

**APPLICATION OF THE MAUT METHOD IN RECIPIENTS INDONESIA
SMART PROGRAM (PIP) IN 014673 MEKAR SARI
ELEMENTARY SCHOOL**

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Abstract: Many children drop out or stop school due to economic constraints, especially personal costs such as not being able to buy school supplies, educational development donations and so on. Therefore, the government has a policy to help by issuing the Smart Indonesia Program (PIP) as a goal to help students' personal costs in pursuing education. As the smart Indonesia program progresses, many parents of students complain because the selection of students receiving PIP assistance is not on target and does not comply with the provisions. As with the data collection of students receiving the Smart Indonesia Program (PIP) assistance at State Elementary School 014673 Mekar Sari Village, it is also not optimal where the recording system is still inputted into Microsoft Excel. Therefore, a system is needed that is integrated with a calculation processing technique, namely a decision support system used at State Elementary School 015673 Mekar Sari Village to determine prospective recipients of the Smart Indonesia Program assistance who are truly worthy and appropriate. For this reason, this study uses the Multi-Attribute Utility Theory (MAUT) method to find students who are eligible for PIP benefits in the determination process.

Keywords: maut method; mekar sari elementary school; smart indonesia program.

Abstrak: Banyaknya anak yang putus atau berhenti sekolah dikarenakan kendala ekonomi terutama pada biaya pribadi seperti tidak mampu membeli perlengkapan sekolah, uang sumbangan pembinaan pendidikan dan lain sebagainya. Maka dari itu pemerintah memiliki kebijakan untuk membantu dengan mengeluarkan Program Indonesia Pintar (PIP) sebagai tujuan untuk membantu biaya pribadi siswa dalam menempuh pendidikan. Seiring berjalannya program indonesia pintar banyak kalangan orang tua siswa mengeluh dikarenakan dalam pemilihan siswa penerima bantuan PIP tidak tepat sasaran dan tidak sesuai dengan ketentuan. Seperti halnya dengan pendataan siswa penerima bantuan Program Indonesia Pintar (PIP) di Sekolah Dasar Negeri 014673 Desa Mekar Sari juga belum optimal dimana masih sistem pencatatan lalu di *input* ke *Microsoft Excel*. Maka dibutuhkan sebuah sistem yang sudah terintegrasi dengan sebuah teknik pengolahan perhitungan yaitu sistem pendukung keputusan yang digunakan pada Sekolah Dasar Negeri 015673 Desa Mekar Sari untuk penentuan calon penerima bantuan Program Indonesia Pintar yang benar layak dan pantas. Untuk itu penelitian ini menggunakan metode *Multi-Attribute Utility Theory (MAUT)* untuk mencari siswa yang layak mendapat manfaat PIP dalam proses penentuannya.

Kata kunci: metode maut; program indonesia pintar; sd negeri mekar sari.

INTRODUCTION

Education is one of the things that guarantees life in the future. However, economic constraints often force parents to stop sending their children to school. Therefore, the Ministry of Education and Culture (Kemendikbud) and the Ministry of Religion (Kemenag) took the initiative to provide assistance for the Smart Indonesia Program (PIP). The Smart Indonesia Program (PIP) is a government initiative that provides financial assistance to students aged between 6 and 21 years. This aid is provided to low-income students to reduce strain on parents and keep them in school.

State Elementary School 014673 Mekar Sari Village is a State Elementary School which was established on December 31 2002 and is located in Mekar Sari Village, Kec. Buntu Pane District. Asahan Provincial North Sumatra. In carrying out its activities, the State Elementary School 014673 Mekar Sari Village is under the auspices of the UPTD of the Buntu Pane District Education Service with a total of 302 students from Class I to Class VI with 25 potential recipients of the Smart Indonesia Program (PIP).

The background to this research is that many children drop out or stop going to school due to economic constraints, especially personal costs such as not being able to buy school supplies, money from Educational Development Contributions, and so on. Therefore, the government took the initiative to help by issuing the Smart Indonesia Program (PIP) with the aim of helping students with their personal costs in pursuing education. As the Smart Indonesia Program progressed, many parents complained that the selection of students who received PIP assistance was not on

target and did not comply with the provisions. Then data collection on students receiving Smart Indonesia Program (PIP) assistance at State Elementary School 014673 Mekar Sari Village is also not optimal, namely they still use books and then input them into Microsoft Excel.

To solve the problems in the research above, a Decision Support System is needed which is used to determine which potential recipients of Smart Indonesia Program assistance are worthy and worthy of receiving assistance. For this reason, the author uses the Multi-Attribute Utility Theory (MAUT) method to find students who deserve PIP benefits. Processing or modifying data using unstructured solving models or rules combined with computer capabilities in interactive services to create a DSS. The technique for making this application is the Multi Attribute Utility Theory (MAUT) technique. This method will later be created for recipients of the Smart Indonesia Program (PIP) assistance at State Elementary School 014673 Mekar Sari Village.

The application of SPK has been widely used to solve problems, as was done in research, namely from the results of previous research the author wanted to help employees in determining recommendations for prospective heads of community health centers using a Decision Support System to determine scholarship recipients. The Smart Indonesia program uses the Multi Attribute Utility Theory method be more objective in determining scholarship recipients for the Smart Indonesia Program. With the resulting Cyclomatic Complexity value = 7 [1].

Future research applying the Multi Attribute Utility Theory (MAUT) method

can help pharmacists in making decisions on controlling the inventory of medicines and medical devices very well. So this research is very appropriate in controlling the supply of medicines and medical devices in pharmacies [2].

Future research applying the MAUT method is expected to be able to determine the criteria for employees who are worthy of deactivation, because the MAUT method will carry out a ranking process based on attributes with different weights so that the results are more optimal, then a ranking process will be carried out which will determine the optimal alternative [3]. The application of the MAUT method can help reduce subjectivity in decision making, and allow for a more objective and systematic assessment of various relevant criteria, thereby helping consumers make more informed and rational decisions [4]. To select the best employees using the website-based MAUT method with the CodeIgniter framework and MySQL database and this research was conducted using the RUP methodology [5]. It has been proven that employee performance assessments can help the South Pesisir Population and Civil Registration Service [6]. The calculation results from the MAUT method obtained a result of 0.6731 with alternative A7 in the name of Bintang Simanjuntak as the best alternative that deserves to be accepted as Broadcasting [7]. The decision support system developed can be an effective and efficient tool in helping sellers make the right decisions in selecting used cars to sell to consumers [8].

With the existence of a decision support system using the MAUT method, it can make it easier to determine the recipients of elderly assistance to the people who are entitled to receive it [9]. Based on calculations carried out using

the MAUT method, it was found that the MSI Cyborg Katana (B13VGK) laptop is the first ranked gaming laptop with a utility value of 0.7035[10].

A solution is needed in this case in the form of a decision support system in determining recipients of Smart Indonesia Program (PIP) assistance and making it easier for Smart Indonesia Program (PIP) Assistance Recipients at State Elementary School 014673 Mekar Sari Village using the Multi-Attribute Utility Theory (MAUT) model.

METHOD

The calculation method uses the MAUT method in determining the Smart Indonesia Program (PIP) at State Elementary School 014673 Mekar Sari Village using the smallest value (Min) and the largest value (Max) in table 1.

Table 1. Find Min and Max Values

Alternative/ Criteria	C1	C2	C3	C4	C5
Zayuka	3	3	2	3	1
Rasya Fachiny	2	3	4	3	1
Ramadhan	2	2	4	1	1
Abid Alfakhri	3	2	2	3	1
Mhd Irfan	1	2	5	3	1
Ardiansya	3	3	4	1	1
Dinda Riana	2	3	5	3	1
Kenzi Wijaya	3	5	5	2	1
Anugrah					
Senja	3	4	3	3	1
Vanesa	1	2	2	2	1
-	-	-	-	-	-
Indah Laura	2	5	2	3	1
Max	3	5	5	3	3
Min	1	1	1	1	1

Calculating the normalized matrix utility value for each alternative according to its attributes can be seen in table 2.

Table 2. Matrix Normalization Utility Results

Alternative	C1	C2	C3	C4	C5
Zayuka	1,0	0,5	0,3	1,0	0,0
Rasya	0,5	0,5	0,8	1,0	0,0
Ramadhan	0,5	0,3	0,8	0,0	0,0
Abid A	1,0	0,3	0,3	1,0	0,0
Mhd Irfan	0,0	0,3	1,0	1,0	0,0
Ardiansya	1,0	0,5	0,8	0,0	0,0
Dinda Riana	0,5	0,5	1,0	1,0	0,0
Kenzi	1,0	1,0	1,0	0,5	0,0
Anugrah	1,0	0,8	0,5	1,0	0,0
Vanessa	0,0	0,3	0,3	0,5	0,0
-	-	-	-	-	-
Indah Laura	0,5	1,0	0,3	1,0	0,0

Multiply the criteria weight by the utility value to determine the ranking value for each alternative. This is the weight that determines the value of how important the element is with the weight values used can be seen in table 3.

Table 3. Weight Value

Criteria	Weight Value
Parents Income	5 0.278
Number of dependents	3 0.167
Presence	4 0.222
Rapor Score	3 0.167
Completeness File	3 0.167
Total	15 1.000

The results of multiplying the weight values with the criteria values per alternative can be seen in table 4.

Table 4. Multiplication Results of Each Alternative

Alternatif /Nilai	C1	C2	C3	C4	C5
Bobot	0,28	0,17	0,22	0,17	1,17
Zayuka	0,28	0,08	0,06	0,17	0,00
Rasya	0,14	0,08	0,17	0,17	0,00
Rama	0,14	0,04	0,17	0,00	0,00
Abid A	0,28	0,04	0,06	0,17	0,00
Mhd	0,00	0,04	0,22	0,17	0,00
Ardian	0,28	0,08	0,17	0,00	0,00
Dinda	0,14	0,08	0,22	0,17	0,00
Kenzi	0,28	0,17	0,22	0,08	0,00
Anugrah	0,28	0,13	0,11	0,17	0,00
Vanessa	0,00	0,04	0,06	0,08	0,00
-	-	-	-	-	-
Indah	0,14	0,17	0,06	0,17	0,00

The quantitative method uses various mathematical models that rely on historical data or associative variables to determine recipients of the Smart Indonesia Program (PIP) assistance at State Elementary School 014673 Mekar Sari Village.

Multi Attribute Utility Theory (MAUT) is a scheme in which the final evaluation, $v(x)$, of an object x is defined as the weight added to a value relevant to its dimension value. The expression usually used to call it is utility value. Multi-Attribute Utility Theory is used to convert several interests into numerical values on a scale of 0-1 with 0 representing the worst option and 1 the best. This allows direct comparison of various measures [11].

In summary, the steps in the MAUT method are to determine the relative weight for each criterion, where the total weight is 1.

$$\sum_{i=1}^n W_i = 1 \tag{1}$$

Information:

W_i = Criteria Weight

List all alternatives

Calculate the matrix normalized utility value for each alternative according to its attributes:

$$U(x) = \frac{x - x_i^-}{x_i^+ - x_i^-} \tag{2}$$

Information:

$U(x)$ = Normalization of alternative weights

x_i^- = Minimum criteria value (worst weight)

x_i^+ = Maximum criteria value (best weight)

x = Alternative weights

Multiply the criteria weight by the utility value to determine the ranking value for each alternative:

$$V(x) = \sum_{i=1}^n W_i.V_i(x) \tag{3}$$

Where $v(x)$ is the evaluation value of an object i and w_i is the weight that determines the value of how important the i element is compared to other elements. Meanwhile, n is the number of elements in normalizing alternative weights. So to calculate the relative weight for each criterion, use the weight normalization function as follows [12]:

$$w_i = \frac{w'_i}{\sum w'_i} \tag{4}$$

The Multi Attribute Utility Theory (MAUT) method is a scheme in which the final evaluation, $v(x)$, of an object x is defined as the weight added to a value that is relevant to its dimension value. The expression usually used to call it is utility value. Multi-Attribute Utility Theory is used to convert several interests into numerical values on a scale of 0-1 with 0 representing the worst option and 1 the best. This allows direct comparison of various measures [13], as weights that add up to a value relevant to their dimension values.

The expression usually used to call it is utility value [14], this method is quantitative comparisons that apply in various fields by combining different expenses and profits [15]. This method is used to determine value the weight of each criterion, which is then carried out the process of sorting the final scores from highest to lowest (ranking) to determine recommendations best alternative to worst alternative [16]. This MAUT method will be used to process

the existing criteria determined previously, and these criteria will be processed into a recommendation [17].

RESULT AND DISCUSSION

The decision support system process for determining Smart Indonesia Program (PIP) Assistance Recipients at State Elementary School 014673 Mekar Sari Village, errors still occur. For example, determining whether recipients of Smart Indonesia Program (PIP) assistance are eligible or not, because there are still errors in the current system. However, getting the Smart Indonesia Program (PIP) assistance recipients who have the right and appropriate needs at the State Elementary School 014673 Mekar Sari Village is not an easy matter.

The large number of recipients of the Smart Indonesia Program (PIP) assistance who have and fulfill the requirements makes the determination process difficult. Therefore, this research will discuss a decision support system which is expected to help the State Elementary School 014673 Mekar Sari Village in determining the Smart Indonesia Program (PIP) Assistance Recipients.

Table 5. Multiplication Result of Each Alternative

Name of Students	Total	Rank
Zayuka Alfaroh	0,58	11
Rasya Fachiny	0,56	12
Yoga Ramadhan	0,35	22
Abid Alfakhri	0,54	14
Mhd Irfan	0,43	21
Ardiansya	0,53	18
Dinda Riana	0,61	10
Kenzi Wijaya	0,75	4
Anugrah Senja	0,68	7
Vanesa Daviera	0,18	24
-	-	-
Indah Laura	0,53	16

Based the global priority values from table 5, the highest value obtained as a Smart Indonesia Program (PIP) Assistance Recipient is alternative A14, namely Kesya Fitri Azzahra with a value of 0.90 in 1st place, Salsabila Ayu Hanifa with a value of 0.80 in 2nd place, Reza Arfana with a value 0.78 which refers to each criterion held by State Elementary School 014673 Mekar Sari Village.

Main Menu Use

This main menu form contains menus and sub menus found in the admin system that have been previously designed, users can choose menus provided by the system that has been created:



Image 2. Home page display

Calculation form

The MAUT calculation form displays the results of the criteria and alternative values.

Image 3. The MAUT Calculation For

MAUT Method Calculation Result Form

The Multi Attribute Utility Theory (MAUT) Method calculation results form is a display of the results of the criteria and alternative values:



HASIL PENILAIAN PENERIMA BANTUAN PROGRAM INDONESIA PINTAR (PIP)

Kode	Nama Peserta Didik	Total	Rank
A14	Kesya Fitri Azzahra	0.9583	1
A18	Salsabila Ayu Hanifa	0.7778	2
A12	Reza Arfana	0.7778	3
A08	Hani Wijaya	0.75	4
A17	Muhammad Rafli	0.75	5
A19	Fauzan Wijaya	0.7222	6
A09	Angrah Senja Pratama	0.6906	7
A11	Alfa Shafira Qurrah Simangunsong	0.6328	8
A21	Afiya Sahara	0.625	9
A07	Dinda Rani	0.6111	10
A01	Zayka Afaroh	0.5833	11
A02	Reza Fachry	0.5556	12
A22	Shabilah Anwar	0.5556	13
A04	Abid AlFahri	0.5417	14
A15	Ramazona	0.5278	15
A25	Dhaki Lahir	0.5278	16
A23	Kevin Alviano	0.5278	17
A06	Krisna Ardiansyah Sinaga	0.5278	18
A24	Nidya Alicia Quana	0.4961	19
A20	Muhammad Rafah	0.4722	20
A05	Muhammad Irfan	0.4306	21
A03	Yoga Ramadhani	0.3472	22
A13	Nevla Sari Rahayu	0.2222	23
A10	Vanessa Daviera Kizky	0.1806	24
A16	Cheri Aulia	0.1467	25

Mekar Sari, 29-08-2024
Ditandatangani

Ika Lubis, S.Pd
Kepala Sekolah

Image 4. MAUT Method Calculation Report

CONCLUSION

The decision support system for recipients of the Smart Indonesia Program (PIP) assistance experienced by the school and State Elementary School 014673 Mekar Sari Village uses the MAUT method. The decision support system application for determining Smart Indonesia Program (PIP) Assistance Recipients at State Elementary School 014673 Mekar Sari Village was created to obtain more objective results. The results of calculations using alternative data obtained are that the highest value weight determines the recipient of the Smart Indonesia Program (PIP) assistance, namely Kesya Fitri Azzahra with a value of 0.9583, the second alternative is Salsabila Ayu Hanifa with a value of 0.7778 and the alternative is Reza Arfana with a value of 0.7778.

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