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Decision Support System for Determining Homeroom Teachers at Musda Perbaungan Private Vocational Schools Using the Simple Additive Weighting Method

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ABSTRACT

This research is based on observations, the MUSDA Perbaungan Private Vocational School is one of the vocational schools that cannot be separated from the struggle of the Regional Government of Serdang Bedagai Regency which is located in Tualang. MUSDA Perbaungan Private Vocational School has majors in Computer Network Engineering, Software Engineering, Light Vehicle Engineering, Motorcycle Engineering, and Mechanical Engineering with a total number of 45 teachers. Making a decision support system for determining homeroom teachers is very much needed by the MUSDA Perbaungan Private Vocational School. This system will make it easier to determine homeroom teachers, and also this system can help evaluate teacher performance systems that are lacking in performance standards in general. Thus, a decision support system using the Simple Additive Weighting (SAW) method is suitable to be developed in this system. This system will make it easier to find and determine teachers who are worthy of being homeroom teachers and will speed up the calculation of assessments and attributes to determine teachers who are worthy of being homeroom teachers. The Simple Additive Weighting method can be used as a method in making applications in decision making. Simple Additive Weighting uses a value ordering system in determining attribute ratings, where the rating of each attribute is summed with the weight of the attribute in question. The Simple Additive Weighting method is often also known as the weighted addition method. The basic concept of the Simple Additive Weighting method is to find the weighted sum of the performance ratings for each alternative on all attributes.

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1. INTRODUCTION

As the development of information and communication technology makes people want to make it easier to carry out all kinds of activities, the function of technology itself is to help humans in facilitating all activities or work and streamlining work time. In addition, the human error factor can be minimized as small as possible by the existence of information and communication technology.

MUSDA Perbaungan Private Vocational School is one of the vocational schools that cannot be separated from the struggle of the Regional Government of Serdang Bedagai Regency which is

located in Tualang. MUSDA Perbaungan Private Vocational School has majors in Computer Network Engineering, Software Engineering, Light Vehicle Engineering, Motorcycle Engineering, and Mechanical Engineering with a total number of 45 teachers. The role of the teacher is the most important educator factor in an educational institution, especially in the homeroom teacher can be said to be a substitute for parents at school. Therefore, the role of homeroom teachers can be said to be important in the development of the teaching and learning process and in the structure of school performance, as well as playing a role in fostering and improving the education quality of students in the daily teaching and learning process in the classroom.

The system for determining homeroom teachers at the MUSDA Perbaungan Private Vocational School in general still uses a manual system, so schools still have problems in determining which teachers are eligible to be homeroom teachers, so that in general the teachers selected manually do not match the criteria values. And then the teacher who will be selected later to become the homeroom teacher must achieve the required criteria values.

Making a decision support system for determining homeroom teachers is very much needed by the MUSDA Perbaungan Private Vocational School. This system will make it easier to determine homeroom teachers, and also this system can help evaluate teacher performance systems that are lacking in performance standards in general. Thus, a decision support system using the Simple Additive Weighting (SAW) method is suitable to be developed in this system. This system will make it easier to find and determine teachers who are worthy of being homeroom teachers and will speed up the calculation of assessments and attributes to determine teachers who are worthy of being homeroom teachers.

The Simple Additive Weighting method can be used as a method in making applications in decision making. Simple Additive Weighting uses a value ordering system in determining attribute ratings, where the rating of each attribute is summed with the weight of the attribute in question. The Simple Additive Weighting method is often also known as the weighted addition method. The basic concept of the Simple Additive Weighting method is to find the weighted sum of the performance ratings for each alternative on all attributes. The Simple Additive Weighting method is suggested to solve the selection problem in a multi-process decision-making system. The Simple Additive Weighting method is a method that is widely used in decision making that has many attributes.

The Simple Additive Weighting method is often also known as the weighted addition method. The basic concept of the Simple Additive Weighting method is to find the weighted sum of the performance ratings for each alternative on all attributes. Simple Additive Weighting Method It is recommended to solve the selection problem in a multi-process decision-making system. The Simple Additive Weighting method is a method that is widely used in decision making that has many attributes. The Simple Additive Weighting method requires a decision matrix normalization process.

2. RESEARCH METHOD

2.1 Data analysis

The results of the study contain data from research that has been carried out at the MUSDA Perbaungan Private Vocational School. With the results of research conducted by researchers at the MUSDA Perbaungan Private Vocational School by collecting all the required data. Data obtained directly from interviews and surveys conducted directly in the field and case studies and literature studies that the authors did in stages to obtain appropriate data, then processed to obtain conclusions that were in accordance with the research conducted.

2.2 Description of the Simple Additive Weighting (SAW) Method

The SAW method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes. The SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings. The formula for the Simple Additive Weighting (SAW) method can be seen below:

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{\underset{i}{Max}\, x_{ij}} & Jika\ j\ adalah\ attribut\ keuntungan\ (benefit) \\ \dfrac{\underset{i}{Min}\, x_{ij}}{x_{ij}} & jika\ j\ adalah\ attribut\ biaya\ (cost) \end{cases}$$

SAW Method Formula

Source :Kusumadewi, Fuzzy Multi-Attribute Decision Making, 2006 Page 74 Description:
rij = normalized performance rating value
xij = attribute value owned by each criterion
Max xij = the greatest value of each criterion
Min xij = the smallest value of each criterion
benefits = if the largest value is the best
cost = if the smallest value of t is the best

Where rij as the normalized performance rating of alternative Ai on attribute Cj ; i=1,2,…,m and j=1,2,…,n . The preference value for each alternative (Vi) can be seen below:

$$V_i = \sum_{j=1}^{n} W_j\ r_{ij} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

SAW Method Preference Formula

Source :Kusumadewi, Fuzzy Multi-Attribute Decision Making, 2006 Page 74 Description:

Vi = ranking for each alternative

Wj = weight value of each criterion

rij = normalized performance rating value

A larger Vi value indicates that alternative Ai is preferred

3. RESULTS AND DISCUSSIONS

3.1 System Implementation

System implementation is the stage in implementing the system that has been built, where later it will be known the quality of the system designed, whether it can run well and in accordance with the expected goals. To realize the system that has been designed in the information system, other supporting facilities are needed which in principle are usually referred to as technical aspects, namely hardware, software, brainware.

3.2 System implementation stages

The implementation of the Decision Support System for Determining Homeroom Teachers Based on Expertise and Class at MUSDA Perbaungan Private Vocational Schools Using the SAW Method can be seen from the following.

a. Login Page

This decision support system login page is for users to log in as admin by entering the username and password "admin".

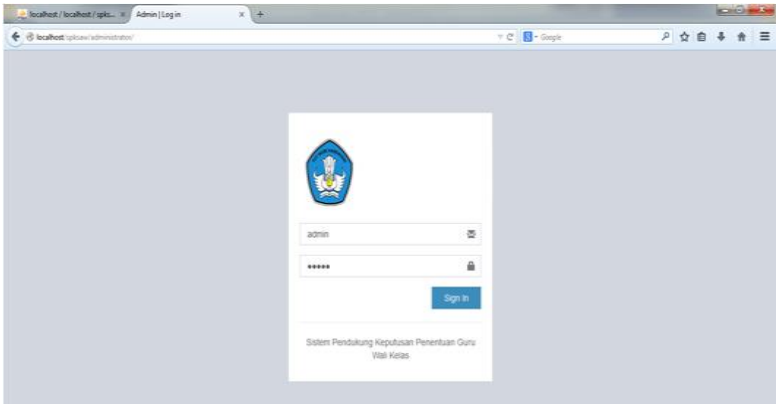

Figure 1. Login page

b. Main page

The main page of the decision support system that has been built below contains menus that function to call other pages. The menus are Class Data, Group Data, Teacher Data, Weighting Criteria, Criteria Data, Classification Data and Analysis Results.

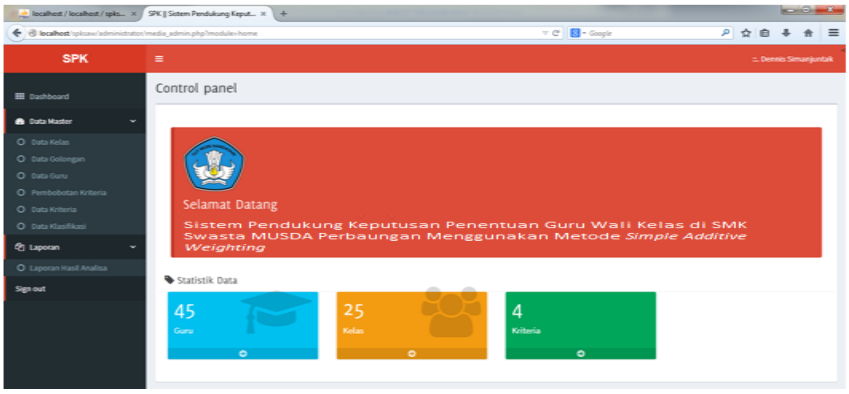

Figure 2. Main page

c. Teacher Data Page

The teacher data page is used for teacher data processing such as adding teacher data, viewing teacher data in detail, changing teacher data and deleting teacher data. The following shows the teacher data for a total of 45 teachers.

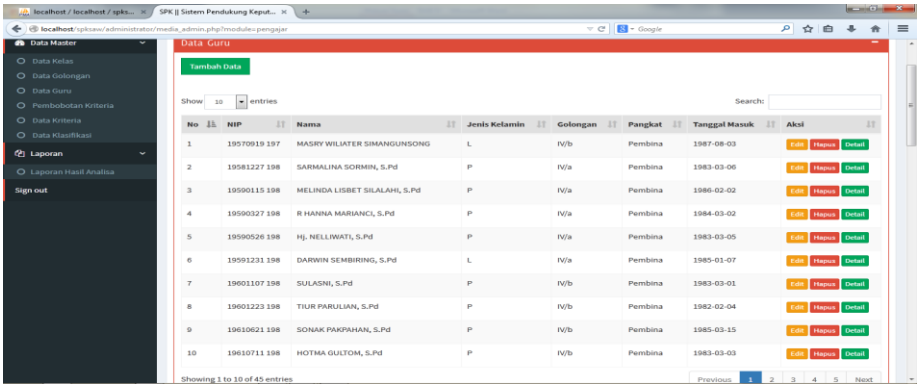

Figure 4.Teacher data page

d. Teacher data input page and teacher data details
The teacher data input page functions to add teacher data and detail data for teachers who teach at MUSDA Perbaungan Private Vocational Schools.

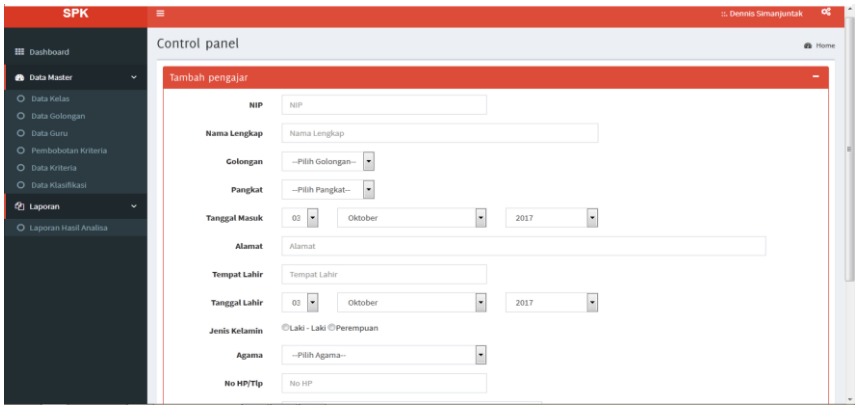

Figure 5.Teacher data input page

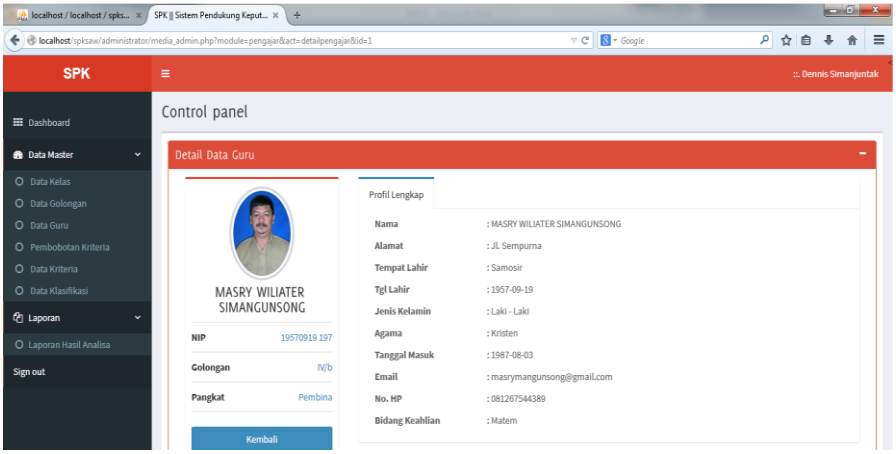

Figure 6. Teacher details page

e. Criteria data page
The criteria data page displays criteria data and the weight value of each criterion in determining prospective homeroom teacher candidates. On this page, there is a data display of 4 teacher criteria, Professionalism, Pedagogy, Personality, and Social Sense as well as the weight value of each criterion.

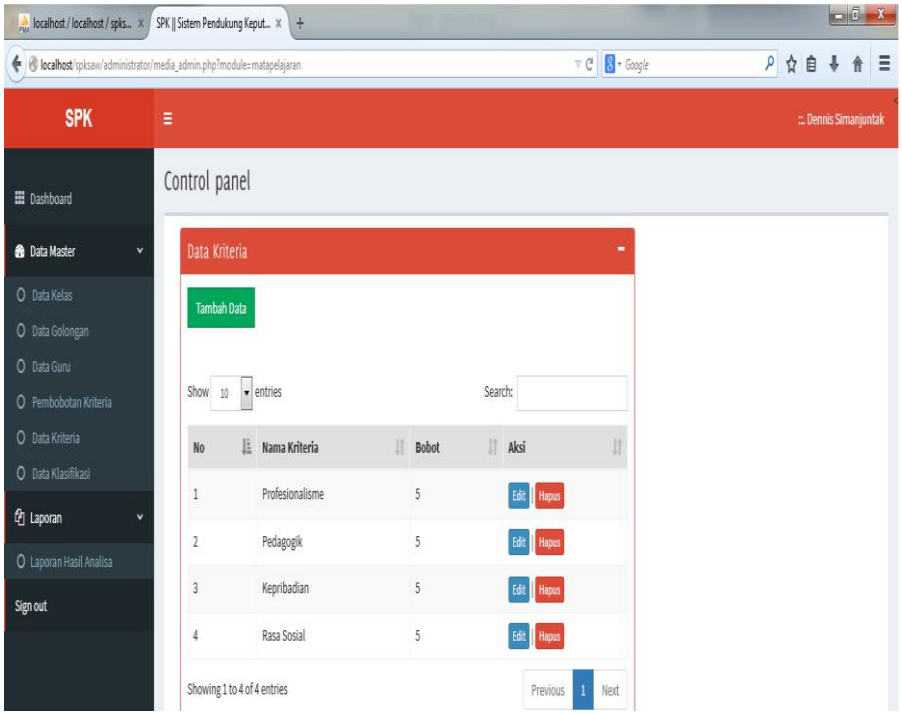

Figure 7. Criteria data page

f. Classification data page

The classification data page is a page for grouping teachers with the criteria and weights of each criterion. The following shows the overall classification data for 45 teachers.

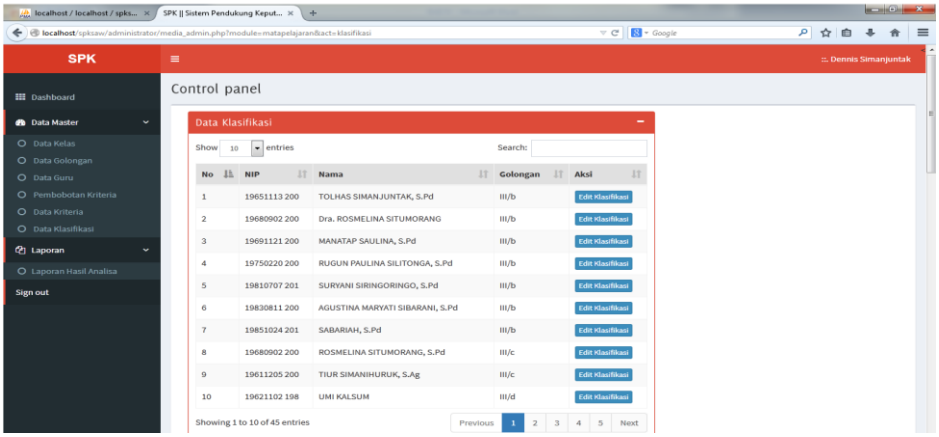

Figure 8. Classification data page

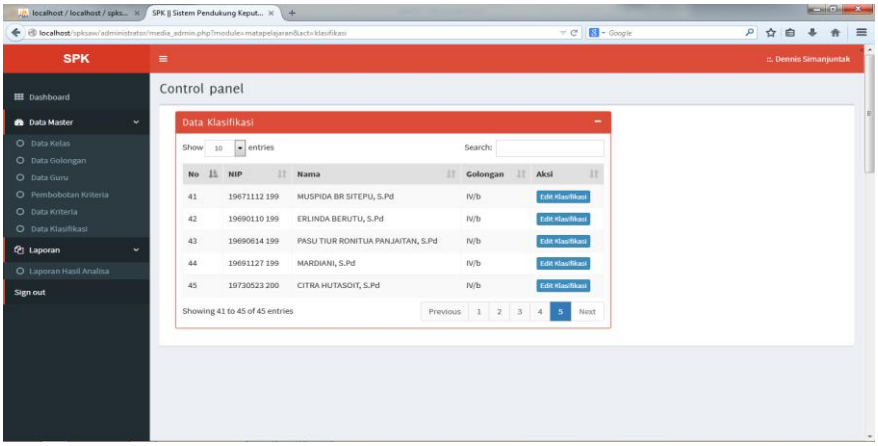

Figure 9. Classification data page

g. Initial value analysis result page
The page of the results of the initial value data analysis to display the results of the analysis of the values of the weights on each teacher's criteria using the SAW method. The following is a display of the results of the initial score analysis of 45 teachers.

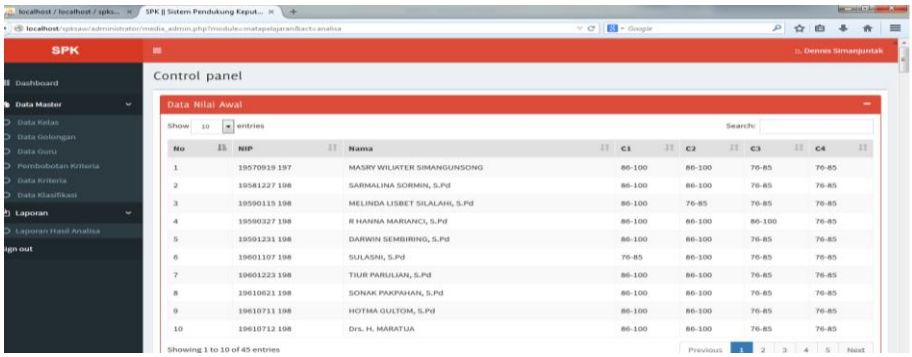

Figure 10. Initial value analysis result page

h. Start matrix page
This initial matrix results page displays the results of the order of the scoring matrix for each weight value of the criteria C1, C2, C3, and C4. The following shows the initial matrix of 45 teachers.

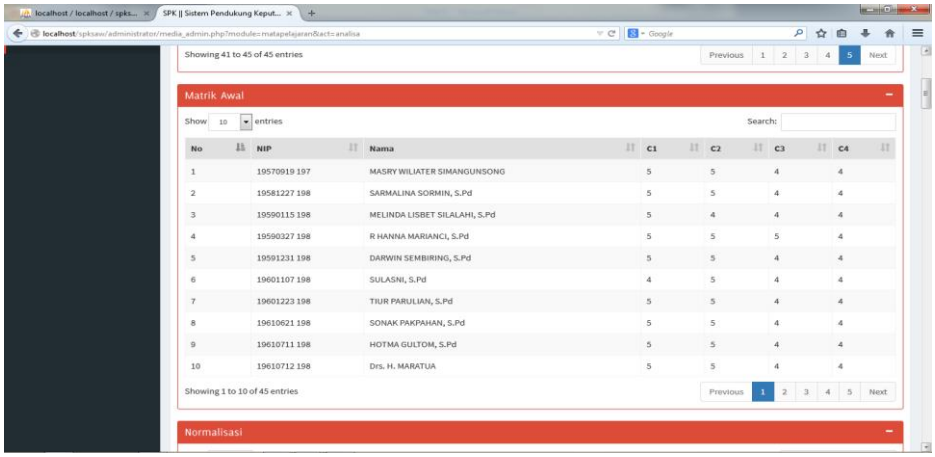

Figure 11. Initial matrix result page

i. Normalization result page

This normalization results page displays the results of the normalization of SAW calculations from a total of 45 teachers on each weighted value for each criterion.

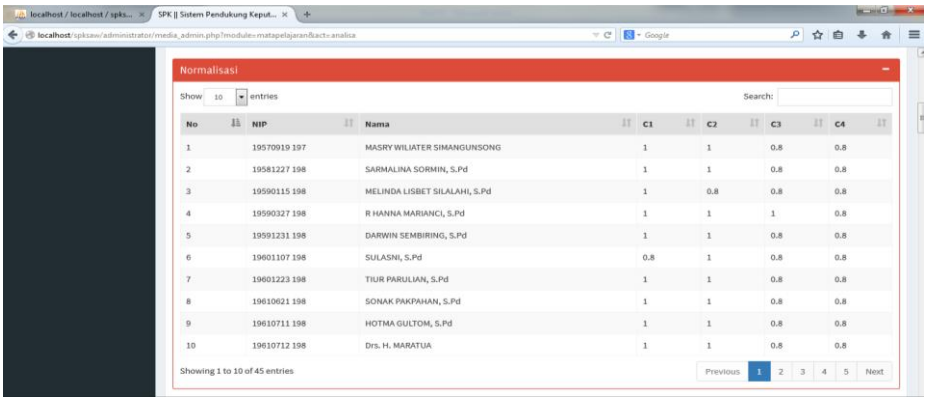

Figure 12. Normalization result page

j. Ranking results page

This ranking results page displays the results of the weighted sum ranking, the results of this ranking are the final results of the teacher's criteria assessment. These results also show the overall ranking of 45 teachers who have been graded from the highest to the lowest scores, as well as showing which teachers are eligible and which are not eligible to become homeroom teacher candidates.

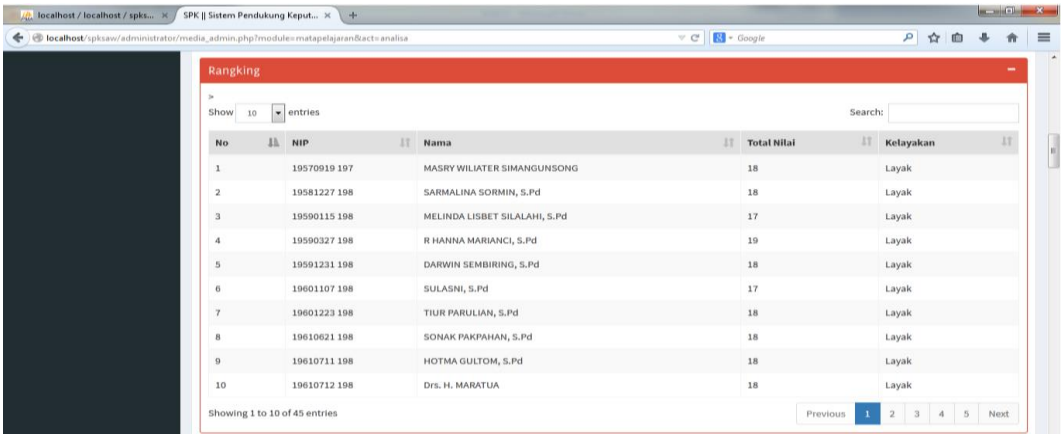

Figure 14. Ranking results page

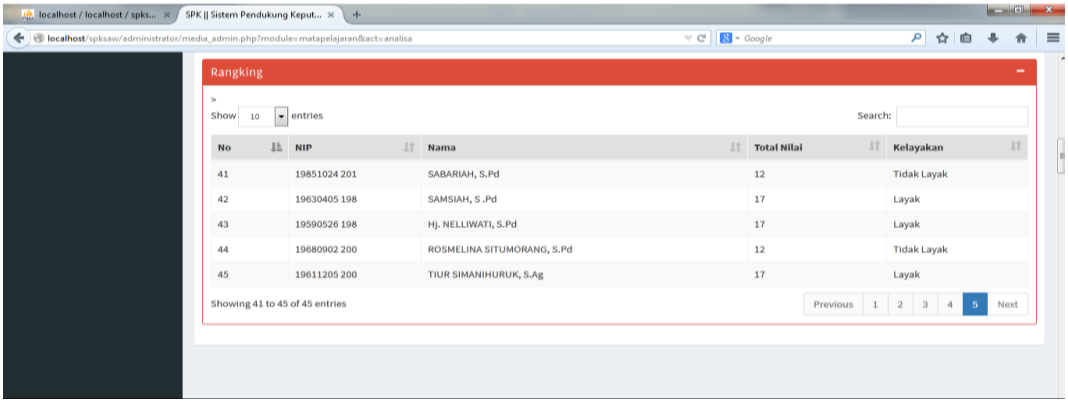

Figure 15. Ranking results page

3.3 System Weaknesses and Strengths

The advantages and disadvantages can be used as material for the development of this system in the future.

1. Implementation and Testing Results
   The system weaknesses observed by the authors are as follows:
   a. The system cannot determine a teacher as homeroom teacher in a certain class
   b. The system does not display the methods of matrix calculation and normalization
2. System Advantages
   The advantages of the system observed by the author are as follows:
   a. This system can determine teachers who are eligible to be homeroom teachers.
   b. This system can be used as a tool for principals to determine eligibility to become homeroom teachers based on rankings.

4. CONCLUSION

Based on research conducted by researchers, it can be concluded several things as follows: The existence of a decision support system to determine homeroom teachers at the MUSDA Perbaungan Private Vocational School will assist the principal in determining homeroom teachers for each class. With this decision support system, it proves that the Simple Additive Weighting method

has been successfully implemented into the system and has been proven during research testing. The calculation of the different weight values of each criterion will produce different values and produce different decisions.

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