Design of Decision Support System Determination of Indonesian Smart Card Receiver (KIP) Using Simple Additive Weighting (Saw) Method Based On Mobile Web

Dewi Anggun, Hasbiana, Selvyani, Siska Ulandari, Beautiful Sari, Elmayati, Lukman Sunardi,

Faculty of Engineering, Bina Insan University
[1]dewianggun,speed3@gmail.com , [2]hasbiana00@gmail.com,
[3]selvisuput@gmail.com , [4]siskaulandari41@gmail.com, [5]indahsari12@gmail.com ,
[6]elmayati@univbinainsan.ac.id, [7]lukman_sunar at@univbinainsan.ac.id

Abstract

In addition, education is a very decisive instrument in contributing to the progress of a nation in building the character of the nation. Smart Indonesia Card (KIP) is a card that is given as a marker or identity of the recipient of the Smart Indonesia Program (PIP) assistance. The Smart Indonesia Card (KIP) provides assurance and certainty that school – age children are registered as recipients of educational assistance. Each child receiving PIP education assistance is only entitled to receive 1 KIP card.

Keywords: Smart Indonesia Card (KIP), Decision Support System, Simple Additive Weighting (SAW), Web Mobile.

1. Introduction

The process of studying a public policy made based on the interests of the wider community will be the initial description of the implementation of the policy. Not only that, assessing public policies can be made at the time of formulating policies, meaning that before giving an assessment an evaluation can be carried out. One of the policies that have been implemented is free education which aims to prevent children aged primary and secondary education from enjoying education. in various levels of living standards and social classifications to enjoy education [1].

The Smart Indonesia Program (PIP) is designed to help school-age children from poor/vulnerable poor/priority families continue to receive education services until they graduate from secondary education, either through formal education (starting from SD/MI to children graduating from SMA/SMK/MA). as well as non-formal education (Package A to Package C and standardized courses)[3]. Through this program, the government seeks to prevent students from dropping out of school, and is expected to attract dropouts to continue their education.

1. Objectives

The purpose of this research is to design a decision support system that can be used by the selection committee of prospective recipients of the Smart Indonesia Card (PIP) of SMA Negeri 7 Lubuklinggau City in determining the prospective recipient of the Smart Indonesia Card (KIP).

2. Literature Review

A decision support system is part of a computer-based information system (including a knowledge-based system (knowledge management)) that is used to support decision making in an organization or company.
The Simple Additive Weighting (SAW) method is one of the methods used in the process of making a decision. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes.

Mobile web is a browser-based HTML page that is accessed using portable devices (smartphones or tablets) via cellular networks such as 3G, 4G or Wifi.

3. Methods

System Development Method

The method that the author uses in developing this system is the waterfall method. The steps or stages contained in the waterfall method are as follows:

a. Planning Stage
   The author determines the goals and targets to be achieved by observing events in the field.
b. Analysis Stage
   The author determines the criteria used and alternatives that can represent the goals that have been determined and the methods to be used.
c. Design Stage
   This design stage is used to recapitulate the data into an easy-to-understand data form, the form used is a tabular form.
d. Implementation Stage
   At this stage, the authors perform data analysis and data processing using software or systems built.
e. Maintenance Stage
   This stage is carried out if the results obtained in the previous process found problems or the results were not as desired, then repeated at the stage in accordance with the results of the analysis.

4. Data Collection

Method of collecting data

In collecting the data needed as material for writing this report are:

a. Primary data
   The methods used to collect the data are as follows:
   1) Observation Method
      The author obtains data by observing the processes that occur, information and reports at SMA Negeri 7 Lubuklinggau City.
   2) Interview Method
      The data collection technique is carried out by conducting interviews with the selection committee of prospective KIP recipients.
   3) Documentation Method
      In this process, the writer looks for documents such as organizational structure and other data needed in writing this research report by documenting the documents and data.
b. Secondary data
   The secondary data that the authors get comes from various sources such as books, reports, journals and others.

5. Results and Discussion

5.1 Numerical Result

From the system design, the results of this study are in the form of a decision support system by applying the Simple Additive Weighting (SAW) method to the process of providing KIP assistance for students of SMAN 7 Lubuklinggau City. The following are the stages of the SAW method: disability, disaster victims, parent's income, academic value, achievement

1) Determine the criteria that will be used as a reference in decision making, namely C1.

Disability (C1)	
Type of disability	Weight Value
Physical disability	10
Sensory disability	8.5
Mental disability	6.5
Intellectual disability	4.0

Disaster Victim (C2)	
Types of disaster victims	Weight Value
Landslide	10
Flood	8.5
Tsunami	6.5
Erupting volcano	4.0

Parent's Income (C3)	
Total Parent's Income	Weight Value
< Rp. 500, 00	10
>Rp. 1.000.000,00	8.5
<Rp. 1,500,000,00	6.5
>Rp. 2,000,000,00	4.0

Academic Value (C4)	
Average Academic Score	Weight Value
Master all the material	10
Get a perfect score	8.5
Become a class champion	6.5
Olympic competition winner	4.0

Achievement (C5)	
Achievement Type	Weight Value
Learning achievement	10
Sports achievements	8.5
Art achievement	6.5
Environmental achievements	4.0

2) Determine the suitability rating of each alternative on each criterion

Alternative	Criteria				
	Disability	Disaster Victim	Parent's Income	Academic Value	Performance
Beautiful	10	8.5	10	6.5	10
Sari	8.5	8.5	8.5	8.5	8.5
Robi	6.5	8.5	4.5	6.5	10
Andi	4.5	8.5	6.5	6.5	8.5

3) Gives the weight vector:
W = [10, 5, 6, 4, 8]

4) Normalization of the x matrix to calculate the value of each criterion:
A1) R11 = 10 / max(10, 8.5, 10, 6.5, 10) = 10/10 = 1
R12 = 8.5 / 10 = 0.85
R13 = 10 / 10 = 1
R14 = 6.5 / 10 = 0.65
R15 = 10 / 10 = 1

A2) R21 = 8.5 / 10 = 0.85
R22 = 8.5 / 10 = 0.85
R23 = 8.5 / 10 = 0.85
R24 =8.5/10 = 0.85
R25= 8.5 / 10 = 0.85

A3) R31 = 6.5 / 10 = 0.65
R32 = 8.5 / 10 = 0.85
R33 = 4.5 / 10 = 0.45
R34 = 6.5 / 10 = 0.65
R35 = 10 / 10 = 1

A4) R41 = 4.5 / 10 = 0.45
R42 = 8.5 / 10 = 0.85
R43 = 6.5 / 10 = 0.65
R44 = 6.5 / 10 = 0.65
R45 = 8.5 / 10 = 0.85

5) SAW calculation result = W x R
A1 = (10) (1) + (5) (0.85) + (6) (1) + (4) (0.65) + (8) (1) = 10+4.25+6+2 ,6+8=30,85

A2 = (10) (0.85) + (5) (0.85) + (6) (0.85) + (4) (0.85) + (8) (0.85) = 8.5 +4.25+5,1+3.4+6.8=28.05

A3 = (10) (0.65) + (5) (0.85) + (6) (0.45) + (4) (0.65) + (8) (1) = 6.5+4 ,25+2.7+2.6+8=24.05

A4 = (10) (0.45) + (5) (0.85) + (6) (0.65) + (4) (0.65) + (8) (0.85) = 4.5 +4.25+3.9+2.6+6.8=22.05

Based on the calculation of SAW, the alternative that gets assistance from KIP recipients is Indah

5.2 Graphical Result

In designing this system using the spk table, namely:

Field Name	Type	Size	Key	Information
Academic Value	Char	5		Academic Value
Performance	real			Performance

5.3 Discussion

1. Student Data Page

This page contains Student data that has been entered into the system. Student data page can be seen in Figure 4.1

Figure 4.1 Student Data Pages

2. Student Input Page

This page is used to enter Student data into the system. Student input page can be seen in Figure 4.2

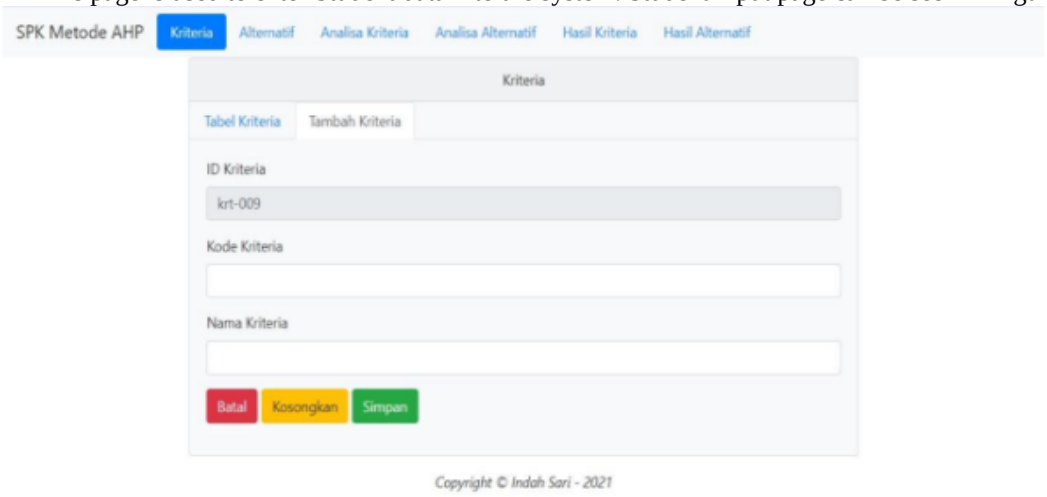

Figure 4.2 Student Input Page

3. Criteria Processing Page

This page contains criteria data that have been entered into the system. This page can be seen in Figure 4.3

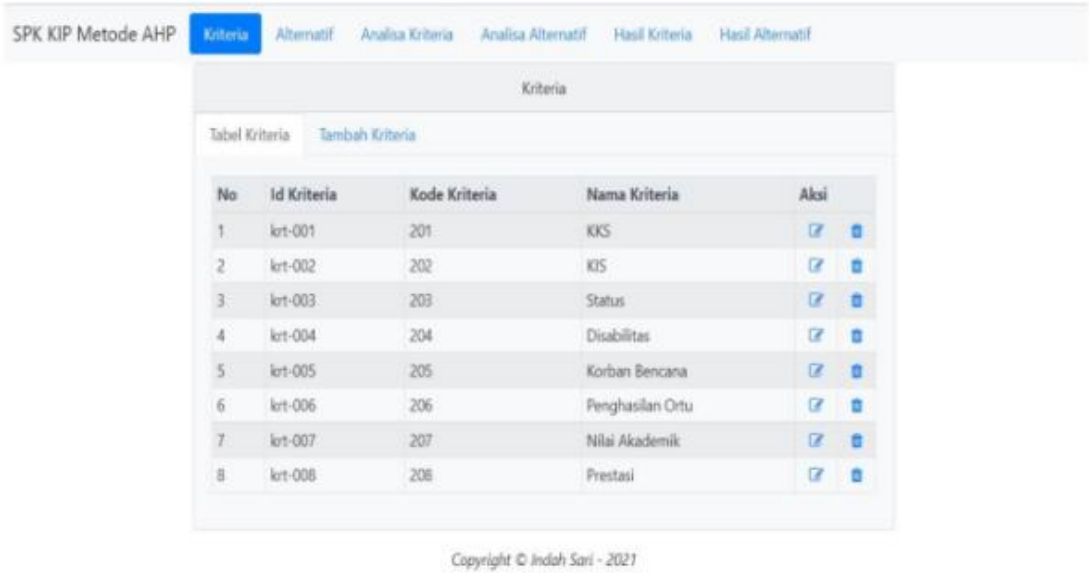

Figure 4.3 Criteria Processing Page

4. Criteria Input Page

This page serves to ensure the criteria data into the system. The criteria input page can be seen in Figure 4.4

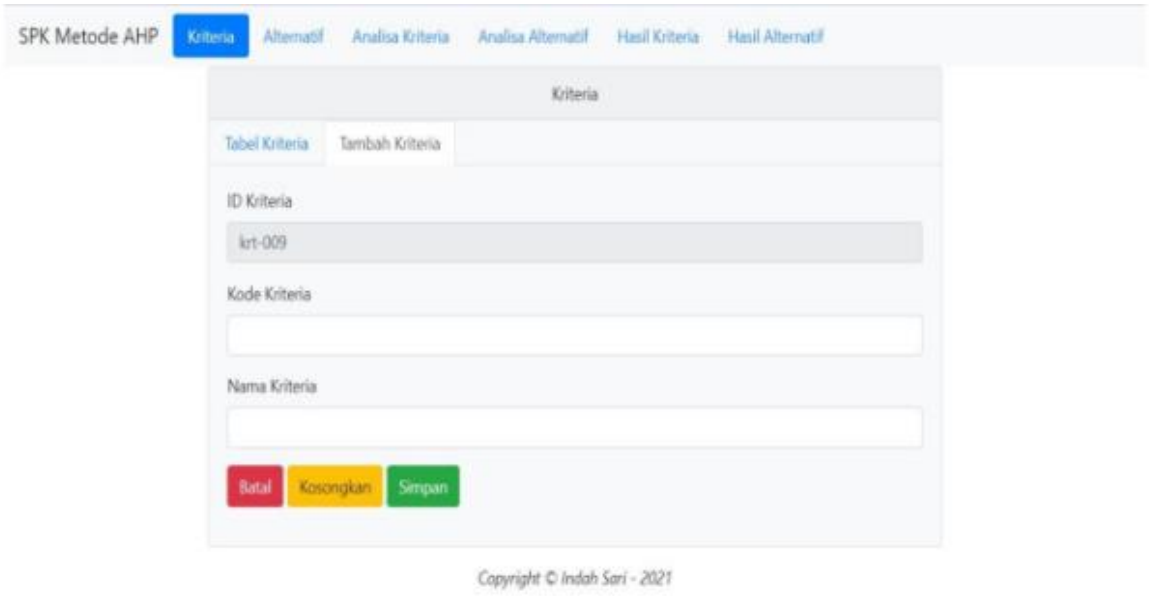

Figure 4.4 Criteria Input Page

5. Criteria Analyst Page

This page is used to analyze the existing criteria. The criteria analysis page can be seen in Figure 4.5

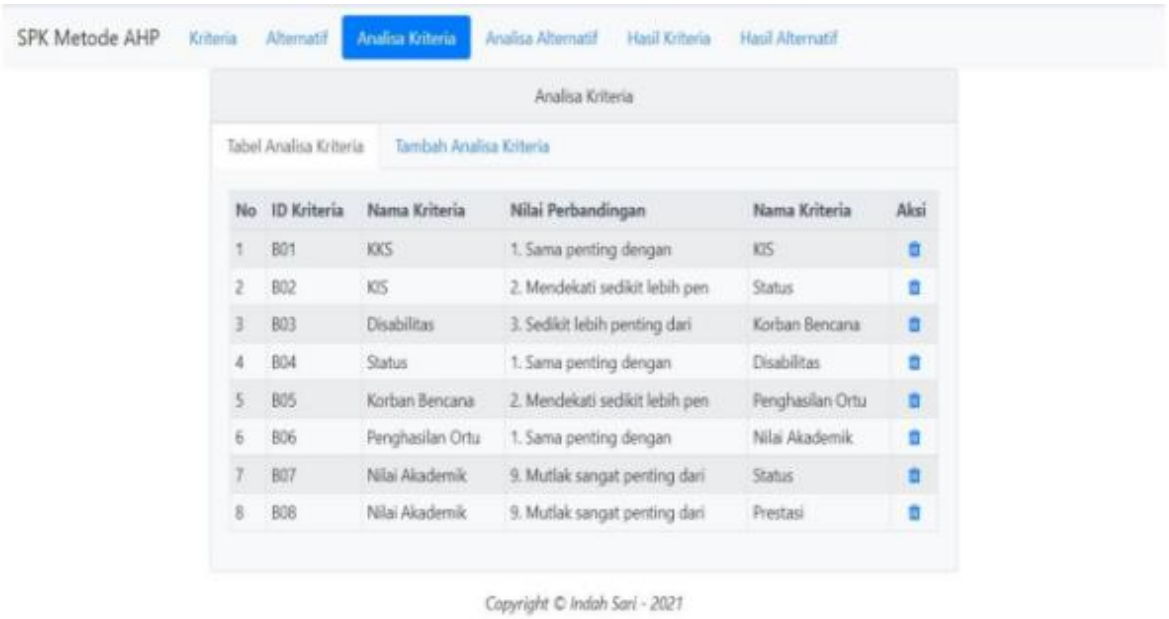

Figure 4.5 Criteria Analysis Page

6. Criteria Calculation Page

This page is used for the process of calculating the existing criteria values. The criteria calculation page is seen in Figure 4.6

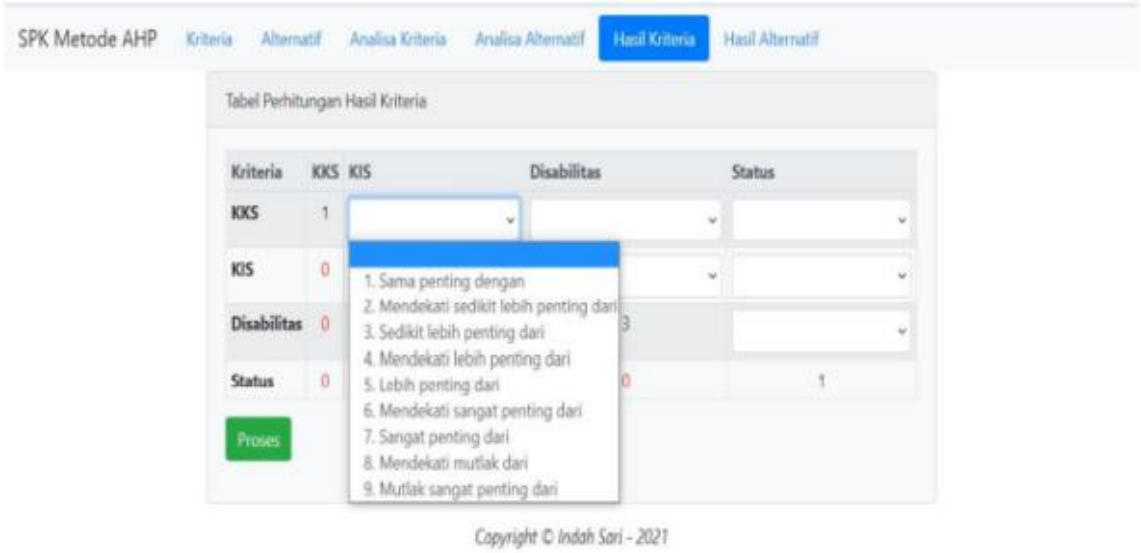

Figure 4.6 Criteria Calculation Page

7. Ranking Page

This page uses the ranking process of data that has been processed using the AHP method. The ranking results page can be seen in Figure 4.7

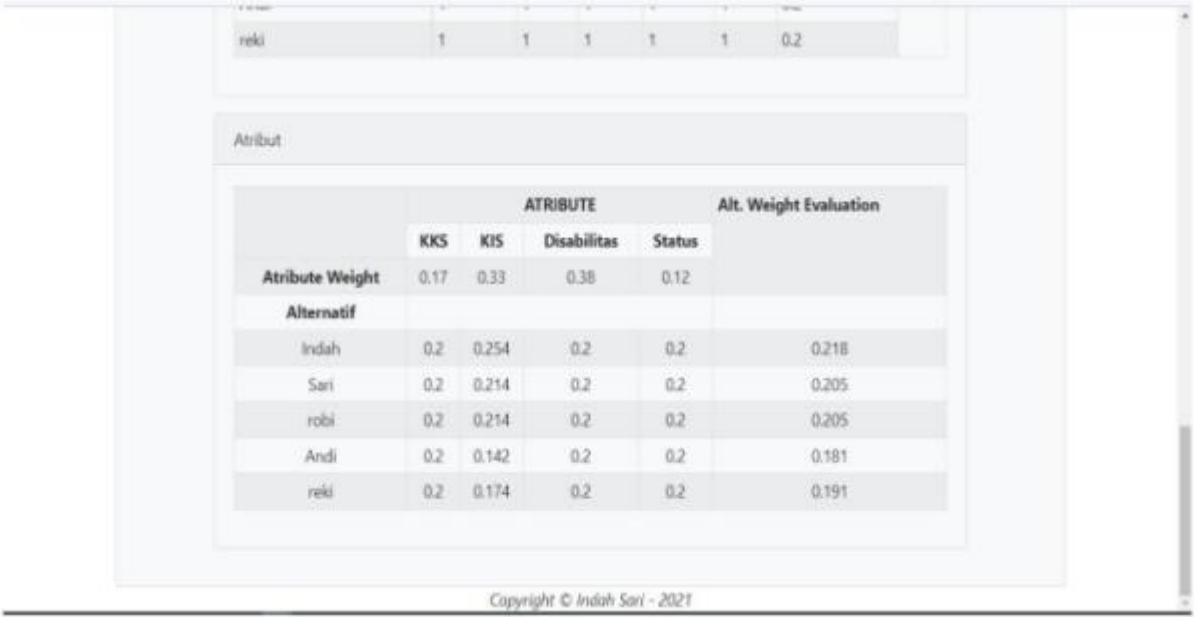

Figure 4.7 Ranking Results Page

6. Conclusion

Based on the existing discussion, conclusions can be drawn regarding the decision support system made, namely:

Adanya sistem pendukung keputusan penentuan penerima KIP maka proses penentuan caon penerima KIP tidak lagi menggunakan cara manual atau didasarkan pada perhitungan yang manual. Adanya sistem pendukung keputusan penentuan penerima KIP dengan metode AHP, maka hasilnya akan lebih valid karena menggunakan metode dalam proses perhitungannya. Adanya sistem pendukung keputusan penentuan penerima KIP maka proses Panitia seleksi calon penerima Kartu Indonesia Pintar (KIP) SMA Negeri 7 Kota Lubuklinggau tidak lagi megalami kesulitan dalam mengelola data dalam jumlah banyak.

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