Decision Support System for KIP Universitas Global Jakarta Scholarship Recipients Using the Simple Additive Weighting (SAW) Method

Kun Harjiyanto[1], Risma Ekawati[2], Febria Anjara[3]*✉, Ariep Jaenul[4]

[1]Department of Industrial Engineering, Universitas Global Jakarta, Indonesia

[2]Department of Information Technology, Universitas Global Jakarta, Indonesia

[3]Department of Digital Business, Universitas Global Jakarta, Indonesia

[4]Department of Electrical Engineering, Universitas Global Jakarta, Indonesia

*Corresponding Author: febriaanjara@jgu.ac.id

Article Information

ABSTRACT

According to Article 76 of Law No. 12 of 2012 on Higher Education, it is stated that the government, local governments, and/or universities have an obligation to ensure that poor students have the opportunity to complete their studies through academic regulations. Out of the total number of applicants, only 61,067 participants were accepted, and they were distributed among various colleges. The technical guidelines for the implementation of the KIP Kuliah 2021 selection, issued by the Education Financing Service Center of the Directorate General of Higher Education, outline several criteria that prospective students must meet. To ensure accuracy, a selection process involving academic ability tests and interviews is conducted to identify eligible candidates for assistance. The registration process, which includes document verification, assessment of academic potential, and interviews, requires significant time. Choosing prospective students based on specific criteria further adds to the time and human resource allocation required. This study aims to facilitate monitoring of the activities of students receiving KIP Lectures in tertiary institutions and to facilitate student evaluation based on the grades obtained using the system. The applied system selects alternative value-weighted values using the SAW method.

How to Cite:

Harjiyanto, K., et al. (2024). Decision Support System for KIP Universitas Global Jakarta Scholarship Recipients Using the Simple Additive Weighting (SAW) Method. Jurnal Teknologi Informasi Dan Pendidikan, 17(1), 161-179. https://doi.org/10.24036/jtip.v17i1.663

1. INTRODUCTION

The KIP Kuliah Scholarship sets itself apart from other scholarships by placing its emphasis on providing assistance and support to economically disadvantaged students rather than solely rewarding academic excellence. This distinction is outlined in article 76, paragraph 1 of Law No. 12 of 2012 concerning Higher Education, which states that the Government, Local Governments, and/or Universities have a responsibility to ensure that students facing financial hardships are given the opportunity to successfully finish their studies according to the academic regulations [1]. KIP Kuliah or Kartu Indonesia Pintar Kuliah is an education fee assistance provided by the government for high school graduates or equivalent who have good academic potential but have obstacles in terms of the economy. The assistance is given to students who are economically disadvantaged but have good academic potential. It is different from scholarships that focus on providing awards or financial support to those who excel [2].

Based on the technical guidelines for the implementation of the KIP Kuliah 2021 selection for the Education Financing Service Center of the Ministry of Education and Culture of the Republic of Indonesia, several criteria must be met by prospective students, including the factor of ownership of the KIP Card, KKH, KKS or registered with DTPT, are students from families in less decile, and then registrants are selected based on academic ability and the level of economic feasibility by the relevant universities [3]. After evaluating the absolute condition, a selection process was implemented to ensure that the assistance provided would effectively reach the intended recipients. This selection process involved conducting academic ability tests and interviews to accurately identify individuals who would benefit from the assistance program.

Universitas Global Jakarta currently handles the application process and performance assessment of prospective KIP Kuliah applicants manually. This involves selecting and comparing performance evaluation files of students, which results in a time-consuming decision-making process due to the high number of students. To streamline and assist universities in assessing student performance based on predetermined criteria, an effort is being made to introduce a computer-based system utilizing a specific method within a Decision Support System..

This research is conducted to make it easier for universities to monitor the activities of KIP Kuliah recipient students and make it easier to evaluate students on the results of the

scores that have been obtained. The purpose of this study is to build a decision support system for selecting scholarship admissions using the SAW (Simple Additive Weighting) method. This method was chosen because this method can determine the weight value for each attribute, then continue with a ranking process that will select the best alternatives from several alternatives (registrants) based on certain criteria and weights [4]. Based on previous research, it can be concluded that this study succeeded in conducting alternative rankings of outstanding teachers from the results of weight calculations using the Simple Additive Weighting (SAW) method so that the largest value that was selected as the best alternative and from the highest alternative [5][6]. In another study, it was concluded that the SAW and Topsis Methods can be used to complete the selection of several alternatives based on several predetermined criteria, the results of the comparison of the SAW and Topsis methods obtained the results on the calculation of the SAW Method are more recommended [7], then in the comparative research of the SAW and WP methods, the measurement results of the Hamming Distance method show a difference that is not far apart, namely 78% for the SAW method and 80% for the WP method. Although in general the two methods are relatively equally relevant, in certain special conditions the SAW method is considered relatively more relevant to be implemented in this case compared to the WP method [8].

This study aims to implement a Scholarship Admission Decision Support System using the SAW method within a Decision Support System. The system is created with the purpose of streamlining the process of selecting scholarship recipients by automatically organizing and presenting relevant outcomes. It functions as a valuable tool for making efficient decisions in the scholarship admission process.

2. RESEARCH METHOD

In conducting this research, the researchers follow a systematic process comprising the following stages:

2.1. Data Collection Techniques

Data collection serves as a fundamental requirement for conducting research, aiming to acquire valid data that can be utilized in the research process [9]. Various methods are employed for data collection, including:

1. Observation: The researchers collect data by directly observing the scholarship admission selection process at the Global University of Jakarta, particularly within the scholarship selection team.
2. Interview: Data is gathered through interviews with members of the scholarship selection team, utilizing a question-and-answer format to obtain relevant information regarding the scholarship selection data.
3. Literature Study: Data is sourced from reliable references such as books, journals, proceedings,

and other scholarly materials, which support and augment the research process.

2.2. Flowchart

Flowcharts serve as visual representations depicting the sequential flow of a system. In this case, a flowchart is employed to illustrate the anticipated flow of the system that is being developed. Presented below is a flowchart that outlines the step-by-step progression of the system:
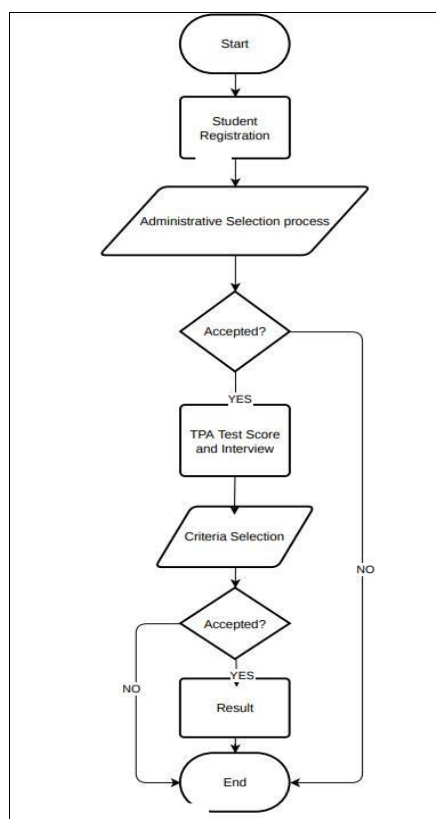

Figure 1. Flowchart of KIP Scholarship Acceptance System JGU

Figure 1. illustrates the workflow of the KIP Kuliah scholarship acceptance system. The process begins with prospective KIP Kuliah students registering for the scholarship. Subsequently, the admin conducts a file selection process to determine eligibility. If the applicants pass this initial screening, they proceed to undergo a landfill test and an interview test. The committee inputs the scores obtained from both tests, and the system initiates a selection process. If the applicants successfully meet the test selection criteria, the system displays the results of the selection. The committee or admin then selects a group of students who will be awarded the KIP Kuliah scholarships. Finally, the system presents a list of students who have been granted the scholarship.

2.3. System Development Techniques

System development is a crucial aspect in the data processing process, contributing to the formation of research outcomes. Throughout the system development process, researchers engage in various activities to ensure its successful implementation [10][11]. These activities encompass:

1) System Analysis is useful for analyzing the needs of the system. This can be done after the data is obtained. The data needed are registrant data, criteria data, weight data, quota data.
2) System Design The system design in this study is useful for designing the system in a structured manner so that it will facilitate the implementation of the system.
3) System Implementation: During the system implementation stage, a Decision Support System Application (SPK) program is developed using the PHP programming language and MySQL database. This application enables the selection process for KIP Kuliah scholarships based on specific quota criteria.
4) System Testing is carried out to determine the functional quality of the SPK Application program. So that researchers conducted two system tests, namely the Functionality Test and the Validity Test [12][13].

2.4. Metode Simple Additive Weighting (SAW)

The SAW method is one of the methods of Decisson Support System [14]. Which is often also known by the term weighty summation method. The fundamental principle behind the SAW method is to calculate the weighted sum of the performance ratings for each alternative across all attributes [15]. The simple additive weighting method, as implied by its name, can be understood as a straightforward approach for assigning weights or performing weighted summation to address problems within a decision support system. The concept behind this method is to assign importance (priority scale) to the performance of each alternative across all attributes [16]. Regarding the problem-solving algorithm utilizing Simple Additive Weighting (SAW) [17].

1) Step 1: first define the criteria that will be used as a benchmark for solving the problem.
2) Step 2: normalize each alternative to each attribute by assessing the rating.
3) Step 3: Calculate the preference weight value on each alternativeStep 4: bending.

The SAW method necessitates the normalization of the decision matrix (x) to a standardized scale that enables comparison with all available alternative ratings. [18]. The equation is as follows:

$$r_{ij} = \begin{cases} \dfrac{X_{ij}}{Max_i \, X_{ij}} \\ \dfrac{X_{ij}}{Min_i \, X_{ij}} \end{cases}$$

(1)

Where:
rij = Normalized performance rating
Max Xij = Maximum value of each row and columnMin Xij = Minimum value of each row and column Xij = the queue value that each criterion has

The preference values for each alternative (Vi) are given in the following:

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

(2)

Information:
Vi = Preference valuewj = Ranking weight
rij = normalized performance rating

A greater Vi value indicates that ai alternatives are referred. Simple Additive Weighting (SAW) completion steps:
1) Identify the criteria that will be used as reference points in decision-making, denoted as Ci.
2) Assign a rating to each alternative for each criterion.
3) Create a decision matrix based on the criteria (Ci), and normalize the matrix using equations tailored to the attribute type (profit or cost) to obtain a normalized matrix.
4) The final result is determined through a ranking process, where the normalized matrix R is multiplied by the weight vector and the sum is calculated. The alternative (Ai) with the highest value is selected as the best solution.

2.4.1. Analisis Criteria

After completing the interview process, the author proceeds to analyze the interview outcomes. In the initial phase, prospective applicants are required to fulfill mandatory registration requirements, including documents such as ID card, scholarship-related documents (KKS/KIP/PKH/Surat DTKS), certificates, and school transcripts (SKHUN). Additionally, they must provide their Student ID Card, Family Card (KK), Parent's Salary Slip, Proof of Property Tax Payment (PBB), and photographs of their residence. These mandatory documents also play a significant role during the interview assessment.

SAW (Simple Additive Weighting) decision support system method, the required criteria will be given weight [19]. From several criteria obtained, the authors analyzed the weight level of each criterion. The weight consists of the following six fuzzy numbers [20].

Table 1. Weighting of Variable

Variabel	Weight (Value)
Very Low (SR)	0

Low (R)	0,2
Average (S)	0,4
Middle (T1)	0,6
High (T2)	0,8
Very High (ST)	1

2.4.1.1. Parent's Income Criteria(C1)

During the interview with the KIP College scholarship administrator at JGU, it was revealed that the criteria for parental income requirements are as follows: a maximum income threshold of Rp. 4,000,000,- or divided by the number of dependents within the family, with each family member allocated Rp. 700,000,-. Based on this information, the author has established a classification system for parental income, consisting of six distinct weight levels. The weighting of values on the criteria can be seen in table 2.

Table 2. Parent Income (C1)

Parent Income (C1)	Value
<= Rp. 1,5 Million	1
> Rp. 1,5 Million - Rp. 2 Million	0,8
> Rp. 2 Million - Rp. 2,5 Million	0,6
> Rp. 2,5 Million - Rp. 3 Million	0,4
> Rp. 3 Million - Rp. 4 Million	0,2
> Rp. 4 Million	0

Table 3. Weighting for the Number of parents' dependents

Number of Parental Dependents (C2)	Value
1	0
2	0,2
3	0,4
4	0,6
5	0,8

More than 5	1

2.4.1.2. Criteria for Academic Ability Test (C3) and Interview Test (C4)

For weighting, the criteria for the Academic Ability Test and the Interview Test have the same level of weighting. The weighting of values on the criteria C3 and C4 can be seen in table 4.

Table 4. Weighting of Test Scoring 1

Test Scores	Weight
> 90	1
> 80 - 90	0,8
> 70 - 80	0,6
> 60 - 70	0,4
> 50 - 60	0,2
<= 50	0

3. RESULTS AND DISCUSSION

The results and discussion section of this study is dedicated to presenting a detailed analysis of the data collected and providing an in-depth interpretation of the findings. Based on the alternatives, the researchers made the following table preference value as the test data on table 5 below:

Table 5. Data Test

Alternatif	C1	C2	C3	C4
DFTR1	0.60	0.60	0.80	1.00
DFTR2	0.20	0.60	0.80	0.80
DFTR3	0.40	0.40	0.60	0.40
DFTR4	0.40	0.80	0.80	0.60
DFTR5	0.80	0.60	0.40	0.40
DFTR6	0.60	0.20	0.20	0.40
DFTR7	0.20	0.60	0.60	0.80
DFTR8	0.60	0.20	0.40	0.80
DFTR9	1.00	0.80	0.20	0.60
DFTR10	0.80	0.00	0.60	0.60

3.1. Formula

Next is to determine the value of the preference given to the decision makers value, and the process of calculating normalization matrix according to the formula.

$$r_{ij} = \begin{cases} \dfrac{X_{ij}}{\underset{i}{Max}\ X_{ij}} \\[2em] \dfrac{\underset{i}{Min}\ X_{ij}}{X_{ij}} \end{cases}$$

(3)

3.1.1. Parent income (C1)

$$r_{11} = \frac{0.80}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.80}{1.00} = 0.80$$

$$r_{12} = \frac{0.20}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.20}{1.00} = 0.20$$

$$r_{13} = \frac{0.40}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.40}{1.00} = 0.40$$

$$r_{14} = \frac{0.40}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.40}{1.00} = 0.40$$

$$r_{15} = \frac{0.80}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.80}{1.00} = 0.80$$

$$r_{16} = \frac{0.60}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.60}{1.00} = 0.60$$

$$r_{17} = \frac{0.20}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.20}{1.00} = 0.20$$

$$r_{18} = \frac{0.20}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.60}{1.00} = 0.20$$

$$r_{19} = \frac{1.00}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{1.00}{1.00} = 1.00$$

$$r_{20} = \frac{0.80}{max\ (0.80;\ 0;20;\ 0,40;\ 0,40;\ 0,80;\ 0,60;\ 0,20;\ 0,20;\ 1.00;\ 0,80\ )} = \frac{0.80}{1.00} = 0.80$$

3.1.2. Criteria for the Number of Parental Dependents (C2)

$$r_{11} = \frac{0.40}{max\ (0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.40}{0.80} = 0.50$$

$$r_{12} = \frac{0.60}{max\ (0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.60}{0.80} = 0.75$$

$$r_{13} = \frac{0.40}{max(0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.40}{0.80} = 0.50$$

$$r_{14} = \frac{0.80}{max\ (0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.80}{0.80} = 1.00$$

$$r_{15} = \frac{0.60}{max\ (0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.60}{0.80} = 0.75$$

$$r_{16} = \frac{0.20}{max\ (0.60;\ 0.60;\ 0.80;\ 0,80;\ 0.60;\ 0.40;\ 0,40;\ 0,20;\ 0,20;\ 0,80)} = \frac{0.20}{0.80} = 0.25$$

$$r_{17} = \frac{0.60}{\max(0.60; 0.60; 0.80; 0.80; 0.60; 0.40; 0.40; 0.20; 0.20; 0.80)} = \frac{0.60}{0.80} = 0.75$$

$$r_{18} = \frac{0.20}{\max(0.60; 0.60; 0.80; 0.80; 0.60; 0.40; 0.40; 0.20; 0.20; 0.80)} = \frac{0.20}{0.80} = 0.25$$

$$r_{19} = \frac{0.80}{\max(0.60; 0.60; 0.80; 0.80; 0.60; 0.40; 0.40; 0.20; 0.20; 0.80)} = \frac{0.80}{0.80} = 1.00$$

$$r_{20} = \frac{0.00}{\max(0.60; 0.60; 0.80; 0.80; 0.60; 0.40; 0.40; 0.20; 0.20; 0.80)} = \frac{0.00}{0.80} = 0.00$$

3.1.3. TPA Test (C3)

$$r_{11} = \frac{0.80}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.80}{0.80} = 1.00$$

$$r_{12} = \frac{0.80}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{1.00}{0.80} = 1.00$$

$$r_{13} = \frac{0.60}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.60}{0.80} = 0.75$$

$$r_{14} = \frac{0.80}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.80}{0.80} = 1.00$$

$$r_{15} = \frac{0.40}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.40}{0.80} = 0.50$$

$$r_{16} = \frac{0.20}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.20}{0.80} = 0.25$$

$$r_{17} = \frac{0.60}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.80}{0.80} = 1.00$$

$$r_{18} = \frac{0.40}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.40}{0.80} = 0.50$$

$$r_{19} = \frac{0.20}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.20}{0.80} = 0.25$$

$$r_{20} = \frac{0.60}{\max(0.80; 0.80; 0.60; 0.80; 0.40; 0.20; 0.60; 0.40; 0.20; 0.60)} = \frac{0.60}{0.80} = 0.75$$

3.1.4. Interview Test (C4)

$$r_{11} = \frac{1.00}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{1.00}{1.00} = 1.00$$

$$r_{12} = \frac{0.80}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.80}{1.00} = 0.80$$

$$r_{13} = \frac{0.40}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.40}{1.00} = 0.40$$

$$r_{14} = \frac{0.60}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.60}{1.00} = 0.60$$

$$r_{15} = \frac{0.40}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.40}{1.00} = 0.40$$

$$r_{16} = \frac{0.40}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.40}{1.00} = 0.40$$

$$r_{17} = \frac{0.80}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.80}{1.00} = 0.80$$

$$r_{18} = \frac{0.80}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.80}{1.00} = 0.80$$

$$r_{19} = \frac{0.60}{\max(1.00; 0.80; 0.40; 0.60; 0.40; 0.40; 0.80; 0.80; 0.60; 0.60)} = \frac{0.60}{1.00} = 0.60$$

$$r_{20} = \frac{0.60}{\max(1.00; 0.80; 0.40; 0,60; 0.40; 0.40; 0,80; 0,80; 0,60; 0,60)} = \frac{0.60}{1.00} = 0.60$$

Normalizing the Matrix The next step is to normalize the matrix by calculating the normalized performance rating value (rij) of the alternative Ai in the Cj attribute based on the equation adjusted for the type of attribute. The formula for normalizing is as follow:

$$R = \begin{pmatrix} 0.80 & 0.50 & 1.00 & 1.00 \\ 0.20 & 0.75 & 1.00 & 0.80 \\ 0.40 & 0.50 & 0.75 & 0.40 \\ 0.40 & 1.00 & 1.00 & 0.60 \\ 0.80 & 0.75 & 0.50 & 0.40 \\ 0.60 & 0.25 & 0.25 & 0.40 \\ 1.00 & 0.75 & 1.00 & 0.80 \\ 0.20 & 0.25 & 0.50 & 0.80 \\ 1.00 & 1.00 & 0.25 & 0.60 \\ 0.80 & 0.00 & 0.75 & 0.60 \end{pmatrix}$$

Next is the process of calculating preference (V) by using the following equation:

$$V_b = \sum_{l=1}^{N_b} W_l \tag{4}$$

Information: Vi = Ranking for each alternative
Wj = Weight value of each criterion [1.00; 0.80; 0.80; 1.00]
rij = Normalized performance rating value

V1   = (1.00×0.80)+(0.80×0.50)+(0.80×1.00)+(1.00×1.00)
    =0.80+0.40+0.80+1.00
    =3.00

V2   =(1.00×0.20))+(0.80×0.75)+(0.80×1.00)+(1.00×0.80)
    =0.20+0.60+0.80+0.80
    =2.40

V3   =(1.00×0.40))+(0.80×0.50)+(0.80×0.75)+(1.00×0.40)
    =0.40+0.40+0.60+0.40
    =1.80

V4 =(1.00×0.40))+(0.80×1.00)+(0.08×1.00)+(1.00×0.60)
=0.40+0.80+0.80+0.60
=2.60

V5 =(1.00×0.80))+(0.80×0.75)+(0.80×0.50)+(1.00×0.40)
=0.80+0.60+0.40+0.40
=2.20

V6 =(1.00×0.60))+(0.80×0.25)+(0.80×0.25)+(1.00×0.40)
=0.60+0.20+0.20+0.40
=1.40

V7 =(1.00×1.00))+(0.80×0.75)+(0.80×1.00)+(1.00×0.80)
=1.00+0.60+0.80+0.80
=3.20

V8 =(1.00×0.20))+(0.80×0.25)+(0.80×0.50)+(1.00×0.80)
=0.20+0.20+0.40+0.80
=1.60

V9 =(1.00×0.80))+(0.80×1.00)+(0.80×0.25)+(1.00×0.60)
=0.80+0.80+0.60+0.60
=2.80

V10 =(1.00×0.80))+(0.80×0.00)+(0.80×0.75)+(1.00×0.60)
=0.80+0.00+0.60+0.60
= 2.00

Based on the calculation, the results of the selection can be seen in table 6 below:

Table 6. Result of Alternative Data

Ranking	Alternative	Vi
1	V7	3.20
2	V1	3.00
3	V9	2.80
4	V4	2.60
5	V2	2.40
6	V5	2.20
7	V10	2.00
8	V3	1.80
9	V8	1.60

| 10 | V6 | 1.40 |

Results are acquired through a ranking process, following which the alternatives are arranged in descending order based on their numerical values. This facilitates participants in discerning the priority levels, with higher values indicating greater precedence. Based on the above calculations, the author created a website to facilitate the selection process. The following are the results of the website that has been develop.

3.2. Admin login page
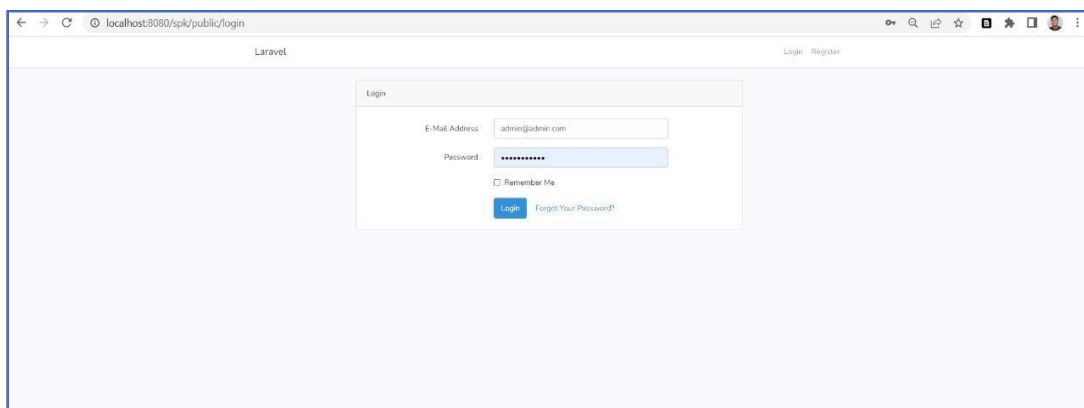
Figure 2. Admin Login page

The login display is the display that first appears when the program is run. Serves as a program admin username and password input form. The login display image can be shown in the figure 4 below.

Admin login page is specifically designed for administrators to enter their credentials when accessing the website. It serves as a secure gateway for authorized personnel to gain entry to the system and perform administrative tasks. By entering their login details on this page, administrators can ensure secure access to the website's features and functionalities.

3.3. Dashboard Page

Dashbord page, this form appears after the admin has successfully entered the username and password correctly. This page provides an overview of important data, including the number of applicants, the number of applicants who successfully passed the application process, and the number of students who did not meet the application requirements. Dashboard page is shown in Figure 3 below.
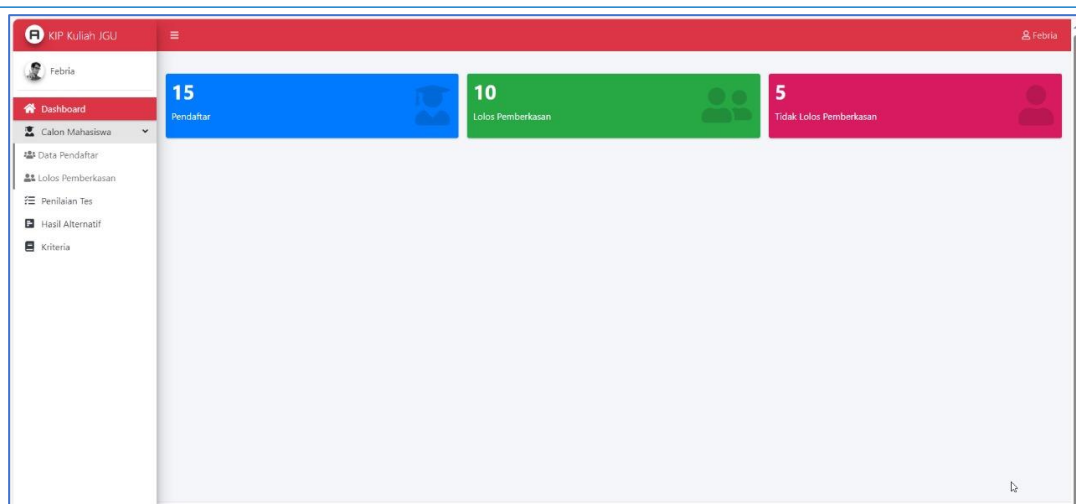
Figure 3. Admin Dashboard Page

3.4. Register Page

The register page data input design is a special page in the application program that allows prospective students to enter scholarship applicant data. Register page, displayed in the image 4 below.
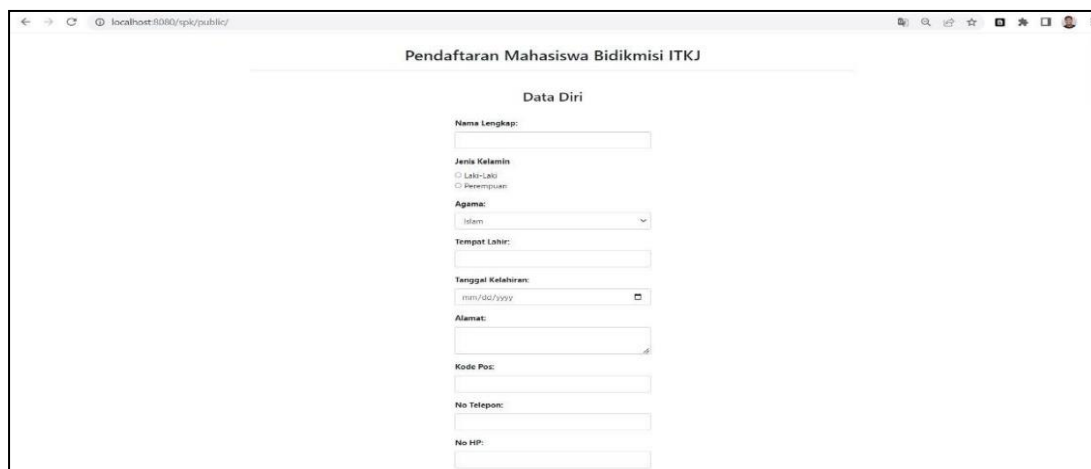
Figure 4. Participant Input Data Page

3.5. The registrant's data page

This page is for viewing applicant data that has been automatically selected by the system based on comprehensive criteria, including file completeness and compliance with weight requirements. In addition, admins can also access detailed information of

individuals. The registrant's data page shown on figure 5 below.

Figure 5. The registrant's data page (Qualified)

This page on figure 5 displays data for applicants selected based on the requirements. while for applicant data that does not qualified for the requirements will be separated on another page, as shown on figure 6 below.

Figure 6. The registrant data (Not Qualified)

3.6. Assesment Data Page

This page allows the admin to input the scores of the Academic Potential Test and Interview Test conducted as part of the assessment process.

Figure 7. Assesment Data Page

Each value inputted on the page above will immediately be given a weighting value by the system according to the level of importance of each criterion based on the matrix.

3.7. Criteria Page

The Criteria page serves to assign weights to the criteria, taking into account the importance of each criterion. This ensures that the final score results are more accurate according to the assigned weights, thus increasing the accuracy of the alternative ranking process.

Figure 8. Criteria Weighting Page

3.8. Result of Alternatif Page

Figure 9. Result Page

After all data filling procedures are completed, the system automatically sets the final score of each participant according to the weight of importance. The resulting data is then sorted from highest to lowest value. So far, the data displayed in the system is in accordance with the required criteria and has good accuracy. Therefore, the selection results displayed in the system can be a viable alternative in the decision-making process.

4. CONCLUSION

The conclusions drawn from the discussion of the research findings in the preceding chapter are as follows:
1. The utilization of the Simple Additive Weighting method proves beneficial in addressing current issues, as the assessment process is weighted based on predetermined criteria. This allows for the identification of the highest score, indicating the best alternative for receiving a scholarship.
2. The application of the Decision Support System (DSS) model, employing the Simple Additive Weighting (SAW) method, demonstrates greater effectiveness and optimality when implemented at Jakarta Global University.
3. The implementation of the Decision Support System (DSS) is web-based, allowing for easy accessibility and usage.

ACKNOWLEDGEMENTS

REFERENCES

[1] A. Y. S. Ely Purnawati, Prayoga Pribadi, Indra Alan Nugroho, "Pendampingan Program KIP-K (Kartu Indonesia Pintar Kuliah)," vol. 4, no. 1, pp. 1–15, 2022.

[2] A. Mulyani et al., "The Prediction Of Ppa And Kip-Kuliah Scholarship Recipients Using Prediksi Penerima Beasiswa Ppa Dan Kip-Kuliah Menggunakan," vol. 3, no. 4, pp. 821–827, 2022.

[3] Kemendikbud, "Pedoman Pendaftaran Kartu Indonesia Pintar Kuliah (KIP-K)," Puslapdik, vol. 1, no. 1, pp. 1–18, 2021, [Online].

[4] R. Rosidin and Y. Ramdhani, "Implementasi Metode Simple Additive Weighting (SAW) Dalam Penilaian Kinerja Karyawan Pada LPK Pelita Massa Berbasis Web," vol. 1, no. 5, pp. 1114–1122, 2022.

[5] F. S. Hutagalung, B. K. Hutasuhut, and A.-K. Al-Khowarizmi, "Comparison of Simple Additive Weighting (SAW) and Promethee Methods in Rice Quality Selection," J. Comput. Sci. Inf. Technol. Telecommun. Eng., vol. 1, no. 1, pp. 24–30, 2020, doi: 10.30596/jcositte.v1i1.4358.

[6] L. H. Hasibuan et al., "Sistem Pendukung Keputusan Pemberian Nilai Pada Asisten Pratikum Jurusan Teknik Informatika Dengan Metode Simple Additive Weighting (Saw) Berbasis Web 2. 0," vol. 2, no. 2, 2022.

[7] A. Abdillah, "Sistem Pendukung Keputusan Penerimaan Siswa Baru Dengan Metode Simple Additive Weigthing (Saw) Di Sman 1 Cikakak Kab . Sukabumi," SISMATIK (Seminar Nas. Sist. Inf. dan Manaj. Inform., pp. 124–131, 2021.

[8] A. W. et al Pamungkas, "Sistem Pendukung Keputusan Penerimaan Beasiswa Kurang Mampu Smk Harapan Dengan Metode Simple Additive Weighting (Saw)," Teknois J. Ilm. Teknol. Inf. dan Sains, vol. 9, no. 1, pp. 73–82, 2019.

[9] M. Puspa, "Decision Support System For Supplementary Food Recipients (PMT) By Using The Simple Additive Weighting (SAW) Method," J. Tek. Inform. C.I.T, vol. 11, no.2,pp.37–44, 2019.

[10] F. Anjara and A. A. Jaharadak, "Expert System for Diseases Diagnosis in Living Things: A Narrative Review," J. Phys. Conf. Ser., vol. 1167, no. 1, pp. 0–11, 2019, doi: 10.1088/1742-6596/1167/1/012070.

[11] D. Nugraha, F. Anjara, and S. Faizah, "Comparison of Web Based and PWA in Online Learning," Proc. 5th FIRST T1 T2 2021 Int. Conf. (FIRST-T1-T2 2021), vol. 9, pp. 201– 205, 2022, doi: 10.2991/ahe.k.220205.035.

[12] R. Taufiq, "Perancangan Sistem Pendukung Keputusan Penerimaan Beasiswa Mengunakan Metode Saw Pada Smp Yuppentek 1 Legok," J. Tek., vol. 6, no. 2, 2017, doi: 10.31000/jt.v6i2.447.

[13] A. Krismadi, A. F. Lestari, A. Pitriyah, I. W. P. A. Mardangga, M. Astuti, and A. Saifudin, "Pengujian Black Box berbasis Equivalence Partitions pada Aplikasi Seleksi Promosi Kenaikan

Jabatan," J. Teknol. Sist. Inf. dan Apl., vol. 2, no. 4, p. 155, 2019, doi: 10.32493/jtsi.v2i4.3771.

[14] A. S. Putra, D. R. Aryanti, and I. Hartati, "Metode SAW (Simple Additive Weighting) sebagai Sistem Pendukung Keputusan Guru Berprestasi (Studi Kasus : SMK Global Surya)," Pros. Semin. Nas. Darmajaya, vol. 1, no. 1, pp. 85–97, 2018.

[15] Retno Hidayati, Novriyenni, and Nurhayati, "Comparative Analysis Of Decision Support Systems Determining The Right Food Business Location In Binjai City Using Topsis And Saw Methods," Int. J. Heal. Eng. Technol., vol. 1, no. 2, pp. 155–165, 2022, doi: 10.55227/ijhet.v1i2.30.

[16] R. Hermawan, M. T. Habibie, D. Sutrisno, A. S. Putra, and N. Aisyah, "Decision Support System For The Best Employee Selection Recommendation Using Ahp (Analytic Hierarchy Process) Method," Int. J. Educ. Res. Soc. Sci., vol. 2, no. 5, pp. 1218–1226, 2021.

[17] P. M. Kusumantara, M. Kustyani, and T. Ayu, "Pendukung Keputusan Pemilihan Wedding Organizer Di," Tek. Eng. Sains J., vol. 3, no. I, pp. 19–24, 2019.

[18] M. Muqorobin, A. Apriliyani, and K. Kusrini, "Sistem Pendukung Keputusan Penerimaan Beasiswa dengan Metode SAW," Respati, vol. 14, no. 1, pp. 76–85, 2019, doi: 10.35842/jtir.v14i1.274.S

[19] A. Fitrul Hadi, R. Permana, and H. Syafwan, "Decision Support System in Determining Structural Position Mutations Using Simple Additive Weighting (SAW) Method," J. Phys. Conf. Ser., vol. 1339, no. 1, 2019, doi: 10.1088/1742- 6596/1339/1/012015.

[20] N. Sari, "Implementation of the AHP-SAW Method in the Decision Support System for Selecting the Best Tourism Village," J. Tek. Inform. CIT Medicom, vol. 13, no. 1, pp. 23–32, 2021.