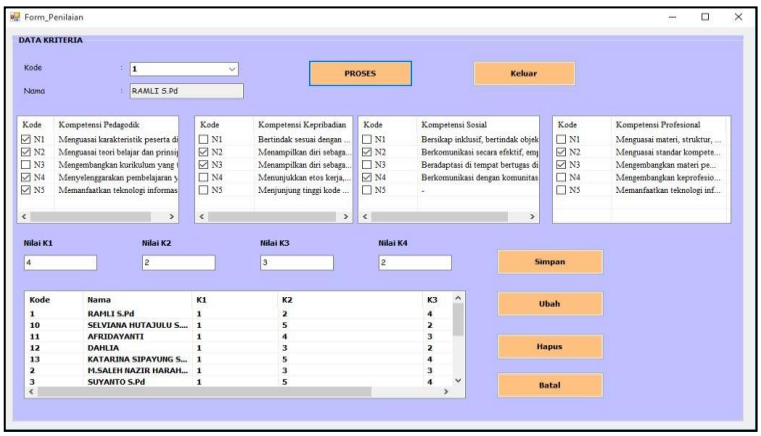

Figure 4. Appraisal Data Form Display

e. Display of Calculation Result Form

This form is used to calculate the feasibility of the teacher's performance. The form can be seen in the following picture:

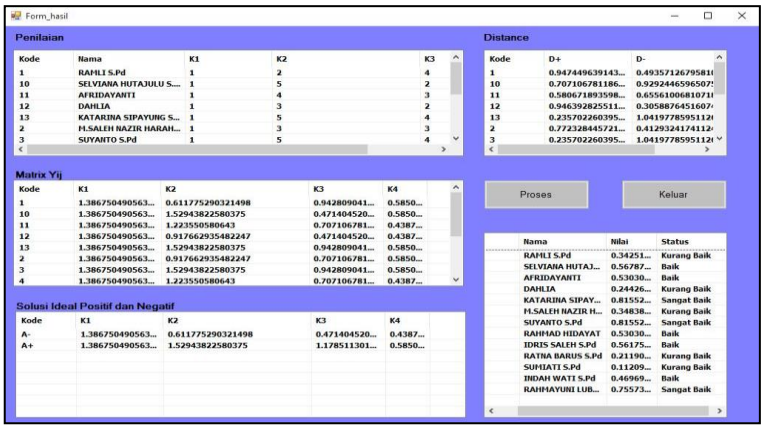

Figure 5. Display of Calculation Result form

f. Report Form Display

The report form is a form to display the data from the calculation process where the data is usually printed out in the form of a report.

Figure 6. Assessment Result Report

After carrying out the implementation process, the next process is a trial with the aim of finding out that the application that has been made is in accordance with the needs. The forms of system testing are as follows:

Table 2. Teacher performance assessment results display

teacher name	N_final	Status
RAMLI S.Pd	0.342514994422111	Not good
SELVIANA HUTAJULU S.Pd	0.567875968731552	Good
AFRIDAYANTI	0.5303078815470 39	Good
DAHLIA	0.2442644857318 27	Not good

teacher name	N_final	Status
KATARINA SIPAYUNG S.Pd	0.815523262260108	Very good
M. SALEH NAZIR HARAHAP S.Pd	0.348389481383805	Not good
SUYANTO S.Pd	0.815523262260108	Very good
RAHMAD HIDAYAT	0.530307881547039	Good
IDRIS SALEH S.Pd	0.561755389506892	Good
RATNA NEWS S.Pd	0.211902137298812	Not good
SUMIATI S.Pd	0.112094120645131	Not good
INDAH WATI S.Pd	0.469692118452961	Good
RAHMAYUNI LUBIS S.Pd	0.7557355142681 73	Very good

4. CONCLUSION

The implementation of the TOPSIS method on the Teacher Performance Assessment Decision Support System that has been completed, several conclusions can be drawn, namely; Problems that occur with regard to Teacher Performance Assessment can be solved by applying the Topsis (Technique For Others Reference by Similarity to Ideal Solution) method. Application of the Topsis (Technique For Others Reference by Similarity to Ideal Solution) Method for Teacher Performance Assessment by adjusting the criteria and using weights so that they can be used with the algorithm. Applications that adopt the Topsis (Technique For Others Reference by Similarity to Ideal Solution) Method can be used for Teacher Performance Assessment. Testing the system that has been designed for Teacher Performance Assessment by inputting Activity data and criteria then carrying out the calculation process.

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