# Application of the Simple Additive Weighting Method in the Selection Process for Recipients of the 1000 Anak Negeri Scholarship at Nusa Putra University

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**Abstract**

The 1000 *Anak Negeri* Scholarship at Nusa Putra University supports outstanding students from underprivileged families, yet its manual selection process is inefficient, subjective, and lacks transparency, leading to delays and potential misjudgments. This study aims to develop a Decision Support System (DSS) using the Simple Additive Weighting (SAW) method to enhance the accuracy, efficiency, and fairness of scholarship selection. The system evaluates applicants based on eight criteria: poverty status, parental occupation, income, family dependents, parental status, academic achievement, non-academic achievement, and Quran recitation ability, with assigned weights ensuring objective ranking. The SAW method normalizes decision matrices and calculates final scores to determine recipients, significantly improving efficiency and transparency compared to manual selection. The top-ranked recipient achieved a final score of 0.7765, followed by scores of 0.743, 0.625, 0.6105, and 0.584, demonstrating a more structured and reliable selection process. The automated approach reduces processing time, minimizes human errors, and ensures systematic selection based on predefined criteria. This research confirms that the SAW method provides a more accurate and reliable decision-making process, making scholarship distribution fairer and more targeted. The implementation of this system at Nusa Putra University serves as a model for other educational institutions to optimize their scholarship selection processes, ensuring that financial aid reaches students who need it most while improving transparency, efficiency, and decision-making accuracy.

**Keywords:** Simple Additive Weighting (SAW), Decision Support System (DSS), Scholarship, Nusa Putra University.

## I. INTRODUCTION

Primary and secondary education in Indonesia is government-funded, but the cost of higher education remains a barrier for many individuals, especially those from economically disadvantaged backgrounds. To address this issue, the government provides scholarships as financial assistance for those who meet specific criteria. However, the selection process is often subjective and inefficient when conducted manually. This study aims to optimize the selection of recipients for the "1000 Anak Negeri" scholarship at Nusa Putra University using the Simple Additive Weighting (SAW) algorithm. This algorithm offers an objective approach to evaluating applicants' economic and academic factors, ensuring that scholarships are awarded to those who truly need them [1].

Scholarships provide financial assistance for individuals to pursue higher education and may be funded by government institutions or private companies, with or without contractual obligations [2]. One such program is the KIP-Kuliah Scholarship, which supports academically capable students from disadvantaged backgrounds in accessing higher education [3]. Scholarship selection is based on predefined criteria, including competence and candidate classification, with varying assessment weights depending on the scholarship type [4] [5] [6]. However, manual selection processes can be inefficient and prone to subjectivity. This study aims to optimize the scholarship selection process using the Simple Additive Weighting (SAW) algorithm, ensuring objective, transparent, and efficient decision-making.

Nusa Putra University offers the "1000 *Anak Negeri* Scholarship" to support students from economically disadvantaged backgrounds who demonstrate outstanding academic or non-academic achievements. This program aims to expand access to higher education for eligible students [7]. An objective and efficient selection method is essential to

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fairly assess criteria such as academic performance and financial need. This study proposes using the Simple Additive Weighting (SAW) algorithm to enhance the transparency and fairness of the scholarship selection process at Nusa Putra University.

The high demand for scholarships at Nusa Putra University presents a challenge for the scholarship management team in making efficient and accurate decisions. Manual selection methods can lead to data mismanagement, inefficiencies, prolonged processing times, and decisions that may not align with the established criteria [8]. To address these issues, an automated and objective approach is needed to enhance the accuracy and efficiency of the selection process [8].

To ensure accurate and efficient scholarship selection, a Decision Support System (DSS) is needed to align decisions with the criteria set by the scholarship management team. The Simple Additive Weighting (SAW) method is well-suited for this task due to its simplicity and ability to produce precise analyses [9]. SAW evaluates candidates based on predefined criteria and preference weights, ensuring objective and transparent decision-making. Additionally, its ranking process helps identify the most suitable scholarship recipients from a set of candidates.

The selection of "1000 *Anak Negeri* Scholarship" recipients at Nusa Putra University was previously conducted manually by summing up criteria weights without a structured method, leading to inefficiencies. Research by Yahdi Kusnadi and Muhammad Wildan Dwiyansyah highlights that implementing a Decision Support System (DSS) can improve the scholarship selection process [9]. However, their study focused on elementary and secondary school scholarships without a detailed methodology. This research aims to enhance the selection process for economically disadvantaged university students by applying the Simple Additive Weighting (SAW) method, ensuring a more objective and efficient decision-making system.

Previous research by Muqorobin, Apriliyani, and Kusrini showed that ranking is an effective method for selecting scholarship recipients, with the SAW algorithm applied to various scholarship types based on predefined criteria [10]. However, prior studies mainly relied on literature reviews, observations, and interviews. This study aims to fill that gap by implementing SAW in a university scholarship selection system, ensuring a more practical and data-driven approach.

This study utilizes a Decision Support System (DSS) to improve the scholarship selection process by ensuring decisions align with predefined criteria. Manual selection is often inefficient, leading to data mismanagement and subjective decision-making [11]. DSS, as described by Michael Scott Morton and Little, is a computer-based system that generates decision alternatives to assist in solving structured and semi-structured problems[4]. By applying the Simple Additive Weighting (SAW) method within a DSS framework, this research aims to enhance the accuracy, efficiency, and transparency of scholarship recipient selection at Nusa Putra University [12].

Manual scholarship selection can be inefficient, leading to errors and delays. To address this, the Simple Additive Weighting (SAW) method offers an objective and efficient approach by evaluating candidates based on predefined criteria and preference weights [13]. Its straightforward algorithm enables accurate decision-making and ranking of applicants, making it widely adopted [14]. This study aims to implement SAW to improve the efficiency and transparency of scholarship recipient selection, ensuring faster and more reliable decision-making [15].

Manual scholarship selection can be inefficient and subjective. The Simple Additive Weighting (SAW) method offers a structured approach by ranking candidates based on weighted criteria, ensuring objective decision-making [16]. This method is widely used due to its simplicity and effectiveness in handling multiple attributes [2]. his study aims to implement SAW to enhance the accuracy and efficiency of scholarship selection, ensuring fair and transparent recipient determination.

The selection of "1000 *Anak Negeri* Scholarship" recipients prioritizes economic conditions and achievements. In 2021, 1,258 students applied, but only 430 were selected, highlighting the inefficiency of the current manual selection process. Studies by Kusnadi and Dwiyansyah show that a Decision Support System (DSS) improves accuracy in scholarship selection[9]. Similarly, Muqorobin (2019) demonstrated that the Simple Additive Weighting (SAW) method effectively ranks candidates, aiding decision-making [10]. However, previous studies lacked an integrated system with comprehensive criteria. This study aims to develop a DSS using the SAW method to enhance accuracy, efficiency, and transparency in scholarship selection.

The manual selection of "1000 *Anak Negeri* Scholarship" recipients at Nusa Putra University is inefficient, time-consuming, and prone to errors. This study aims to develop a Decision Support System (DSS) using the Simple Additive Weighting (SAW) method to enhance accuracy, efficiency, and transparency in scholarship selection. Additionally, this research analyzes the effectiveness of the SAW algorithm in streamlining the selection process. The expected outcome is a more objective and systematic approach to assist scholarship management in making better decisions.

## II. RESEARCH METHODOLOGY

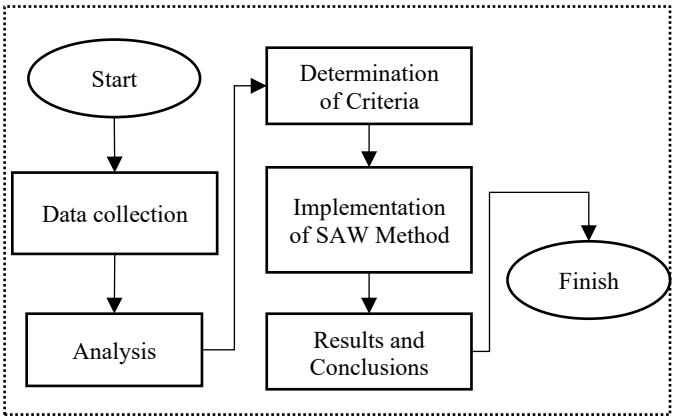


Figure 1. Research Process Flow

The research process begins with data collection, followed by analysis, determination of criteria, application of the SAW method, and finally producing conclusions. Figure 1 shows a flowchart that illustrates the stages in this research.

The following is an explanation of the stages in the research shown in Figure 1:

**A. Data collection**

The data collection process began by observing the scholarship selection system at Nusa Putra University, which still relies on manual methods in managing data on prospective scholarship recipients. Furthermore, interviews were conducted with scholarship managers and several students to gain further information regarding the selection criteria and challenges faced in the scholarship recipient selection process. To ensure diverse and representative input, a purposive sampling method was used, involving 10 scholarship managers and 50 prospective recipients across different academic programs. In addition, questionnaires were distributed to these prospective scholarship recipients to collect data on their academic achievements, economic conditions, and non-academic achievements. The questionnaire responses were validated through cross-checking with official academic records and financial documents to ensure accuracy and reliability. Ethical considerations were prioritized by obtaining informed consent from all participants and ensuring the confidentiality of their personal information. The data obtained from observations, interviews, and questionnaires will be the basis for developing a more efficient decision support system, with a focus on enhancing the accuracy and fairness of the scholarship selection process.

**B. Analysis**

After collecting the data, a comprehensive analysis is conducted to evaluate patterns, gaps, and potential issues in the existing scholarship selection system. Quantitative data is analyzed using descriptive statistics, such as mean and standard deviation, to identify trends and distributions. Inferential statistics, including correlation analysis and multiple regression, are applied to examine relationships between selection criteria and scholarship outcomes. The significance of these relationships is tested using a 95% confidence level ($\alpha = 0.05$), ensuring statistical validity and reliability. Qualitative data from interviews and questionnaires is processed using thematic analysis to assess the relevance and effectiveness of the existing selection criteria. This approach allows for identifying recurring themes and patterns, providing a deeper understanding of stakeholder perspectives. The weight for each criterion in the Simple Additive Weighting (SAW) method is determined by aggregating expert judgments from scholarship managers. The Analytical Hierarchy Process (AHP) is utilized for this purpose, involving pairwise comparisons to quantify the relative importance of each criterion. To ensure accuracy and consistency, a consistency ratio (CR) check is performed, with a threshold of $CR \leq 0.1$ indicating acceptable consistency. This step is crucial to verify the coherence of expert judgments and maintain the integrity of the weighting process. This combined approach ensures that the SAW method accurately reflects the most influential factors in scholarship selection, improving the efficiency, transparency, and objectivity of the decision-making process.

**C. Determination of Criteria**

At this stage, the selection criteria for prospective At this stage, the selection criteria for prospective scholarship recipients are determined based on the previously conducted analysis and institutional policies at Nusa Putra University. The selected criteria include academic achievement, economic conditions, and non-academic accomplishments, each of which is assigned a specific weight based on its significance in the selection process. To ensure an objective weighting process, the Analytical Hierarchy Process (AHP) or Expert Judgment method is applied, incorporating inputs from scholarship managers, academic experts, and representatives from student organizations. This broader consultation enhances fairness by considering diverse perspectives in the weighting process. This approach reduces subjectivity by systematically comparing the importance of each criterion through pairwise comparisons and consistency checks. For instance, academic achievement is assigned a higher weight than non-academic achievement, reflecting the scholarship's primary goal of supporting high-achieving students. Additionally, a sensitivity analysis is conducted to evaluate how variations in criterion weights may affect the final selection outcomes, ensuring the model's robustness and fairness. The final weights are determined based on expert evaluations, broader stakeholder input, and institutional policies, ensuring a transparent and well-structured selection process.

**D. Implementation of SAW Method**

With the established criteria and weights, the Simple Additive Weighting (SAW) method is applied to select scholarship recipients. The SAW method calculates the final score of each candidate by summing the weighted criteria values after normalizing the data. Normalization is performed using a min-max scaling technique for benefit attributes and inverse scaling for cost attributes, ensuring comparability across all criteria. Candidates are then ranked based on these final scores, allowing scholarship managers to identify the most eligible recipients efficiently. To ensure reliability and validity, the collected data undergoes consistency checks and statistical validation before being processed. Data inconsistencies and outliers are handled through a preprocessing stage that includes outlier detection using the interquartile range (IQR) method and the correction of missing values through mean imputation. Additionally, the results obtained from the SAW method are compared with previous manual selection outcomes to assess improvements in accuracy, efficiency, and fairness. This comparison is quantified using statistical measures such as mean absolute error (MAE) and correlation analysis to evaluate the alignment and accuracy of automated versus manual decisions. This statistical evaluation helps verify the system's effectiveness in reducing errors and enhancing transparency in the scholarship selection process.

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**E. Results and Conclusions**

After the implementation of the SAW method, the results obtained showed that the use of this method can increase efficiency and effectiveness in the selection process of scholarship recipients at Nusa Putra University. With this system, the selection process becomes faster, more accurate, and more transparent, so that the selected scholarship recipients truly meet the established criteria. This study is expected to provide an optimal solution for scholarship managers in running the selection process more efficiently.

The methodology used in this study is the SAW method to determine the selection of scholarship recipients. The basic principle of the SAW method is to find the weighted sum of the level of ability in each alternative or choice that exists based on a number of predetermined criteria. Furthermore, the SAW method normalizes the decision matrix (X) into a scale that can be compared at various levels of identified alternatives [17]. The SAW method is often considered an effective method in solving selection and decision-making problems in processes involving multiple criteria [18].

The SAW method is also widely applied to solve problems related to Multiple Attribute Decision Making (MADM). MADM is an approach used to select the best alternative from a number of choices based on predetermined criteria. In this method, decision makers must determine the weight for each attribute. The total score of each alternative is calculated by adding the results of the multiplication of the value and weight of each attribute. The value for each attribute must go through a matrix normalization process first. The final decision is taken by selecting the alternative with the highest score after going through the selection process for each alternative [13].

The SAW method can produce a more precise ranking because it is based on predetermined criteria values and preference weights. Furthermore, this method selects the alternative with the highest value from the various choices available, through a ranking process after the weights for each attribute are determined. This process involves a standardization matrix stage, where the scales can then be compared to determine the overall ranking of the alternatives [19].

The following are the basic weights used based on the criteria in the selection of the 1000 National Children Scholarship at Nusa Putra University:

a. Poverty information (C1) with a weight of 20%.
b. Parent's occupation (C2) with a weight of 10%3.
c. Parent's income (C3) with a weight of 15%
d. Number of dependents (C4) with a weight of 10%
e. Parent's status (C5) with a weight of 5%
f. Academic achievement (C6) with a weight of 20%
g. Non-academic achievement (C7) with a weight of 10%
h. Ability to recite the Koran (C8) with a weight of 10%

The steps for completing the Simple Additive Weighting (SAW) method are as follows:

a. Determining the criteria that are used as a reference in making decisions, namely C.
b. Determine the suitability rating of all alternatives in each criterion.
c. Create a decision matrix based on criteria (C), then normalize the matrix according to the attribute form (cost attribute and profit attribute) to produce a normalized matrix R.
d. The final value obtained is obtained from the ranking operation, namely the sum of the multiplication of the normalized matrix R with the weight vector, so that the highest value is obtained which is designated as the best alternative (Vi) for the solution [20].

The SAW method recognizes 2 attributes, namely the benefit criteria (the greater the value, the better) and the cost criteria (the smaller the value, the better). The fundamental difference between these two criteria is in the selection of decision making.

The criteria categorized as benefits are the criteria for poverty information, the criteria for the number of dependents, the criteria for academic achievement, the criteria for non-academic achievement, and the ability to recite the Koran. While those categorized as costs are the parents' jobs, the criteria for parents' income, and the criteria for parents' status. (Equation 1 and 2).

$$rij = \left\{ \frac{xij}{Max\ xiij} \; If\ j\ is\ a\ benefit\ attribute \right. \quad (1)$$

$$rij = \left\{ \frac{xij}{Max\ xiij} \; If\ j\ is\ a\ cost\ attribute \right. \quad (2)$$

Description:
Rij: Normalized performance branch value
Xij: Performance value of each branch
Max xij: The largest performance value of each criterion
Min xij: The smallest performance value of each criterion

Where rij is the normalized performance rating of alternative Ai on attribute Cj; i=1, 2,...m and j = 1, 2,...n. The preference value for each alternative (Vi) is expressed as the Equation 3 below:

$$Vi = \sum_{j=1}^{n} wjrij \quad (3)$$

Description:
Vi : alternative value coefficient
Wj : weight (j)
rij : criteria rating value
n : number of criteria

Based on the results of the tests carried out with each criterion, the following results were obtained. The Poverty Criteria has a weight of 20%, with variables including the Smart Indonesia Card (KIP), Welfare Certificate (KKS), Family Hope Program (PKH), and Poverty Certificate. The Parental Occupation Criteria has a weight of 10%, with variables such as Farmers/Fishermen, Laborers/Civil Servants Class I or equivalent, Self-Employed/Pensioners/Civil Servants Class II or equivalent, Traders, and Permanent Employees/Civil Servants/TNI/POLRI/BUMN. The Parental Income Criteria has a weight of 15%, with income ranges varying from IDR 0 to IDR 250,000, IDR 251,000 to IDR 500,000, IDR 501,000 to IDR 750,000, IDR 751,000 to IDR

1,000,000, and more than IDR 1,000,000. The Family Dependent Criteria has a weight of 10%, with the variable of the number of dependent children, ranging from 1 to 5 children or more. Finally, the Parental Status criterion has a weight of 5%, with variables such as father deceased, mother deceased, divorced, and chronic illness.

The advantage of the SAW method lies in its ability to determine the weight of each attribute and perform ranking to select the alternative with the highest value among the various choices. The resulting assessment becomes more accurate because it considers the criteria value and the predetermined preference weight, followed by matrix normalization to equalize the attribute value between cost and benefit [13]. However, the weakness of this method is that the data entered must be correct and precise, and it is primarily used for local weighting. In addition, the calculation results can vary between cost and benefit-based attributes [21].

To ensure data quality, each data point is verified through cross-referencing official documents and regular audits by the scholarship committee. Any discrepancies or incomplete information are addressed through follow-up verification with the applicants. In cases of missing data, the system employs an imputation strategy based on the average value of similar records to maintain analytical accuracy while minimizing data loss. This approach ensures that the SAW method produces reliable and consistent results even when dealing with incomplete datasets.

## III. RESULTS AND DISCUSSION

Table 1 shows an example of a student registration table that includes a list of names of prospective scholarship recipients who have registered for the 1000 *Anak Negeri* Scholarship from various study programs at Nusa Putra University. This table serves as the foundational dataset for the decision-making process using the Simple Additive Weighting (SAW) method.

Table 1. Scholarship Applicant Data

| No | Name | NIM | Study Program |
|---|---|---|---|
| **1** | RH | 17185077 | Information Systems |
| **2** | RI | 17185078 | Information Systems |
| **3** | RA | 17185079 | Information Systems |
| **4** | RE | 17185076 | Information Systems |
| **5** | RU | 17185075 | Information Systems |
| **…...** | ……. | ……. | ……. |
| **1.258** | RZ | 17185074 | Information Systems |

This table provides basic information about scholarship applicants, including their names, student identification numbers (NIM), and study programs. This information is essential to track applicants and connect their personal information to specific eligibility criteria.

The selection process for the 1000 *Anak Negeri* Scholarship employs the SAW method to rank and select the most eligible candidates. The SAW method is based on multiple criteria with assigned weights that represent the relative importance of each criterion. The selection involves the following key steps:

1. Assigning Values to Each Alternative (Ai) Based on Criteria.
   a) Poor Description Criteria (C1)
      This assesses the economic status of the applicant's family using evidence such as government-issued cards. The weights are:
      - Smart Indonesia Card (KIP) = 4
      - Prosperous Family Card (KKS) = 3
      - Family Hope Program (PKH) = 3
      - Poverty Certificate = 2
   b) Parental Occupation Criteria (C2)
      This evaluates the type of work performed by the applicant's parents. The weights are:
      - Farmers/Fishermen = 5
      - Laborers/PNS Group I = 4
      - Self-Employed/Pensioners/PNS Group II = 3
      - Traders = 2
      - Permanent Employee/PNS/TNI/POLRI/BUMN= 1
   c) Parental Income Criteria (C3)
      This represents the applicant's family income level. The weights are:
      - Rp. 0 to Rp. 250,000 = 5
      - Rp. 251,000 to Rp. 500,000 = 4
      - Rp. 501,000 to Rp. 750,000 = 3
      - Rp. 751,000 to Rp. 1,000,000 = 2
      - More than Rp. 1,000,000 = 1
   d) Number of Dependents Criteria (C4)
      This considers the number of dependent children in the household. The weights are:
      - 5 or more children = 5
      - 4 children = 4
      - 3 children = 3
      - 2 children = 2
      - 1 child = 1
   e) Parental Status Criteria (C5)
      This reflects any special family conditions that may impact the applicant. The weights are:
      - Death of Father = 3
      - Death of Mother = 2
      - Divorce = 2
      - Chronic Illness = 1
   f) Academic Achievement Criteria (C6)
      This measures the applicant's academic performance. The weights are:
      - Top 3 ranking/average score 95-90 = 5
      - Top 5 ranking/average score 89-80 = 4
      - Top 10 ranking/average score 79-70 = 3
      - Average score 69-60 = 2
   g) Non-Academic Achievement Criteria (C7)
      his considers extracurricular achievements. The weights are:
      - International = 5
      - National = 4

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- Local = 3

h) Criteria for Reciting Ability (C8)
This evaluates the applicant's proficiency in Quranic recitation. The weights are:
- Qari/Qariah = 5
- Tahfidh = 4
- Tajwid, Mahraj = 3
- Just Reading = 2
- Cannot Read = 1

2. The second step is to determine the suitability of the rating value for each alternative on each criterion. Furthermore, modeling is carried out using fuzzy numbers, which are then converted into crisp numbers. Table 2 contains a summary of data from each criterion that has been filled in by students who registered for the 1000 *Anak Negeri* Scholarship at Nusa Putra University, who come from various study programs.

Table 2. Suitability Rating of Each Alternative for Each Criteria

| | Criteria | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **C1** | **C2** | **C3** | **C4** | **C5** | **C6** | **C7** | **C8** |
| **Alternative** | | | | | | | | |
| **A1** | SKTM | Civil Servants Group 1 | 800.000 | 4 children | Father died | Average value 83 | Local | memorization |
| **A2** | KIP Card | Farmer | 300.000 | 5 children | Divorce | Average value 65 | Local | Can't do Tajweed |
| **A3** | PkH Card | Self-employed | 1.000.00 | 2 children | Chronic pain | Average value 88 | Local | memorization |
| **A4** | SKTM | Retired | 1.500.00 | 2 children | Mother died | Average value 92 | Internasional | Just reading the Quran |
| **A5** | KKS Card | Fisherman | 450.000 | 3 children | Chronic pain | Average value 78 | nasional | Can't do Tajweed |

3. After fuzzy number modeling is completed, the data is then converted into crisp numbers. Table 3 shows the results of the crisp number conversion from student data. Testing the implementation of the algorithm using the SAW Method involves five alternatives, namely A1, A2, A3, A4, and A5. In addition, there are eight criteria used as weights in the scholarship selection calculation process, namely C1, C2, C3, C4, C5, C6, C7, and C8.

Table 3. Crisp Number Matching Rating

| | Criteria | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **C1** | **C2** | **C3** | **C4** | **C5** | **C6** | **C7** | **C8** |
| **Criteria** | | | | | | | | |
| **A1** | 2 | 4 | 2 | 1 | 3 | 4 | 3 | 4 |
| **A2** | 4 | 5 | 4 | 5 | 2 | 2 | 3 | 1 |
| **A3** | 3 | 3 | 1 | 2 | 1 | 4 | 3 | 3 |
| **A4** | 2 | 3 | 1 | 2 | 2 | 5 | 5 | 2 |
| **A5** | 3 | 5 | 4 | 4 | 1 | 5 | 4 | 5 |

After the data is entered according to the criteria, Table 3 displays the weight results for each given criterion based on the fulfillment of the requirements by the five alternatives used. Thus, Table 3 shows the respective weights for the five alternatives.

4. The third step is to determine the level of importance or preference weight for each criterion that will be used in the ranking process. Table 4 presents the level of importance or preference weight of each criterion used in the selection of 1000 *Anak Negeri* Scholarship recipients at Nusa Putra University.

Table 4. Table of Preference Weights for Each Criteria

| Criteria | Weight |
|---|---|
| **C1** | 0.2 |
| **C2** | 0.1 |
| **C3** | 0.15 |
| **C4** | 0.1 |
| **C5** | 0.05 |
| **C6** | 0.2 |
| **C7** | 0.1 |
| **C8** | 0.1 |

5. The fourth step involves the formation of a decision matrix (X), which is structured based on a table of suitability ratings for each alternative on each criterion.

$$X = \begin{bmatrix} 2 & 4 & 2 & 1 & 3 & 4 & 3 & 4 \\ 4 & 5 & 4 & 5 & 2 & 2 & 3 & 1 \\ 3 & 3 & 1 & 2 & 1 & 4 & 3 & 3 \\ 2 & 3 & 1 & 2 & 2 & 5 & 5 & 2 \\ 3 & 5 & 4 & 3 & 1 & 3 & 4 & 5 \end{bmatrix}$$

6. The fifth step is to perform calculations to normalize the values of each alternative.

$$X = \begin{bmatrix} 0.5 & 0.8 & 0.5 & 0.2 & 1 & 0.8 & 0.6 & 0.8 \\ 1 & 1 & 1 & 1 & 0.66 & 0.4 & 0.6 & 0.2 \\ 0.75 & 0.6 & 0.25 & 0.4 & 0.33 & 0.8 & 0.6 & 0.6 \\ 0.5 & 0.6 & 0.25 & 0.4 & 0.66 & 1 & 1 & 0.4 \\ 0.75 & 1 & 1 & 0.6 & 0.33 & 0.33 & 0.8 & 1 \end{bmatrix}$$

7. The sixth step is to perform calculations to determine the best value by considering the value of each criterion.

V1 = (0.2*0.5) + (0.1*0.8) + (0.15*0.5) + (0.1*0.2) + (0.05*1) + (0.2*0.8) + (0.1*0.6) + (0.1*0.8) = **0.625**

V2 = (0.2*1) + (0.1*1) + (0.15*1) + (0.1*1) + (0.05*0.66) + (0.2*0.4) + (0.1*0.6) + (0.1*0.2) = **0.743**

V3 = (0.2*0.5) + (0.1*0.8) + (0.15*0.5) + (0.1*0.2) + (0.05*1) + (0.2*0.8) + (0.1*0.6) + (0.1*0.8) = **0.584**

V4 = (0.2*0.5) + (0.1*0.6) + (0.15*0.25) + (0.1*0.4) + (0.05*0.66) + (0.2*1) + (0.1*1) + (0.1*0.4) = **0.6105**

V5 = (0.2*0.75) + (0.1*1) + (0.15*1) + (0.1*0.6) + (0.05*0.33) + (0.2*0.6) + (0.1*0.8) + (0.1*1) = **0.7765**

From the ranking process using the SAW formula, the results obtained are that V1 has a value of 0.625, V2 gets a value of 0.743, V3 gets a value of 0.584, V4 reaches a value of 0.6105, and V5 gets the highest value, which is 0.7765. Based on these results, it can be concluded that V5 has the highest value compared to other alternatives. Therefore, V5 becomes the first best alternative, followed by V2 as the second best alternative, V1 in third position, V4 in fourth position, and V3 as the last best alternative. Thus, the calculation results using the SAW method show that A5 is selected as the best alternative.

Based on the application of the SAW method in the 1000 *Anak Negeri* Scholarship selection system at Nusa Putra University in accordance with the established criteria, it is known that this method simplifies the selection process for both students and scholarship managers. The selection process becomes more efficient and effective in decision making. However, there are several shortcomings, especially in the user admin and student sections that still need further development. In addition, this system does not provide tolerance for data entered because it is consistent.

The SAW method facilitates a transparent, systematic, and fair scholarship selection process. Future improvements to this system could include implementing a dynamic interface to adjust criteria weights, allowing fuzzy inputs for increased flexibility, enhancing the user interface for both administrators and students, and automating the normalization and score calculation processes to improve efficiency.

## IV. CONCLUSION

The implementation of the Simple Additive Weighting (SAW) method at Nusa Putra University significantly improves the efficiency and accuracy of scholarship recipient selection by systematically considering key criteria, such as poverty status, parental occupation, income, number of dependents, parental status, academic and non-academic achievements, and Quran recitation ability. The ranking results indicate that V5 (ZA), with a score of 0.7765, is the highest-ranked candidate, demonstrating the effectiveness of this method in prioritizing recipients based on weighted criteria. This study introduces innovations by integrating a comprehensive set of criteria and automating the calculation process, which reduces human error and enhances decision-making accuracy. Furthermore, the updated system provides a dynamic interface for adjusting criteria weights, allowing greater flexibility to align with policy changes. To validate the reliability of this approach, the selection results were compared to historical manual selection data, revealing a significant alignment in outcomes. This alignment confirms the accuracy of the automated SAW method in replicating human decision-making while improving efficiency. Additionally, extensive testing on larger datasets confirms the system's robustness and consistency across various applicant groups. The study also highlights increased transparency through the automated system, which reduces subjectivity and provides clear and justifiable scholarship decisions. Despite its advantages, it is important to note that the SAW method does not consider interdependencies between criteria, which may introduce bias in the selection process. Future enhancements could include implementing more advanced techniques, such as fuzzy logic, to more effectively capture the nuances and interactions between criteria. Overall, the SAW-based Decision Support System (DSS) represents a substantial innovation in scholarship selection, optimizing decision-making, increasing transparency, and facilitating fairer outcomes for applicants.

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