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Implementation of an Employee Acceptance Decision Support System Using the Simple Additive Weighting (SAW) Method at the Musda Perbaungan Private Vocational School

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ABSTRACT

Employee acceptance factors at SMK Private MUSDA Perbaungan the current applies are education, work experience, GPA, age, interview, personality test, field test and work experience, which are considered necessary to improve the quality of educational institutions. In addition, the process of placing application files is still manual so that prospective applicant files must be evaluated by comparing the file contents with the specified criteria. This series of processes is carried out to supplement the material of consideration in determining what to look for will certainly be very time consuming, so that a decision-making system is needed. Thus, a decision support system for employee acceptance is needed. Decision support systems use the SAW method.

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1. INTRODUCTION

At this time the use of science and technology is developing very quickly and producing new innovations that must be balanced with the ability to adapt to these technologies. One of these areas is decision support systems that can assist in decision making. Decision Support System as a set of integrated computer tools that allow a decision maker to interact directly with the computer, to create information that is useful in making semi-structured decisions and unstructured decisions that are not anticipated [1] [2] [3].

It is hoped that the decisions taken are not subjective so that the quality obtained can be in accordance with expectations so that no party is harmed. The decision making to determine whether the teacher's performance has met the accepted quality or not is based on several criteria set by the school. To avoid the subjectivity of the resulting decisions, a decision support system (DSS) is needed that can help assess teacher performance in deciding to become the best teacher. DSS is a system using a model built to help solve semi-structured problems [4] [5].

An educational institution is driven by humans who are trained and have certain skills and have experience. Human resources in an educational institution are very important to support the progress and quality of educational institutions in achieving goals. Selection of employee acceptance is a very important factor for the smooth process within an educational institution to fill positions belonging to the criteria that are suitable for occupying a position proposed by an educational institution. The process of hiring employees at educational institutions is only based on certain factors, namely education level, work experience, GPA, interview and age. However, there are still other factors, namely interviews, personality tests, GPA, field tests, and work experience to assess someone as a prospective employee expected by educational institutions. These factors can be managed by a system that can help for decision making.

The current factors for accepting employees at the MUSDA Perbaungan Private Vocational School are education level, work experience, GPA, and age which are done manually. The employee recruitment system should be carried out by covering interviews, personality tests, GPA, field tests and work experience, which are deemed necessary to improve the quality of educational institutions. In addition, the process of placing application files is still manual so that the files of prospective applicants must be evaluated by comparing the contents of the file with the established criteria. This series of processes is held to complete the material for consideration in determining what is sought, of course it will be very time consuming, so a decision-making system is needed.

Thus, a decision support system for hiring employees is needed. The decision support system uses the SAW method. The variables of the decision support system are the criteria (attributes) that are assessed in fulfilling the decision, namely, education level, work experience, health, GPA, interviews, personality tests, field tests and age of prospective employees.

The SAW method is often also known as the weighted addition method [6] [7]. The basic concept of the SAW method is to find the weighted sum of performance on each alternative on each attribute. The SAW method is recommended to complete the solution in a multi-process decision-making system. The SAW method is a method that is widely used in decision making which has many 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 [8] [9] [10].

2. RESEARCH METHODS

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 performance on each alternative on each attribute. The Simple Additive Weighting method is recommended to complete the solution 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 SAW method is to find the weighted sum of the performance sticks for each alternative on all attributes [11] [12].

The SAW method is the best known and widely used method to deal with MADM situations. This method is often referred to as the weighted addition method [13].

The SAW method is known as the term weighted addition. 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 [14] [15].

An existing scale is compared with all available alternative branches. According to Nurdin Bahtiar (2012: 56) the formula for normalization is as follows:

$$r_{ij} = \begin{cases} \dfrac{xij}{Max\ xij} \\ \dfrac{Min\ xij}{xij} \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

if i is a benefit attribute

if j is a cost attribute (cost)

Where with rij is the normalized performance rating of Ai on attribute Cj : i = 1, 2 ...., m and j 1, 2,,,,,,,n.

Description:
Max Xij = The greatest value of each Criterion i.
Min Xij = The smallest value of each Criterion i.
Xij = The value of the attribute owned by each criterion
Benefits = If the largest value is the best
Cost = If the smallest value is the best
Preference value for each alternative (V1) is given the following formula:

$$Vi = \sum_{j=1}^{n} wj\ rij \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Description
Vi = Rank for each alternative
Wj = Rank weight value (from each criterion)
rij = Normalized performance rating value.
A larger Vi value indicates that alternative A1 is preferred.

The advantage of the SAW method compared to other decision support system methods lies in its ability to make a more precise assessment because it is based on the criteria value and the weight of the level of importance required. The SAW method can also select the best alternative from a number of available alternatives, then a ranking process is carried out in which the total weight values of all criteria are added up after determining the weight value of each criterion.

3. RESULTS AND DISCUSSION

3.1 System Implementation Stages

The results of making a decision support system for hiring employees using the SAW method at the MUSDA Perbaungan Private Vocational School that were built are as follows:

a. Login Form

Administrator Login Form is a form for a user who is authorized to use the system. By filling in the correct username and password, an administrator can use the system.

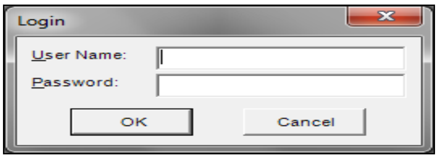


Figure 2. Login Form

b. Main Menu Form

This form is used as a place to accommodate all the options contained in the system that is designed as shown in Figure 2:

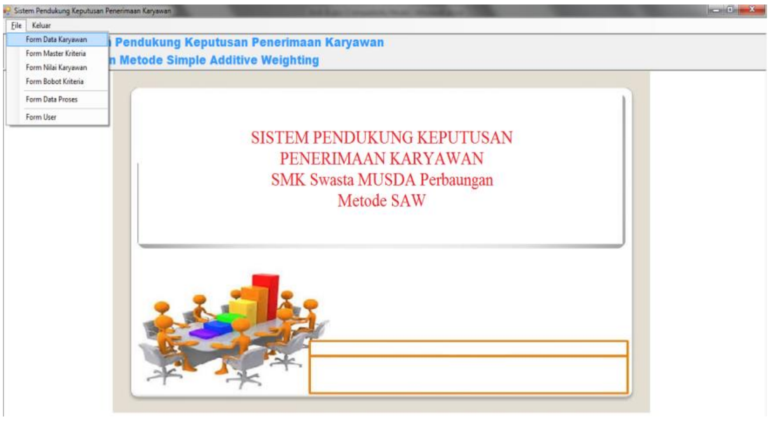
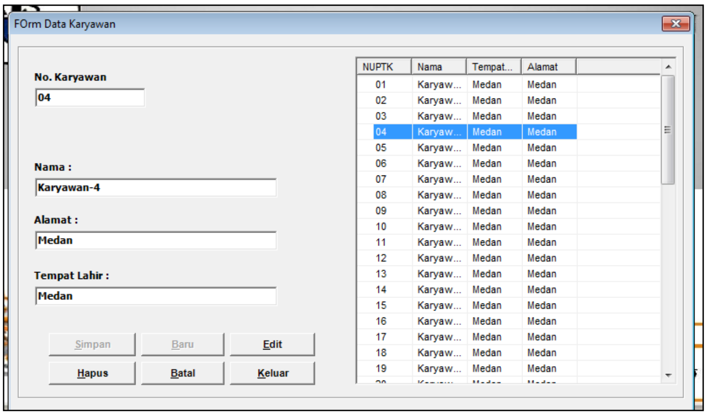


Figure 2. Main Form

c. Candidate Data Input Form

This form is used to enter Candidate data into the system, as for a picture of the implementation of this form can be seen in Figure 3:



No. Karyawan
04

Nama :
Karyawan-4

Alamat :
Medan

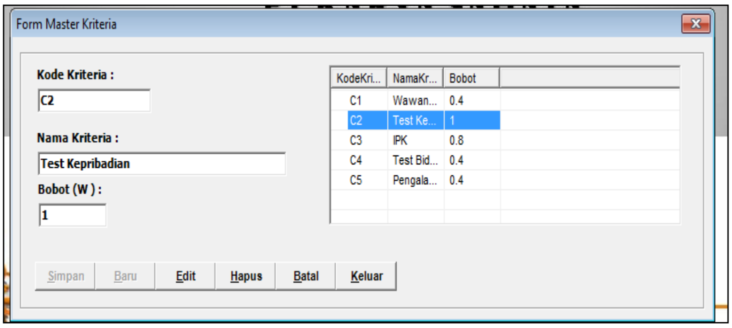
Tempat Lahir :
Medan

NUPTK	Nama	Tempat...	Alamat
01	Karyaw...	Medan	Medan
02	Karyaw...	Medan	Medan
03	Karyaw...	Medan	Medan
04	Karyaw...	Medan	Medan
05	Karyaw...	Medan	Medan
06	Karyaw...	Medan	Medan
07	Karyaw...	Medan	Medan
08	Karyaw...	Medan	Medan
09	Karyaw...	Medan	Medan
10	Karyaw...	Medan	Medan
11	Karyaw...	Medan	Medan
12	Karyaw...	Medan	Medan
13	Karyaw...	Medan	Medan
14	Karyaw...	Medan	Medan
15	Karyaw...	Medan	Medan
16	Karyaw...	Medan	Medan
17	Karyaw...	Medan	Medan
18	Karyaw...	Medan	Medan
19	Karyaw...	Medan	Medan

Figure 3. Candidate Data Form

d. Criteria Data Troop Form

This form is used to enter criteria data into the system, while a picture of the implementation of this form can be seen in Figure 4



Kode Kriteria :
C2

Nama Kriteria :
Test Kepribadian

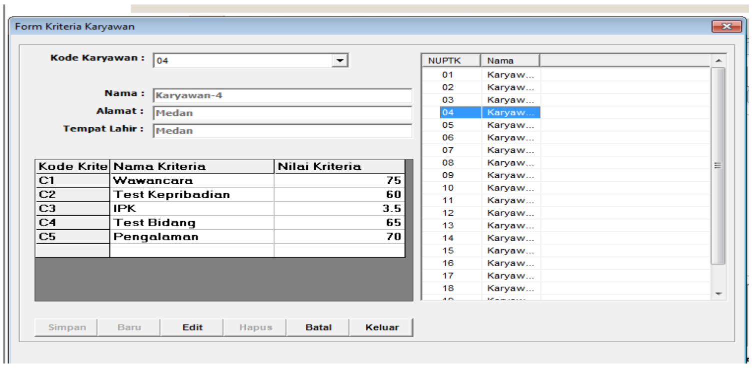
Bobot (W) :
1

KodeKri...	NamaKr...	Bobot
C1	Wawan...	0.4
C2	Test Ke...	1
C3	IPK	0.8
C4	Test Bid...	0.4
C5	Pengala...	0.4

Figure 4. Criteria Data Form

e. Employee Value Form

This form is used to enter the employee value form into the system, as for a picture of the implementation of this form can be seen in Figure 5:



Kode Karyawan : 04

Nama : Karyawan-4
Alamat : Medan
Tempat Lahir : Medan

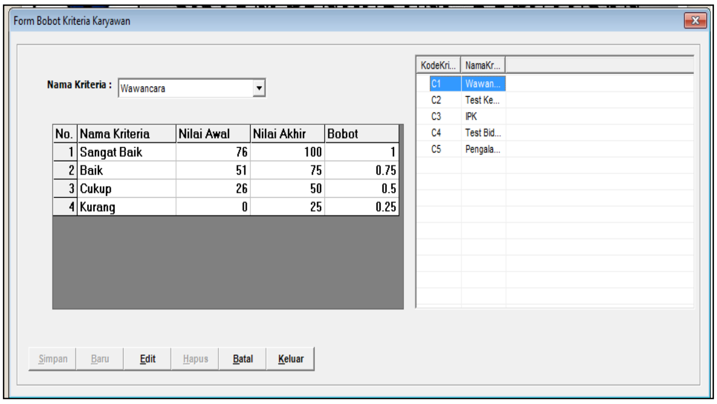
Kode Krite	Nama Kriteria	Nilai Kriteria
C1	Wawancara	75
C2	Test Kepribadian	60
C3	IPK	3.5
C4	Test Bidang	65
C5	Pengalaman	70

NUPTK	Nama
01	Karyaw...
02	Karyaw...
03	Karyaw...
04	Karyaw...
05	Karyaw...
06	Karyaw...
07	Karyaw...
08	Karyaw...
09	Karyaw...
10	Karyaw...
11	Karyaw...
12	Karyaw...
13	Karyaw...
14	Karyaw...
15	Karyaw...
16	Karyaw...
17	Karyaw...
18	Karyaw...

Figure 5. Employee Value Form

f. Criteria Weight Form

This form is used to enter the criteria weight form data into the system, as for a picture of the implementation of this form can be seen in Figure 6:



Nama Kriteria : Wawancara

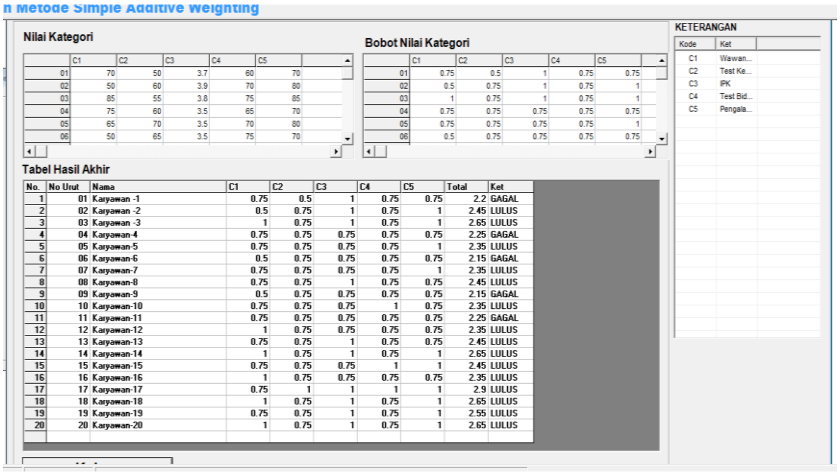
No.	Nama Kriteria	Nilai Awal	Nilai Akhir	Bobot
1	Sangat Baik	76	100	1
2	Baik	51	75	0.75
3	Cukup	26	50	0.5
4	Kurang	0	25	0.25

KodeKri...	NamaKr...
C1	Wawan...
C2	Test Ke...
C3	IPK
C4	Test Bid...
C5	Pengala...

Figure 6. Criteria Weight Form

g. Value Rounding Process Data Entry Form

This form is used to carry out the value creation process, while the image of the implementation of this form can be seen in Figure 7:



Nilai Kategori

	C1	C2	C3	C4	C5
01	70	50	3.7	60	70
02	50	60	3.9	70	80
03	85	55	3.8	75	85
04	75	60	3.5	65	70
05	65	70	3.5	70	80
06	50	65	3.5	75	70

Bobot Nilai Kategori

	C1	C2	C3	C4	C5
01	0.75	0.5	1	0.75	0.75
02	0.5	0.75	1	0.75	1
03	1	0.75	1	0.75	1
04	0.75	0.75	0.75	0.75	0.75
05	0.75	0.75	0.75	0.75	1
06	0.5	0.75	0.75	0.75	0.75

KETERANGAN

Kode	Ket
C1	Wawan...
C2	Test Ke...
C3	IPK
C4	Test Bid...
C5	Pengala...

Tabel Hasil Akhir

No.	No Urut	Nama	C1	C2	C3	C4	C5	Total	Ket
1	01	Karyawan -1	0.75	0.5	1	0.75	0.75	2.2	GAGAL
2	02	Karyawan -2	0.5	0.75	1	0.75	1	2.45	LULUS
3	03	Karyawan -3	1	0.75	1	0.75	1	2.65	LULUS
4	04	Karyawan-4	0.75	0.75	0.75	0.75	0.75	2.25	GAGAL
5	05	Karyawan-5	0.75	0.75	0.75	0.75	1	2.35	LULUS
6	06	Karyawan-6	0.5	0.75	0.75	0.75	0.75	2.15	GAGAL
7	07	Karyawan-7	0.75	0.75	0.75	0.75	1	2.35	LULUS
8	08	Karyawan-8	0.75	0.75	1	0.75	0.75	2.45	LULUS
9	09	Karyawan-9	0.5	0.75	0.75	0.75	0.75	2.15	GAGAL
10	10	Karyawan-10	0.75	0.75	0.75	1	0.75	2.35	LULUS
11	11	Karyawan-11	0.75	0.75	0.75	0.75	0.75	2.25	GAGAL
12	12	Karyawan-12	1	0.75	0.75	0.75	0.75	2.35	LULUS
13	13	Karyawan-13	0.75	0.75	1	0.75	0.75	2.45	LULUS
14	14	Karyawan-14	1	0.75	1	0.75	1	2.65	LULUS
15	15	Karyawan-15	0.75	0.75	0.75	1	1	2.45	LULUS
16	16	Karyawan-16	1	0.75	0.75	0.75	0.75	2.35	LULUS
17	17	Karyawan-17	0.75	1	1	1	1	2.9	LULUS
18	18	Karyawan-18	1	0.75	1	0.75	1	2.65	LULUS
19	19	Karyawan-19	0.75	0.75	1	0.75	1	2.55	LULUS
20	20	Karyawan-20	1	0.75	1	0.75	1	2.65	LULUS

Figure 7. Assessment Process Data Form

4. CONCLUSION

Based on the research conducted, some conclusions are drawn as follows: The application of the SAW method as a method in making the application of a decision support system for employee recruitment at the MUSDA Perbaungan Private Vocational School has been successfully implemented.

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