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Application of Decision Support System to Determine the Optimization of the Learning Plan Preparation Process in Schools Using the SAW Method

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ABSTRACT

The preparation of an effective learning plan is one of the important factors in improving the quality of education. In the context of the 2024 Independent Curriculum, the flexibility and independence of schools in designing learning plans will be greater, but this also requires the right strategy in determining priorities and the resources needed. This research aims to develop a Decision Support System (DSS) that can help optimize the process of preparing lesson plans in schools using the Simple Additive Weighting (SAW) method. The SAW method was chosen because of its ability to assess and compare various alternatives based on predetermined criteria, such as Relevance to the World of Work, Project-Based Learning, Special Competency Development, Technology Utilization, Soft Skills Development, Plan Flexibility, Inclusive Learning, Collaboration with Industry, Critical Thinking Skills, Time Management. The results of this study show that the DSS implemented is able to provide more effective and efficient recommendations in preparing learning plans that are in accordance with the principles of the 2024 Independent Curriculum. Thus, it is hoped that this system can be a tool for educators in developing more structured and targeted learning plans.

INTRODUCTION

In the world of education, the preparation of lesson plans is one of the important aspects that determine the quality of the teaching and learning process. A good lesson plan can ensure that each material taught is in accordance with the predetermined curriculum and can achieve the desired learning goals. However, the process of preparing this lesson plan often faces various obstacles, such as time constraints, insufficient resources, and complexity in accommodating various student needs.

One way to overcome this obstacle is to implement a Decision Support System (DSS). DSS can help in more effective and efficient decision-making by providing various analysis tools and methods that can optimize the process of preparing learning plans. The Simple Additive Weighting (SAW) method is one of the methods that is often used in DSS because of its good ability to combine various relevant criteria in decision-making. The SAW method works by giving weight to each criterion that is considered important, then doing calculations to determine the optimal value based on these criteria. In the context of preparing a lesson plan, these criteria can include time allocation, student needs, teacher ability, and the suitability of the material with the curriculum. The implementation of DSS with the SAW method is expected to help schools in determining a more optimal learning plan. Thus, the teaching and learning process can run more effectively, efficiently, and in accordance with the educational goals that have been set. In addition, the implementation of DSS is also expected to reduce the administrative burden for teachers, so that they can focus more on teaching activities and student competency development. However, the implementation of DSS is not free from challenges. These challenges include the need for accurate and complete data, as well as the need for training for teachers and school staff in using this system. Therefore, this study is important to examine how the application of DSS with the SAW method can be implemented effectively in the school context, as well as how this system can be optimized to support a better learning plan preparation process.

In a study conducted by (Erma Kurniasari Nurhasanah et al. in 2020) with the title Decision Support System for the Selection of Outstanding Students with the Simple Additive Weighting Method. In college, students are required to be active and have achievements in academic and non-academic fields. The purpose of this study is to create a Decision Support System (DSS) for the selection of outstanding students. The

method used in this study is the Simple Additive Weighting (SAW) method, the concept of the SAW method is to determine the weight value for each attribute and then continue with the ranking process to determine the best alternative. The system is created using Hypertext Preprocessor (PHP) as a programming language, with a MySQL database.

METHOD

The research method is an overview of the steps so that research can be carried out in a structured manner, so a framework is prepared from the beginning to the achievement of the final result as follows:

1. **Preparation.** At this stage of preparation is the beginning of the research process that will be carried out, the preparations carried out are:
   a. Determining the background of the problem, this is done by looking for problems and obstacles what happened, by looking for information directly at SMK Putra Anda Binjai.
   b. Formulate what problems occur and how the solution process will be carried out.
   c. Providing this limitation is done to provide limitations on this research, namely starting from the data used, variables, software or systems used and the output that will be produced, namely the grouping of Pencasila Student Profile data.
   d. Determine the objectives, namely what the results will be achieved from this research process.
   e. Research benefits, namely what benefits will be generated from the Pancasila Student Profile data grouping research.
2. **Theoretical Studies**. At this stage, a theoretical study of the existing problems will be carried out. The study was carried out to determine the concepts that will be used in the research, especially about data mining, clustering methods, Matlab software that will be used in the analysis process carried out in this study.
3. **Data Collection.** This stage is intended to collect supporting data obtained from SMK Putra Anda Binjai in the related section by looking directly at the data grouping of Pancasila Student Profiles at SMK Putra Anda Binjai.
4. **Data Analysis.** At this stage, the analysis of supporting data will be carried out, namely the data grouping data of the Pancasila Student Profile data at SMK Putra Anda Binjai which has been obtained in the previous stage of the grouping of Pancasila Student Profile data at SMK Putra Anda Binjai using data mining techniques with clustering algorithms as a method of solving problems. Data analysis is needed to get solutions to the research problems that are being carried out.
5. **Testing and Implementation**
   a. At this stage, testing of data variables and data implementation as well as the preparation of system programs will be carried out.
   b. Preparing the data to be analyzed, namely the grouping of Pancasila Student Profile data at SMK Putra Anda Binjai.
   c. Determine what variables will be used, namely Class, Grades and Pancasila Student Profile.
6. **Final Stage.** This stage is the stage of drawing conclusions and suggestions that can be made in the preparation of the thesis. With the conclusion, it will

RESULTS AND DISCUSSION

Test Results

In the discussion of the results of this test, the results of the decision support system for the optimization of teaching tools will be displayed and explained with the results of the preference value, the results of this preference value will later be the basis for the decision to be made whether the teaching tool is optimal or not, here are the results of the preference value that has been completed:

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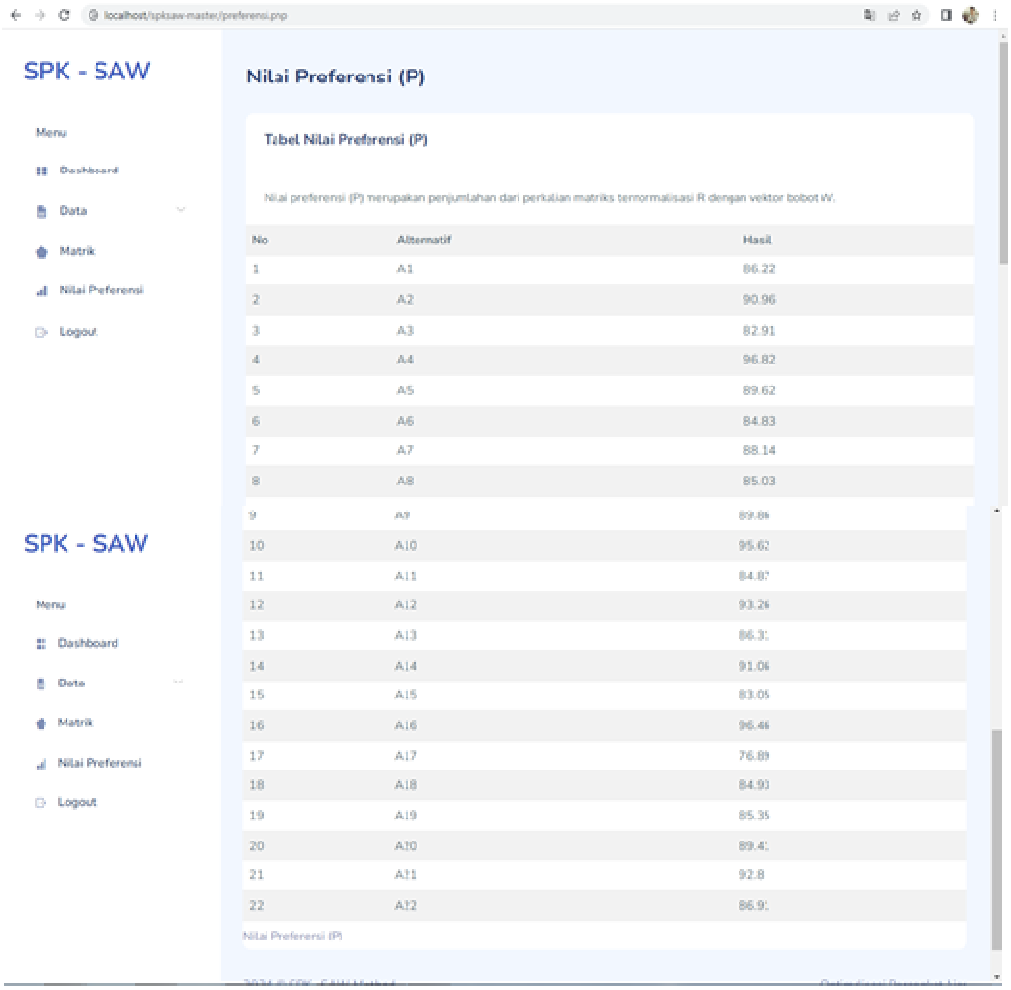

Figure 1. Preference value

Information:

From the results of the preference value, it is known that the highest score is in alternative A4 (X Indonesian) with a score of 96.82. From these results, it is known that the teaching tools x Indonesian are very optimal compared to other teaching tools, while the results of the lowest preference score are in alternative A17 (XI Physical education, sports and creation) with a score of 76.86, which means that there are still teaching tools that are not optimal and need to be evaluated.

Discussion

The home view menu here displays the initial *interface* which contains a view of the decision support system and a description of the SAW algorithm. In this initial menu there are several connected menus such as data, Matrix and Preferred Value. The Dashboard *menu page* can be seen in figure 2.

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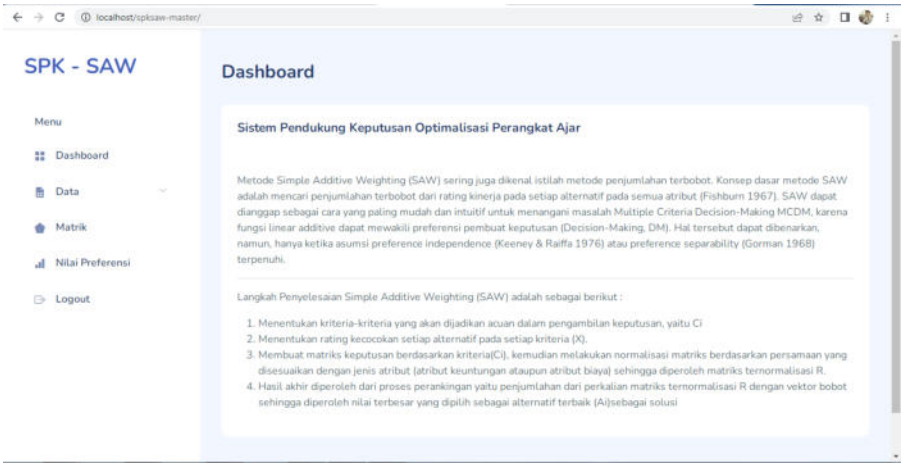

Figure 2. Dashboard Display

The data menu has 2 submenus, namely the alternative menu which is used to fill in the alternative data and then the weight and criteria submenu which is used to adjust the weight value of each criterion.

Figure 3. Alternative Menu Display

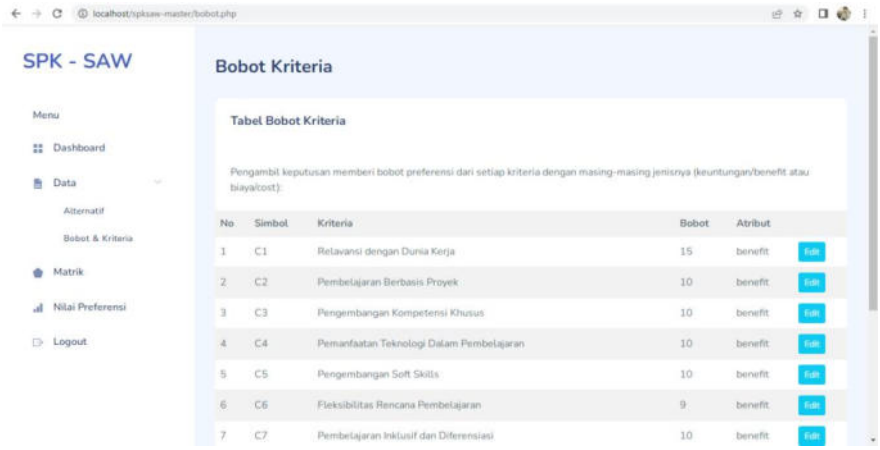

Figure 4. Weight and Criteria Menu Display

The matrix menu is used to fill in the value of each alternative that will be calculated into the decision matrix.

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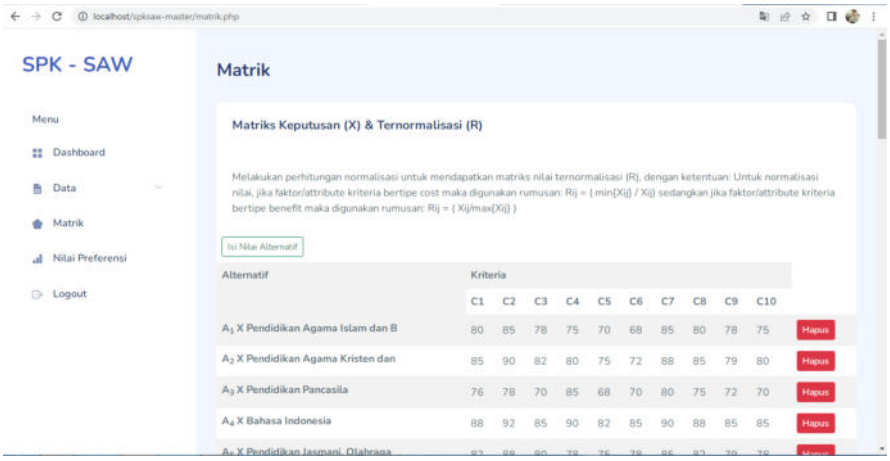

Figure 5. Matrix Menu Display

The preference value menu is a menu that displays the preference value or the final result of the decision support system by multiplying the previous matrix.

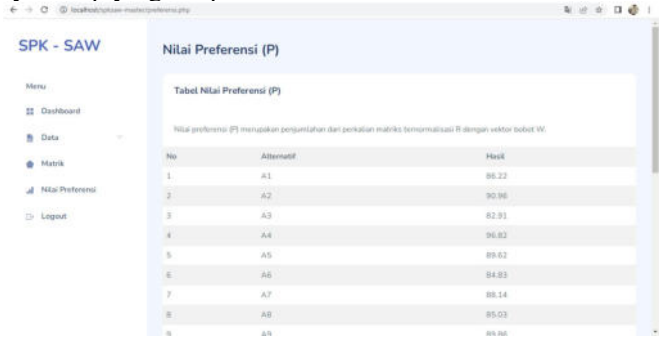

Figure 6. Menu Display Values preferences

CONCLUSION

The Simple Additive Weighting (SAW) method can be used to determine a learning plan by measuring various relevant criteria, such as the effectiveness of the subject matter, conformity with the Independent Curriculum, and student needs. SAW works by summing up the normalized values for each criterion and alternatives. The alternative that has the highest score will be considered the most optimal learning plan. By considering the weight of each criterion, SAW allows for more objective decision-making in the preparation of learning plans. The application of DSS with the SAW method can improve the efficiency and quality of the learning plan preparation process because this method provides a structured and systematic approach in assessing various alternatives based on several criteria. SAW allows for quick and accurate calculations of various relevant factors, making it easier for lesson planners to make the best choices. The use of DSS reduces subjectivity in decision-making, so it is expected to improve the quality of results that are more in line with student needs and learning goals. The implementation of the Simple Additive Weighting (SAW) method involves several main steps: Identification of criteria, Normalization of the decision matrix, Weighting of criteria, Calculation of the final value, Selection of the best alternative, from that step it can be concluded that the final result is the highest score is in alternative A4 (X Indonesian) with a score of 96.82. From these results, it is known that the teaching tools x Indonesian are very optimal compared to other teaching tools, while the results of the preference value that is tied to alternative A17 (XI Physical education, sports and creation) with a score of 76.86 means that there are still teaching tools that are not optimal and need to be evaluated.

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