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Decision Making System for Educator Recruitment at IP Daarul Arqam Private Junior High School using Simple Additive Weighting Method

Nurul Anzani [1], M. Rhifky Wayahdi [2], Ellanda Purwawijaya [3]
[123] Universitas Battuta, Medan, Indonesia
[123] Fakultas Teknologi, Universitas Battuta, Medan, Indonesia
[1] adzaninurul9@gmail.com [2] muhammadrhifkywayahdi@gmail.com [3] ellanda.purwa.wijaya@gmail.com

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ABSTRACT

An institution can work well to achieve its goals which are determined by many factors. Teachers play an important role in improving the life of a nation. Teachers have great obligations and responsibilities in terms of educating the nation's children. Therefore, a school has several criteria in selecting educators. For this reason, accuracy and examination are needed in selecting educators to get qualified teachers. By using a Web-based decision support system the problems faced by foundations or schools can be overcome, so that subjectivity in decision making can be reduced. This system can integrate data on prospective educators from various sources, such as education, work experience, expertise, and others. In addition, this system can also apply predetermined decision-making methods, such as the Simple Additive Weighting (SAW) method. By using this system, decision makers can easily access and analyze prospective educators' data comprehensively. They can also see the results of ranking prospective educators based on relevant criteria. This allows decision makers to make more objective and informed decisions in determining teaching staff. With this application, it can make it easier to make decisions on determining teaching staff.

Corresponding Author:

Nurul Anzani
Universitas Battuta
Email: adzaninurul19@gmail.com

1) INTRODUCTION

An institution can work well to achieve its goals which are determined by many factors. Factors in determining candidates who will be accepted as educators in an educational institution. Teachers play an important role in improving the life of a nation. Teachers have great obligations and responsibilities in terms of educating the nation's children.

Therefore, a school has several criteria in selecting educators. For this reason, accuracy and examination are needed in selecting educators to get qualified teachers. In this IP Daarul Arqam Private Junior High School also has criteria in the selection of teaching staff but in this case this school still uses manual methods to select every educator who wants to apply for a job at the school. Therefore, the author wants to try to create a program or an application that can make it easier for schools to select new qualified educators.

A decision support system is an interactive information system that provides information, modeling, and manipulation of system data [1], and also decision-making systems help human life a lot [2]. Because it is used to assist decision making in semi-structured situations and unstructured situations, where no one knows exactly how decisions should be made. The goal is to solve problems, both semi-structured and unstructured

[3]. The acceptance of new teaching staff is not only based on certain criteria. in this school, teaching staff must have criteria that have been set by the school.

These criteria can include education, work experience, expertise, fluency in reading the Qur'an, physical and spiritual health, and good behavior. There are several steps that are usually taken by the decision-making system for recruiting teaching staff, namely determining criteria, registration, administrative selection, academic assessment, competency selection, interviews, and final decisions.

Research on the decision-making system for recruiting educators has been widely carried out, such as Setiawan's research on Teacher Recruitment Decision Support Systems Using Tahani Fuzzy Logic [4] and Nurjaya's research on Decision Support Systems for Teacher Admission Selection Systems Using the Simple Additive Weighting (SAW) Method [5], in this study discussing the process of recruiting teachers and has several weaknesses and still raises several issues such as knowing the sensitivity to changes in weight values.

From the description above, it is hoped that by using a decision support system (SPK) the problems faced by foundations or schools can be overcome, so that subjectivity in decision making can be reduced, so the author raises a research title entitled "Decision Making System for Educator Recruitment at IP Daarul Arqam Private Junior High School using Simple Additive Weighting (SAW) Method". However, what determines in this decision making is the decision maker itself because the system is only an alternative decision. While the final decision is still determined by the decision maker, namely the principal.

2) METHOD

2.1. Simple Additive Weighting

The Simple Additive Weighting (SAW) method is a method for summing weights by determining the weight value on the attributes and then performing the ranking process which 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 [6]. Using the SAW method, it is expected to help companies / agencies [7].

The SAW method is often referred to as the weighted sum method. The basic concept of the SAW method involves finding the weighted sum of the performance ratings on each alternative, taking into account all the attributes involved. The SAW method requires the normalization process of the decision matrix (x) to a scale that can be compared with all existing alternative ratings [3].

$$r_{ij} \begin{cases} \dfrac{x_{ij}}{Max\ x_{ij}} & \text{If } j \text{ is a benefit attribute} \\ \dfrac{Min\ x_{ij}}{x_{ij}} & \text{If } j \text{ is a cost attribute} \end{cases}$$

Where:

r_{ij}	= normalized performance rating value
x_{ij}	= the value of the attributes of each criterion
max x_{ij}	= the largest value of each criterion
min x_{ij}	= the smallest value of each criterion
benefit	= if the largest value is the best
cost	= if the smallest value is the best

The preference value for each alternative (V_i) is given as follows:

$$V_i = \sum_{j=1}^{n} W_j r_{ij}$$

Where:

v_i	= ranking for each alternative
w_j	= weight value of each criterion
r_{ij}	= normalized performance rating value

2.2. Research Medotology

Analysis and design of the system carried out in this study, namely using the development of the Waterfall system method, the waterfall model provides a sequential or sequential software lifeflow approach starting from analysis, design, coding, testing, and implementation and maintenance stages.

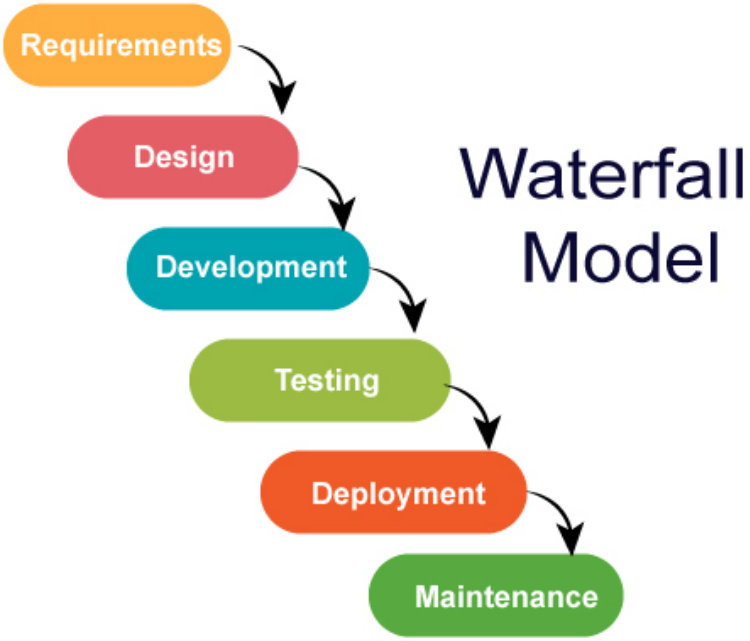

Figure I. Waterfall Model

3) RESULTS AND DISCUSSION

a. SAW Method Calculations

1) Determine the criteria that will be used as a reference in decision making

Table I. Criteria Table

No.	Criteria	Category	Value
C1	Education	D3 / S1 according to major	100
		Currently studying	50
		D3 / S1 not in accordance with the department	80
C2	Work Experience	2 years	50
		2-5 years	80
		5-10 years	100
C3	Expertise	Good public speaking	100
		Skills	50
		Qur'an memorization	80
C4	Fluent in reading al-qur'an	Fluent	100
		Stammering	50
		Can't	0
C5	Physical & Spiritual Health	There is a health certificate	100
		No Health Certificate	20
		Physical Limitations	50
C6	Good Behavior	There is an SKCK letter	100
		No SKCK letter	20
		Good attitude	80

2) Determine the weight of each criterion

Table II. Criteria Weighting

Criteria	Weight	Matches
C1	20%	Benefit
C2	30%	Benefit
C3	10%	Benefit
C4	20%	Benefit
C5	10%	Benefit
C6	10%	Benefit
Total	100%	

3) Define alternatives and nomalization

Table II. Criteria Weighting

Alternative	Criteria					
	C1	C2	C3	C4	C5	C6
A1	100	50	100	100	100	100
A2	50	80	50	50	20	20
A3	80	100	80	0	50	80

Normalization result:

$$r = \begin{pmatrix} 1 & 0,5 & 1 & 1 & 1 & 1 \\ 0,2 & 0,8 & 0,5 & 0,2 & 0,2 & 0,2 \\ 0,8 & 1 & 0,8 & 0 & 0,5 & 0,8 \end{pmatrix}$$

4) Ranking

W = [0,2; 0,3; 0,1; 0,2; 0,1; 0,1]

A1 = (0,2*1) + (0,3*0,5) + (0,1*1) + (0,1*1) + (0,1*1) + (0,1*1) = 0,75
A2 = (0,2*0,2) + (0,3*0,8) + (0,1*0,5) + (0,1*0,2) + (0,1*0,2) + (0,1*0,2) = 0,39
A3 = (0,2*0,8) + (0,3*1) + (0,1*0,8) + (0,1*0) + (0,1*0,5) + (0,1* 0,8) = 0,67

Then the alternative that has the highest value and can be selected is alternative A1 with a value of 0.75.

b. Implementation

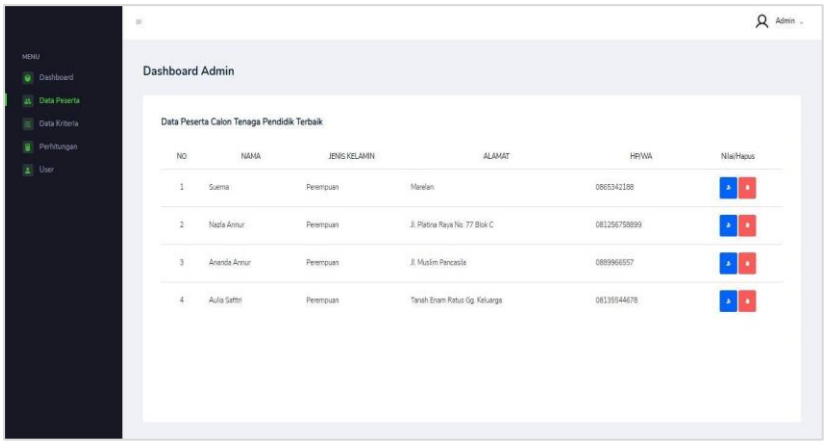

Figure I. Educator Candidate Data Menu Display

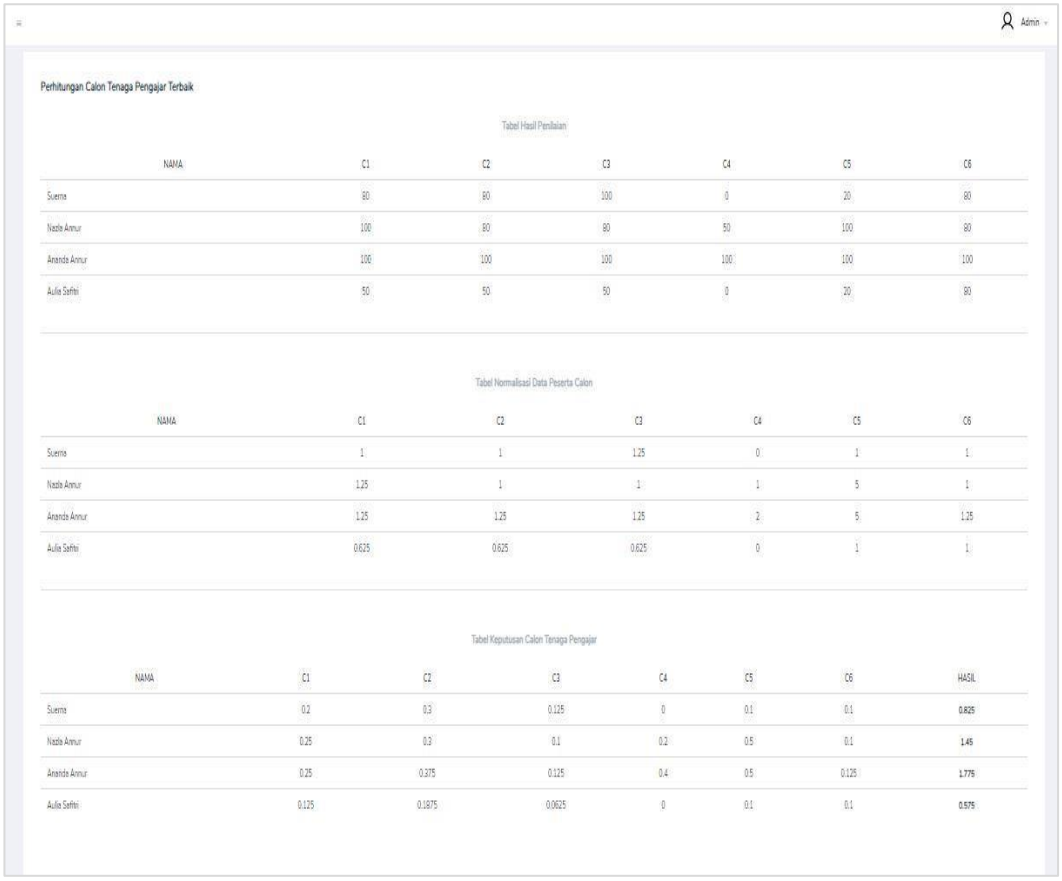

Figure II. Calculation Menu Display

The results of the system feasibility study using the TELOS feasibility study are:

1) Technical feasibility, technological feasibility highlights the system requirements that have been compiled from the technology used.
2) Economic Feasibility, In the construction of a new system, of course, investment or funds are needed which are not small to get benefits for the long term.
3) Legal Feasibility, In general, the legality of a project is not a problem, so the general feasibility assessment can very likely be given a value of 10. However, if there are legal problems that result in management dealing with the law, then the legal feasibility assessment is worth 9.5.
4) Operational Feasibility, the Operational Feasibility Factor assesses the presence of users or resources who are well trained and have a strong commitment to running the system.
5) Schedule Feasibility, The key to success is the measurement of time estimation errors. If the system to be implemented is not too complex or simple, standard and locally based, and the total development time is measured in hours or days. Then the measurement of the time estimation error required in design and implementation is small. On the other hand, if the implemented system is a very complex system, requiring a total time in years, then the possibility of measuring the time estimation error is higher.

4) CONCLUSION

a. From the calculation using the Simple Additive Weighting method, the incoming data will be processed so as to get the right calculation results.
b. Decision Making with the SAW Method can help make decisions on the acceptance of teaching staff based on the test stages.

c. The Decision Support System designed is able to select the recipient of teaching staff through a fast and precise assessment so as to streamline the selection process at IP Daarul Arqam Private Junior High School.

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