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Decision Making System for Acceptance of Teaching Staff at Pondok Anugerah Special School with Simple Additive Weighting (SAW) Method

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ABSTRACT

Special School (SLB) is a means of gaining knowledge for children with special needs. The quality of the school is inseparable from the quality of the teachers who provide teaching and education. Selecting prospective teachers who will teach and educate in schools is one way to improve school quality. Teacher recruitment is carried out to find teaching staff that suits the needs of the school based on the criteria determined by the school. Acceptance of teaching staff at this school is only by interview tests without going through the selection stage to see the talents and abilities of prospective teaching staff, after which the school negotiates by asking the teacher's approval for the acceptance of prospective teachers, so that the quality of prospective teachers to teach students with special needs is not so prominent, which results in ineffective criteria for the desired teacher to care for or guide students. A system that can help produce accurate assessment results by implementing a Decision Support System (SPK) is needed. One of the decision support system methods is the Simple Additive Weighting (SAW) method. The SAW method is a method that uses several assessment criteria that are important factors in the selection of teacher acceptance. The assessment criteria include education, experience, age, and the results of oral tests and interviews. From the results of these criteria will produce the assessment weight of each prospective teaching staff, then calculations will be carried out to find the ranking results based on the highest to lowest priorities. This research produces an information system to assist leaders in making the right decisions in the process of recruiting teaching staff at SLB Pondok Anugerah by applying the SAW method. [1]

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1. INTRODUCTION

Special School (SLB) is a means of gaining knowledge for children with special needs, where students can take part in learning according to the learning time set by the school. The importance of education for children makes parents look for the best place to gain knowledge for their children so that one day they become useful people, no exception for children with special needs, they also have the right to get a proper education as well as children in general. [2]

The quality of schools is inseparable from the quality of teachers who provide teaching and education. Selecting prospective teachers who will teach and educate in schools is one way to improve school

quality. Teacher recruitment is carried out to find teaching staff who match the needs of the school based on the criteria determined by the school. The problem being faced at SLB Pondok Anugerah is the lack of effectiveness in recruiting or accepting new teaching staff because the current teaching staff recruitment system is carried out by calling prospective teaching staff by only conducting interviews without [3]

After that the school negotiates by asking the teacher's approval for the acceptance of prospective teachers, so that the quality of prospective teachers to teach students with special needs is not so prominent, which results in ineffective teacher criteria desired to care for or guide students, new teachers are not only based on criteria such as education, but also involve criteria such as teaching experience, age and teaching tests. In this case, decision makers often have difficulty in determining new teaching staff who are in accordance with the criteria that are eligible to be accepted as teaching staff at this Pondok Anugerah SLB.[4] Therefore, in this technological development, SLB Pondok Anugerah needs a system that can help make decisions in the acceptance of teaching staff with a decision-making system (SPK) so that the school is not wrong in considering accepting prospective teaching staff. [5]

This research has also been conducted by (Nurjaya N. A., 2018) with the title "Decision Support System on Teacher Admission Selection System Using SAW (Simple Additive Weighting) Method" in this study to select teacher admissions by determining the weight value of each attribute, then proceed with the ranking process that will select the best alternative from a number of alternatives to determine the teacher to be accepted. And also research has been conducted by (Ismarmiaty, 2020) with the title "Decision Support System for Employee Recruitment of PT Cakra Mobilindo Using the Simple Additive Weighting Method" in this study to build a decision support system that can select prospective employee data by automating data collection, data processing and information distribution so that it makes it easier for the company to be able to manage data and test scores of prospective employees according to predetermined criteria. [6]

2. METHOD

Decision Support System (SPK) is defined as a system that is able to provide problem solving and communication capabilities for problems with semi-structured and unstructured conditions. This system is used to assist decision making, where no one knows exactly how it should be made. [7] CBIS (Computer Based Information System) applications are flexible, interactive and adaptable, developed to support the solution of specific unstructured management problems. [8]

The Simple Additive Weighting (SAW) method is a method for summing weights by determining the weight value on the attribute and then performing a ranking process that becomes an alternative. The SAW method helps in making decisions on a case or problem. In the Simple Additive Weighting (SAW) method, the results obtained are the greatest value that will be selected as the best alternative in decision making and the time required in this method is very short. [9] The normalization process can be completed using the following equation :

$$r_{ij} = \begin{cases} \frac{x_{ij}}{max_{ij}\ x_{ij}} \\ \\ \\ \frac{min_j\ \ x_{ij}}{x_{ij}} \end{cases}$$

Description:
rij = normalized performance rating value
Xij = the value of the attributes possessed by each alternative
Max = largest value
Min = smallest value
Benefit = if the largest value is the best
Cost = if the smallest value is the best

Usually in performing the ranking process, equation 2 is used, namely :
$Vi = \sum_{j=1}^{n} w_j\ r_{ij}$
Description:
Vi = Ranking for each alternative
Wj = Weight value of each criterion
Rij = Normalized work branch value

Here are the calculation steps with the Simple Additive Weighting (SAW) method:
1. Determine the criteria that will be used as a reference in decision making. 2. Determine the suitability rating of each alternative on each criterion. 3. Create a decision matrix based on criteria, then normalize the

matrix based on equations that are adjusted to the type of attribute (profit attribute or cost attribute) so that a normalized matrix R is obtained. 4. The final result is obtained from prankingan, namely the sum of the multiplication of the normalized matrix R with the weight vector so that the largest value is selected as the best alternative as a solution. [10]

3. RESULTS AND DISCUSSION

Based on the results of direct observation and review of the research object, namely SLB Pondok Anugerah, the data needed for calculations using the Simple Additive Weighting (SAW) method is obtained which consists of alternative data, criteria to sub criteria which can then be continued into the calculation and ranking process to produce a final value as a decision / solution to the problem of subjectivity in the recruitment of teaching staff, especially in terms of administrative selection to find prospective teaching staff who best meet the administrative criteria determined by the agency. The solution process is as follows:

1. Determining criteria. Determining the value of criteria (Ci) on a set of alternatives (Ai) along with preference weights (Wj) for each criterion (Ci). The criteria (Ci) and preference weights (Wj) for each criterion can be seen in the following table. Meanwhile, the weighting for each sub-criteria is described in Table 1 and the alternative decisions on the research object can be seen in the following Table:

Table I. Criteria

Criteria (Ci)	Description	Type	Weight (Wj)	
C1	Education	*Benefit*	30%	0,3
C2	Experience	*Benefit*	30%	0,3
C3	Age	*Benefit*	10%	0,1
C4	Oral Test (teaching)	*Benefit*	15%	0,15
C5	Interview	*Benefit*	15%	0,15
Total			100%	1

Normalization of Decision Matrix. As a result of the suitability rating in the following table, a decision matrix (X) can be formed as follows**:**.

$$X=\begin{bmatrix} 0,75 & 0,75 & 1 & 0,75 & 0,75 \\ 1 & 0,75 & 1 & 0,75 & 0,75 \\ 1 & 0 & 1 & 0,75 & 1 \\ 1 & 1 & 0,25 & 0,25 & 1 \\ 0 & 0,75 & 0,75 & 0,25 & 0,75 \end{bmatrix}$$

From the matrix (X), matrix normalization is then carried out by implementing Equation 1 by selecting one of the equations that is suitable for the type of attribute. The normalization process to calculate the value of each criterion is as follows:

After obtaining the normalized matrix, then the ranking process is carried out using the weights that have been determined by the decision maker by implementing Equation 2 to obtain the best alternative as a solution to the employee recruitment problem. The implementation of Equation 2 is as follows:

V1 = (0,3*0,75) + (0,3*1) + (0,1*1) + (0,15*1) + (0,15*0,75)
= 0,88

V2 = (0,3*1) + (0,3*1) + (0,1*1) + (0,15*1) + (0,15*0,75)
= 0,96

V3 = (0,3*1) + (0,3*0) + (0,1*1) + (0,15*1) + (0,15*1)
= 0,7

V4 = (0,3*1) + (0,3*1) + (0,1*0,25) + (0,15*0,33) + (0,15*1)
= 0,82

V5 = (0,3*0) + (0,3*0) + (0,1*0,75) + (0,15*0,33) + (0,15*0,75)
= 0,23

From the above results, the following results are obtained:

Table II. Alternative

Alternative	**Name**	**Final Grade**
A1	Salma Salsabil	0,88
A2	Rony Parulian	0,96

A3	Nabila Taqiya	0,7
A4	Novi Adelia	0,82
A5	Artha Sagita	0,23

On the home page or main page that first appears when the admin enters the username and password. On the page there are several menus consisting of Home, Teacher Data, Criteria Data, SAW Method Calculation and Logout. Each menu has its own function.

Figure I. Admin Page View

On this menu display serves to enter data on prospective teaching staff who will later follow the calculation process to determine who has the highest score to be accepted as a teaching staff.

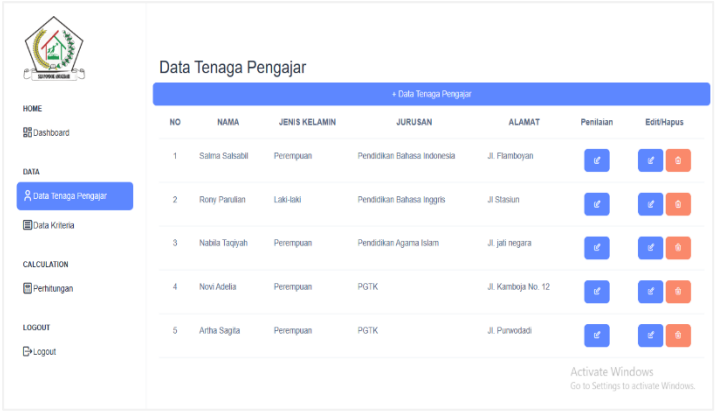

Figure II. Display of Teacher Data Menu

The calculation page design is a design made for the calculation of the SAW method such as the prospective teacher data table and the value of each criterion.

Figure III. Calculation Page Design

4. CONCLUSION

This research aims to develop and implement a decision-making system for recruiting teaching staff at SLB Pondok Anugerah using the Simple Additive Weighting (SAW) method. Based on the research results, several conclusions can be drawn as follows:

1. Effectiveness of SAW Method:
   The Simple Additive Weighting (SAW) method is proven to be effective in helping the decision-making process for teaching staff recruitment. This method allows objective assessment based on various predetermined criteria, such as education, work experience, special skills, and teaching competencies.
2. Appropriate Assessment Criteria:
   This research identified key criteria that are relevant in the selection process of teaching staff at SLB Pondok Anugerah. These criteria include educational background, professional experience, interpersonal skills and technical skills in special education. The weight given to each criterion was adjusted to the specific needs of the SLB.
3. System Implementation:
   The developed decision-making system was successfully implemented at Pondok Anugerah Special School. The use of this system assists the selection committee in screening and evaluating candidates more efficiently and accurately. The system provides a final ranking of each candidate based on a composite score calculated using the SAW method.
4. Increased Transparency and Accountability:
   With this system, the selection process becomes more transparent and accountable. All steps in candidate evaluation are well documented, thus reducing potential bias and subjectivity in decision making.
5. Recommendations for Further Development:
   Although the system has shown satisfactory results, this study recommends further development, such as integration with wider information systems and the use of more complex decision-making methods where necessary. In addition, training for system users also needs to be improved to ensure optimal utilization.

Overall, this research successfully demonstrated that the SAW method can be adapted and effectively applied in the decision-making system for recruiting teaching staff at SLB Pondok Anugerah. With this system, it is expected that the quality of teaching staff selection can be improved, thus contributing positively to the quality of education in the SLB. This research provides a practical contribution in the field of human resource management in the special education sector, as well as enriching the literature regarding the application of the SAW method in the context of workforce selection decision making.

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