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Decision Support System for Poor Student Aid Admission Selection (BSM) using the Topsis Method

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ABSTRACT

The Poor Student Assistance Program (PSAP) is a direct assistance to students and not a scholarship, because it is based on students' economic conditions and not on merit (scholarships). Not all students from poor families can receive the Poor Student Assistance Program (PSAP). So of the many students who are prospective recipients of poor students who have met the criteria for selecting help from poor students, not all of them will be the prospective recipients of these poor students. So that in the selection of prospective beneficiaries of poor students must need a Decision Support System (SPK), so that the school will be helped in determining prospective students who receive Poor Student Assistance (PSAP) so that every student from a poor family can receive such assistance Decision support systems (DSS) are part of a computer-based information system (including knowledge-based systems (knowledge management) that are used to support decision making within an organization or company. poor is Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) TOPSIS provides a solution of a number of possible alternatives by comparing each alternative with the best and the worst alternative alternatives among the alternative problems.

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1. INTRODUCTION

The Poor Student Assistance Program (PSAP) is a National Program that aims to eliminate barriers for poor students from participating in school by helping poor students gain access to decent education services, preventing dropouts, attracting poor students to return to school, helping students meet their needs in learning activities, support the Nine-Year Basic Education Compulsory Education program (even up to the upper secondary level), as well as assisting the smooth running of school programs [1] [2]. Through the Poor Student Assistance (PSAP) it is hoped that school-age children from underprivileged or poor families can continue to attend school, do not drop out of school, and it is hoped that in the future they can break the chain of poverty currently experienced by their parents. The PSAP program also supports the government's commitment to increase

education participation rates in poor districts/cities and to remote areas. The Poor Student Assistance Program (PSAP) is a direct aid to students and not a scholarship, because it is based on the student's economic condition and not based on achievement (scholarship) [3].

In the implementation of the Poor Student Assistance (PSAP), schools often face problems in determining prospective recipients of poor student assistance where not all students from poor families can receive the Poor Student Assistance Program (PSAP). So of the many prospective students who are recipients of poor student assistance who have met the criteria in selecting poor student assistance, not all of them will become prospective recipients of poor student assistance. So that in the selection of prospective recipients of poor student assistance, a Decision Support System (DSS) must be required, so that the school will be assisted in determining prospective students who receive the Poor Student Assistance (PSAP) so that every student who comes from poor families can receive the assistance. Decision support system Decision support systems are part of computer-based information systems (including knowledge-based systems (knowledge management) that are used to support decision making in an organization or company [4].

According to Kusumadewi, S. et al (2006) Fuzzy Multiple Attribute Decision Making (FMADM) is a method used to find the optimal alternative from a number of alternatives with certain criteria [5]. 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 [6] [7] [8]. Basically, there are 3 approaches to find the attribute weight value, namely the subjective approach, the objective approach and the integration approach between subjective and objective. Each approach has advantages and disadvantages. In the subjective approach, the weight value is determined based on the subjectivity of the decision makers so that several factors in the alternative ranking process can be determined independently [9] [10].

The method used in the decision-making system for the selection of poor students is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). TOPSIS was first introduced by Yoon and Hwang in 1981 to be used as a method for solving multi-criteria problems [11] [12]. TOPSIS provides a solution from a number of possible alternatives by comparing each alternative with the best alternative and the worst alternative among the alternative problems. This method uses distance to perform the comparison. Yoon and Hwang developed the TOPSIS method based on intuition, namely the alternative choice 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 [13]. TOPSIS provides a solution from a number of possible alternatives by comparing each alternative with the best alternative and the worst alternative among the alternative problems. This method was chosen because this method is a form of decision support model where the main tool is a functional hierarchy with the main input being human perception. TOPSIS provides a solution from a number of possible alternatives by comparing each alternative with the best alternative and the worst alternative among the alternative problems. This method was chosen because this method is a form of decision support model where the main tool is a functional hierarchy with the main input being human perception. This method was chosen because this method is a form of decision support model where the main tool is a functional hierarchy with the main input being human perception.

Unified Modeling Language (UML) is a visual modeling method as a means to design or create object-oriented software. Because the Unified Modeling Language (UML) is a visual language for object-oriented modeling language. Unified Modeling Language (UML) is a tool / model for designing object-oriented software development [14] [15].

2. RESEARCH METHODS

2.1 Application of TOPSIS Method

The FMADM and TOPSIS models in the process require criteria that will be used as calculations for the ranking process. The criteria that are taken into consideration by the selection committee for poor student aid recipients are as shown in the solutions below:

a. TOPSIS begins by building a decision matrix.
In the decision matrix, the matrix column states the attributes, namely the existing criteria, while the matrix rows state alternatives, namely the names of students to be compared and the type of criteria is benefit.
b. Create a normalized decision matrix.
To find the value of the normalized decision matrix, that is, based on the results of the calculation of the matrix column stating the attributes, namely the existing criteria and the row matrix.
c. Determine the positive ideal solution matrix and negative ideal solution.
Next, determine the positive ideal solution matrix (A+) which is the benefit criteria, to find the positive ideal value by determining the highest value for each criterion and the negative ideal solution (A-) which is the cost criteria by finding the lowest value for each criterion.
d. Then calculate the alternative distance from the positive ideal solution (D+) and the alternative distance from the negative ideal solution (D-).
e. Calculating the relative closeness to the positive ideal solution
After calculating the alternative distance from the positive ideal solution (D+) and the alternative distance from the negative ideal solution (D-), the next step is to calculate the relative closeness to the positive ideal solution.
f. Ranking Alternative
Next, the alternatives are sorted from the largest V+ value to the smallest V- value. The alternative with the largest V+ value is the best solution.

2.2 Design

a. Unified Modeling Language (UML)

1). Use Case Diagrams
Use Case Diagrams are used to model processes based on the perspective of system users.
2). Activity Diagram
Activity diagrams are one way of modeling events that occur in use cases

3. RESULTS AND DISCUSSION

3.1 System Implementation

The test carried out is testing the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) method. The TOPSIS method is a framework for making effective decisions. Method testing focuses on visible user actions and users can recognize the output of the system, this test is run by an active system environment using the correct data. At this stage the test is only as an administrator who has full access rights to the system.

a. Main Menu Form
This form is the part where the user interface is a computer system or program that is seen, or perceived by human users, and the commands or mechanisms that the user uses to control operations and enter data.

Figure 2. Main Menu Form

b. Login Form

This form is used so that the user can access the program if the name and password are correct, as shown in the following image:

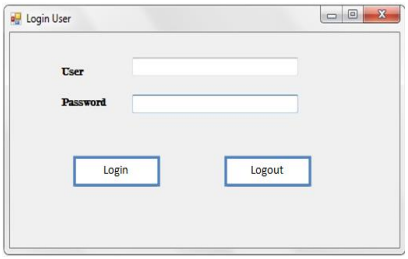

Figure 2. Login Form

c. User Menu Form

Form is data that contains student data and the process of inputting data.

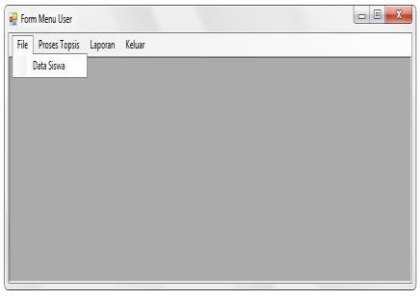

Figure 3. User Menu Form

d. Student Data Input

This form is a display designed to input student data who participate in the selection of recipients of poor student assistance. The following is the input of student data in the following image.

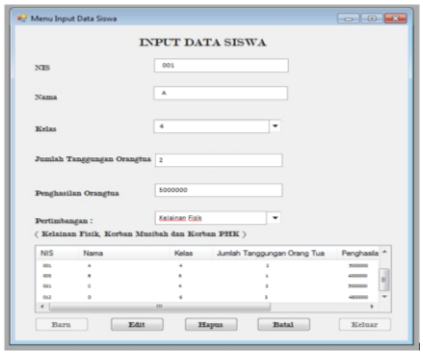

Figure 4. Student Data Input Form

e. Admin Menu Form

This form is a form that contains inputting data on physical abnormalities, victims of disasters and victims of layoffs.

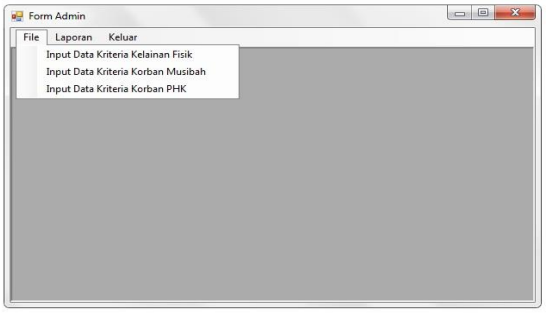

Figure 5. Admin Menu Form

f. Criteria Data Menu Form

This form is a criteria data which is a display that inputs criteria data. This form inputs data on criteria for physical abnormalities, victims of disasters and victims of layoffs, along with the image input data below.

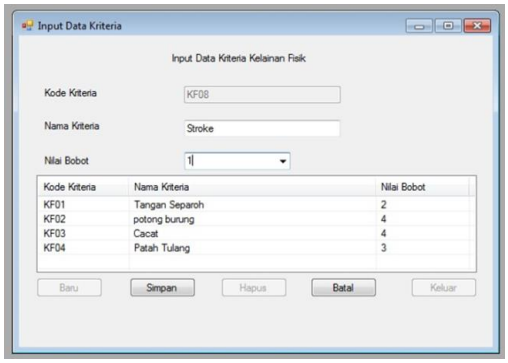

Figure 6.Physical Abnormalities Criteria Data Form

Figure 7.Calamity Victim Criteria Data Form

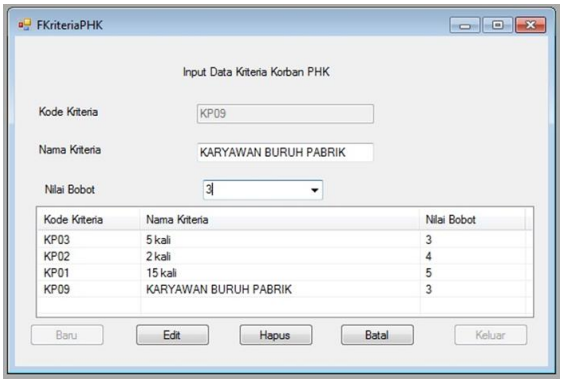

Figure 8.Form Data Criteria for Layoff Victims

g. Scoring form

This form is the result of an assessment of the results of the application that displays students who are recommended for the selection of recipients of poor student assistance. The assessment data form is the result of calculating the value of students who are selected as prospective recipients of poor student assistance based on the weight of the criteria entered. The student data input form is shown in the following figure.

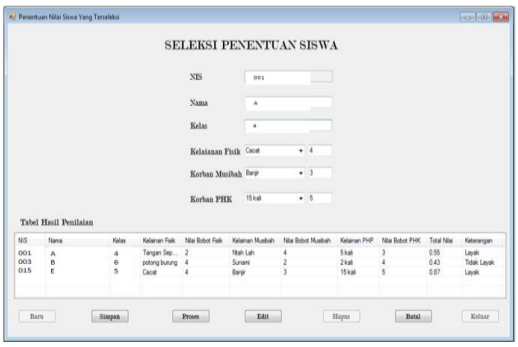

Figure 9.Student Assessment Results Form

4. CONCLUSION

Based on the results of the research that the author did regarding the selection of recipients of the Poor Student Assistance (BSM) based on the assessment of the criteria for each student at the Berlianta Marendal Education Foundation school using the TOPSIS (Technique For Order Preference by Similarity to Ideal Solution) method for the Decision Support System (SPK) for the selection of beneficiaries poor students who have been designed, the authors can draw the following conclusions: In designing a Decision Support System for the selection of recipients of the Poor Student Assistance (BSM) it is very good in the Visual Basic 2008 programming language and application. Student data form, Physical abnormality data input form, Victim data input form calamity,The data input form for the victims of layoffs and the form for determining the selected students and the report on the selection of students who receive assistance from poor students can be applied in the selection of the determination to receive BSM.

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