

Contract Staff Acceptance Selection Using Simple Additive Weighting (SAW) Method

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ABSTRACT

Introduction : Technology is a supporter in making decisions made by a top-level leader. Good decision making will produce a good decision. An example of decision making is the determination of an honorary employment appointment at an agency. In some areas, there are still various offices or government agencies whose recruitment process has not been carried out professionally, but still in the usual ways in the environment such as friendship or family relations. This research designed a web-based decision support system application using SAW method to support the labor selection process at the Class II Agricultural Quarantine Center in Palu. The type of research conducted is qualitative descriptive study. The system development method used in this research is Waterfall development. Waterfall method is the workmanship of a system carried out sequentially or linearly. The analytical method used is Simple Additive Weighting (SAW). This method used because the basic concept of SAW method is to find a weighted sum of the performance ratings on each alternative of all attributes. The programming language used is PHP, while the database used is MySQL. The method used to test this system is black box testing method. Based on manual calculations as a comparison with the calculation of the system built, it can be obtained same results for its value. In addition, the results of ranking was obtained, where the alternative manual calculation that has the highest value is Fadila with a vector value of 1.00.

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1. Introduction

Technology is a supporter in making decisions made by a top level leader [1] - [3]. Good decision making will produce a good decision [4]. An example of decision making is the determination of an honorary employment appointment at an agency. Contractor or Honorary

Worker is someone who is appointed by the Personnel Guiding Officer or other official in the government to carry out certain tasks at a government agency or whose income is borne by the State Budget (APBN) or the Regional Budget (APBD) (Article 1 figure) of Government Regulation No. 48 of 2005 concerning Appointment of Honorary Workers to Become Civil Servants) [5]. As a result of the limited number of Civil Servant (ASN) serving in Palu Class II Agricultural Quarantine Center, the number of jobs or tasks that are not able to be carried out, a selection of Contract Workers is held annually with the number of quota adjusting to the needs of the office. The number of Contract Workers in 2018 is 28 (twenty eight) people then increased to 31 (thirty one) people in 2019 through the selection of contract workers recruitment with 10 (ten) registrants and the quota received was only 3 (three) people. In some areas, there are still various offices or government agencies whose recruitment process has not been carried out professionally, but still in the usual ways in the environment such as friendship or family relations. This happens because there is no systematic standard method for evaluating prospective contract workers. Therefore, the decisions produced are sometimes not in line with the expectations. From these problems, we need a decision support system that can help the Head of Sub-Division of Administration (KTU) in making decisions for the assessment of prospective new contract workers.

The method used in this decision support system is Simple Additive Weighting (SAW) method, because it can determine the weight value for each criterion, then proceed with the ranking process to select the best alternative from a number of alternatives, the alternatives referred to here are those accepted as new contract workers which has predetermined criteria [6], [7]. SAW method can help in making a case decision by producing the greatest value that will be selected as the best alternative. The calculation will be appropriate if the selected alternative meets the specified criteria. Calculations using SAW method becomes more efficient because the time needed in calculations is shorter. Based on the existing problems, this research designed a web-based decision support system application using SAW method to support the workers' selection process at Class II Agricultural Quarantine Center in Palu.

2. Materials and Method

The type of research conducted in this case is qualitative descriptive study which states that qualitative research method is research method based on the philosophy of positivism, used to examine the conditions of natural objects. In this research, researchers are the key instrument. The sampling of data sources was done purposively and snowballed, combining techniques using triangulation (combined), data analysis was inductive/qualitative, and qualitative research results emphasized more on meaning than generalization (tina, nina). The system development method used in this research is Waterfall development. Waterfall method is the workmanship of a system carried out sequentially or in a linear manner [8]. The analytical method used is Simple Additive Weighting (SAW) because the basic concept of SAW method is to find a weighted sum of the performance ratings on each alternative of all attributes. The programming language used is PHP while the database is MySQL. The method used to test this system is the Black Box Testing method in which the testing was done by assessing software testing methods that test application functionality [9].

3. Results and Discussion

3.1 Proposed System Analysis System

The analysis started from obtaining honorary staff data and variables used in determining honorary staff to be received, then a decision support system application was built in which data was stored in a database. The application produced a report recommending the names of honorary staff based on the ranking.

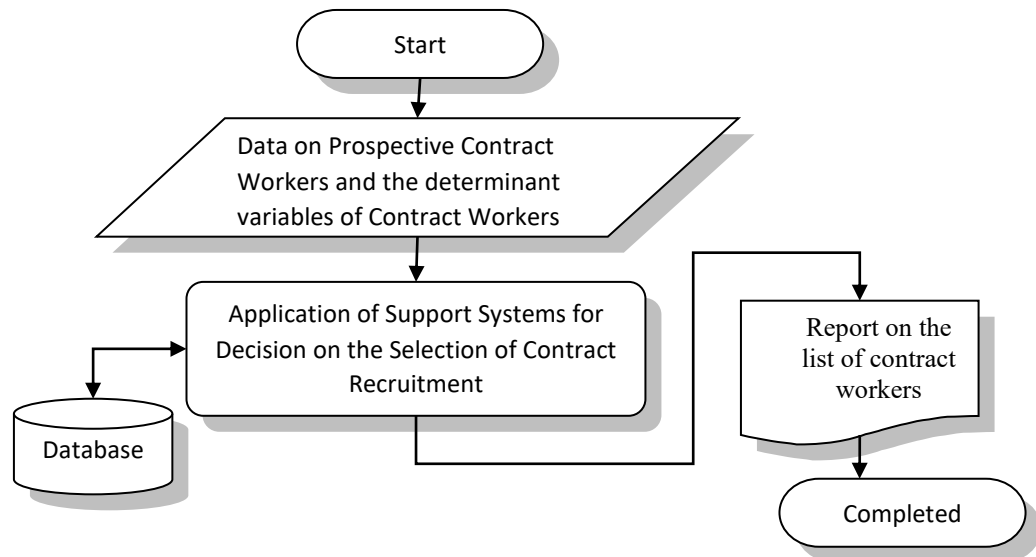


Figure 1. Design of System Made

3.2 Analysis of SAW Method

1. Determining the Table of Contractual Staff Criteria

In determining contractual personnel, there are 5 criteria which will be the supporting variables, those are results of interviews, recent education, work experience, ability to operate computers and certificates of expertise. It can be seen in Table 1.

Table 1. Criteria

Code Criteria	(Weight)	Criteria
C1	0.2	Interview
C2	0.2	Last Education
C3	0.2	Work Experience
C4	0.2	Ability to Operate Computer
C5	0.2	Certificate of Expertise

2. Normalization Stage

Table 2. Ranking of Weighted

Candidates for Contract Workers	Criteria				
	C1	C2	C3	C4	C5
Fadila	1.00	1.00	1.00	1.00	1.00
Johanes S.	0.80	0.80	1.00	0.60	0.40
Ahmad K. A	0.80	0.40	0.80	0.80	0.40
YulfiReski	0.60	1.00	0.20	0.40	0.60

Agus B.	0.40	0.40	0.60	0.60	0.40
Ridhwan	0.20	0.20	0.20	0.20	0.20

3. Finding the Value of Vectors

After getting the table values then, each value is multiplied in the table by the weight of the criteria that we declared earlier continued by looking for the vector values:

1. Fadila = $(1.00 * 0.20) + (1.00 * 0.20) + (0.100 * 0.20) + (1.00 * 0.20) + (0.100 * 0.20)$
= **1.00**
2. Johannes S. = $(0.80 * 0.20) + (0.80 * 0.20) + (0.100 * 0.20) + (0.60 * 0.20) + (0.40 * 0.20)$ = **0.72**
3. Ahmad Khairul = $(0.80 * 0.20) + (0.40 * 0.20) + (0.80 * 0.20) + (0.80 * 0.20) + (0.40 * 0.20)$ = **0.68**
4. YulfiReski = $(0.60 * 0.20) + (1.00 * 0.20) + (0.20 * 0.20) + (0.40 * 0.20) + (0.60 * 0.20)$ = **0.56**
5. AgusBudiono = $(0.40 * 0.20) + (0.40 * 0.20) + (0.60 * 0.20) + (0.60 * 0.20) + (0.40 * 0.20)$ = **0.48**
6. Ridhwan = $(0.20 * 0.20) + (0.20 * 0.20) + (0.20 * 0.20) + (0.20 * 0.20) + (0.20 * 0.20)$
= **0.20**

Based on calculations the alternative manual that has the highest value is Fadila with a vector value of 1.00 and the one with the lowest value is Ridhwan with a vector value of 0.20.

3.2 System Implementation

Initial appearance of the design *Homepage* has a homepage menu. On the main page, there will be an option for the user when entering the application, which is to log in first in order to be able to access the application.

3.3 Trial Program

The next stage was to test the application whether the application is running well before being used by the final users.

Table 3. Trial Application (Blackbox)

Menu	Testing Scenarios	Expected Outputs	Validation
Form Input Data Criteria	Editing criteria weights	Weight data input will be replaced and stored in the database as new data	Success
	Deleting criteria data	Data that has been input	Success
Input Data Crips Forms Input	Criteria	Weight data input that will be replaced and stored in the database as new data	Success
	Deleting criteria	Data deleting criterion data inputted	Success
Employee Data Input Form	on contractor	increased contractorcandidate data	Success

Menu	Testing Scenarios	Expected Outputs	Validation
Inputs data	Deleted contractor candidate data	deleted inputted contractor candidate data	Success
Alternative value input form	Data of prospective contractor	candidate data display of prospective contractor candidate or supporting data selection	Success
	Changing the criteria data for prospective contract workers who have been inputted	Criteria data for prospective contract workers has changed	Success
	Removing the data of contractor	prospective contract workers who have been inputted is deleted	Success

4. Conclusion

Based on manual calculations as a comparison with the calculation of the system built, it is obtained the same results for its value and also the results of ranking where the alternative manual calculations that have the highest value is Fadila with a vector value of 1.00. This shows that the system that was built could process the weight of the selection of contract recruitment selection well. The results of the system process using SAW method are ranking of the applicants with the highest ranking to the lowest ranking. The results of this ranking serve as recommendations for agencies in determining the prospective workforce to be accepted. The decision support system that was made can make it easier and faster to process data and report the determination of recruitment of contract workers in BKP Class II Palu so that it can create work effectiveness and efficiency.

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