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JOURNAL OF TECH-E

| 2581-1916 (Online) | 2598-7585 (Printed) |

Artikel

Information Systems for New Students Assesment at Setia Bhakti Junior High School Using the Simple Additive Weighting (SAW) Method

Felisia Fransiska[1], *Yakub*[2],

[1, 2] *Buddhi Dharma University, Information System, Banten, Indonesia*

SUBMISSION TRACK

Received 20 June 2018;
Revised 20 July 2018;
Accepted 10 September 2018;
Available online 20 September 2018

KEYWORD

New Student Assesment, Junior High School, Simple Additive Weighting,

KORESPONDENSI

E-mail: felisiaf@yahoo.com

A B S T R A C T

Technology has a big role in today's life, especially helping the business process activities within a company or organization, making the business process easier. For this reason the creation of a new student admission system and entrance examination in a high school, which affects the speed and accuracy of the final grades in the process. The method used is the Simple Additive Weighting (SAW) method, which has more precise and accurate advantages compared to other decision-making models, because its ability to conduct an assessment is based on the value of criteria and weighted preferences that have been determined. The design and analysis of new student admissions and entrance examination exams can help and overcome existing problems. New student admission and admission test programs have the advantage of being a computerized student registration, conducting computer-based entrance examination exams and can process data through the system thereby reducing the risk of errors in making reports.

INTRODUCTION

The development of computer technology is progressing along with the increasing needs of the community. The public is increasingly familiar with technology to make it easier to do various activities in life. Using a computer for registration will minimize the risk of data loss and the student candidate forms are arranged neatly, waits long for the results of the entrance examination and will make it easy for school administration staff to make a list of prospective students.

Utilizing computer technology in education will make it easier for school administration staff to make a list of prospective students. Therefore, we need a development of technology and information-based systems that can be understood and used by users [1]. Currently the Registration system is still running using the manual method. The problems faced at Setia Bhakti Junior High School are currently in the Administration and also the Principal's section, among others, the admission of new students requires a lot of paper which is partly wasted, management of data on admission of prospective students who have not computerized, there is no ranking report

student test results. In the process of data and making reports relating to the admission of new students still use Microsoft Word and Microsoft Excel.

Based on the problem above, it is proposed that the student admission system be designed using the UML method and using the SAW method, Simple Additive Weighting is a decision making method by normalizing the matrix to a scale that can be considered, with data that has been collected and then made assessment criteria based on that data. By using the SAW method the results obtained will be seen clearly, so it can be determined by optimally the highest value and be ranked of the largest weight and also by the use of the SAW method in the new student admission system will minimize the bias of preference values [2]. The making of this student admission system uses the use of the VB.Net application, with a MySQL database [3] [4]. This system generates student grade rating reports.

I. LITERATURES REVIEW

In the research application for New Student Registration with the Selection System Using the Simple Additive Weighting (SAW) Method at Vocational High School Miftahul Huda Ciwaringin Using the SAW method in student selection system aims to accelerate and facilitate the selection of prospective new students [5].

The other research using Exponential Comparison Method (MPE) in the Scholarship Decision Support System for Student Achievement at XYZ Vocational School. Decision support system to determine the scholarship recipients of high achieving students with achievement, discipline, and attendance criteria. By applying the MPE method it can reduce costs [6].

Implementation of the SAW Method in Accepting New Students at Negeri 16 Senior High School Medan. SAW method that serves as an aid in making decisions in the selection process. The system ranks based on criteria, from the ranking results will be known prospective students declared passed or not, then the system will provide new school recommendations for prospective students who do not pass the selection by selecting the closest distance from their house [7].

II. METHODS

The Simple Additive Weighting method is often known as the weighted sum method. The basic concept of the Simple Additive Weighting method is to find the weighted sum of the performance ratings for each alternative on all attributes [8] [9]. The Simple Additive Weighting method requires the decision matrix normalization process (X) to a scale that can be compared with all available alternative ratings. The formula shown below:

Step 1: Normalization

Step 2: Looking for Maximum and Minimum Value

$$r_{ij} = \frac{Xij}{Max\ Xij} \qquad \text{for Benefit Attribut}$$

$$r_{ij} = \frac{Min\ Xij}{Xij} \qquad \text{for Cost Attribut}$$

where i, j =1,2, …n (1)

Step 3: calculate the Preference Value

$$Vi = \sum_{j=1}^{n} w_j\, r_{ij} \qquad (2)$$

Where Vi = Preference Value

Vi value will be the result of alternative calculations.

Determination of Criteria taken based on the principal at Setia Bhakti Junior High School that is:

C1 = Primary school Rapot Score
C2 = Primary school national exam scores
C3 = Active in the Organization
C4 = Written Test Value
C5 = Interview Test Score

III. RESULT

The criteria and weightings agreed with the school principal are shown in tables 1 to 5.

Table 1. Criteria Weighting

Criteria	Weight
C1	0.30
C2	0.25
C3	0.20
C4	0.15
C5	0.10

Table 2. Primary School Rapot Score Weighting

Value	Result	Score
<50	Very Low	1
50 - 60	Low	2
61 - 70	Middle	3
71 - 85	High	4
86 - 100	Very High	5

Table 3. Primary School National Exam Scores

Value	Result	Score
<45	Very Low	1
46 – 55	Low	2
56 – 65	Middle	3
66 – 75	High	4
76 - 100	Very High	5

Table 4. Active in the Organization

Value	Result	Score
1 - 6	Very Low	1
7 – 12	Low	2
13 – 18	Middle	3
19 – 24	High	4
25 – 30	Very High	5

Table 5. Interview Test Score

Value	Result	Score
<50	Very Low	1
50 - 60	Low	2
61 - 70	Middle	3
71 - 85	High	4
86 - 100	Very High	5

After get the weighting, in this case using 3 students for calculations:

Table 6. Students Scoring

Students	C1 0.30	C2 0.25	C3 0.20	C4 0.15	C5 0.10
Cecilia	4	4	2	3	4
Floren	4	4	2	4	4
Febby	3	4	2	4	3

After the student scoring, start to calculate normalization with the formula, five criterias above is benefit (+).

$$r_{11} = \frac{Xij}{Max\ Xij} = \frac{4}{4} = 1$$

calculate with the same formula for $r_{12} - r_{35}$

Table 7. Normalization Students Scoring

Students	C1 0.30	C2 0.25	C3 0.20	C4 0.15	C5 0.10
Cecilia	1	1	1	0.75	1
Floren	1	1	1	1	1
Febby	0.75	1	1	1	0.75

After get the normalization result, start to calculate the Preference Value.

$$Vi = \sum_{j=1}^{n} w_j\, r_{ij}$$

$V_1 = (0.3 * 1) + (0.25 * 1) + (0.20 * 1) + (0.15 * 0.75) + (0.10 * 1)$
$= 0.9625$

Preference Value result are follows:

Table 8. Normalization Students Scoring

Students	C1 0.30	C2 0.25	C3 0.20	C4 0.15	C5 0.10	P.V
Cecilia	0.30	0.25	0.20	0.11	0.10	0.9625
Floren	0.30	0.25	0.20	0.15	0.10	1.0000
Febby	0.22	0.25	0.20	0.15	0.07	0.9000

Make a rank from Preference Value table 8.

Table 9. Result

Value	P.V	Rank
Cecilia	0.9625	2
Floren	1.0000	1
Febby	0.9000	3

The student pass the test is Floren, Cecilia, and the last is Febby.

IV. CONCLUSION

Based on an analysis of the Assesment system at Setia Bhakti Junior High School, the conclusions as follows:

1. This system, can produce reports on the entrance test scores along with the ranking of grades from prospective students.
2. This system, can reduce the use of excess paper and the risk of human error.

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BIOGRAPHY

Felisia Fransiska, Graduated from the Information Systems Study Program (S1) in the academic concentration of Information Technology at 2019.

Yakub, Lecturer at Information System Study Program of Buddhi Dharma University, Tangerang. Graduates S1 Information System STMIK Widuri Jakarta, 2002, S2 Master Computer Eresha School of Information Technology, 2005, S2 Master of Management of Budi Luhur University, 2008, S3 Doctoral University of Islam Nusantara Bandung, 2014.