Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022
DOI : https://doi.org/10.33395/sinkron.v7i4.11794
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Village fund cash credit direct assistance recipient decision support system using the Simple Multi Attribute Rating Technique (SMART) method

[1)]Ardian Asti, [2)]Harmayani, [3)]Dicky Apdilah
[1,2,3)] Universitas Asahan, Indonesia
ardianasti45@gmail.com, mayong3010@gmail.com, dickyapdi1404@gmail.com

Submitted : Sep 7, 2022 | **Accepted** : Sep 7, 2022 | **Published** : Oct 3, 2022

Abstract **-** Cash Direct Assistance is a program from the government due to the covid-19 pandemic conditions where with this Cash Direct Assistance is expected to be able to help restore the economy of people affected by government policies to stay at home and maintain their respective health. In determining the recipients of this assistance, the smallest government, namely the village government, still uses manual selection according to the criteria so that it requires a lot of time and high accuracy and a sophisticated application program is needed to overcome it. So in the design of the BLT Dana Desa application, the author designed using the PHP programming language with a decision-making system based on the SMART method where this application system was designed based on changing the processing system in the manual assessment of the recipient's family who was directly selected, now the author changes the assessment system for prospective recipients of cash direct assistance based on an application where this application will facilitate the determination of eligible families get assistance through a government program, namely direct cash assistance for village funds.

Keywords **-** BLT Village Fund, PHP Programming, Smart Method

INTRODUCTION

Cash Direct Assistance or commonly called BLT is an assistance program from public authorities through the provision of money or various types of assistance, both contingent (*conditional cash transfer*) and without exception (*unconditional cash transfer*). Direct Money (BLT) to manage affected individuals in the midst of the Covid-19 pandemic. Some of the prerequisites for beneficiaries are helpless families who are not recipients of the Family Hope Program (PKH), do not have basic food cards and pre-business cards. The process includes the stage of collecting data on prospective recipients by the head of the hamlet who is guided by the Integrated Social Welfare Data (DTKS). Data collection to the community of prospective recipients of the Village Fund BLT is also guided by the Integrated Social Welfare Data (DTKS) from the Ministry of Social Affairs.

Decision Support System that can assist and cooperate in determining the recipients of financial assistance directly from village funds. The model that will be used in this decision support system is SMART (*Simple Multi Attribute Rating Technique*), SMART was chosen because it can determine the weight of the value of each quality. For this situation, the option in question is a person who is qualified for immediate monetary assistance from the village fund (Satya, 2015). From this case, the author made a study with the title "Decision Support System

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022 e-ISSN : 2541-2019
DOI : https://doi.org/10.33395/sinkron.v7i4.11794 p-ISSN : 2541-044X

for Recipients of Direct Cash Assistance Using the *Simple Multi Atribute Rating Technique* (SMART) Method". Through this research, it is hoped that later it will be able to get the results of determining the list of recipients of direct cash assistance for village funds that are accurate and on target so as not to make the assistance a misunderstanding in the community due to inappropriate recipients(Firmanto, 2020).

LITERATURE REVIEW

BLT Village Fund

One of the public power community projects whose authority is given to the Village is the Village Fund Direct Assistance, hereinafter abbreviated as BLT DD. BLT DD is a guide for oppressed individuals who come from rescue cities. The city's assets can further develop covid-19 contemplation through its monetary and social assets. Especially from the Village Revenue and Expenditure Budget (APBDesa) and village funds. To help efforts to reduce the impact of Covid 19, the Village Fund can be allocated for plans to utilize financial arrangements that can be utilized directly at the family and city levels. Paying attention to Government Regulation Number 43 of 2014 which states that the Village Fund is a wealth sourced from the State Budget made by urban planning which is then channeled through the Regional Revenue and Expenditure Budget and relied on as inspiration (Herman Firdaus, Abdillah, Renaldi, & Jenderal Achmad Yani Jl, 2016)

Behind the control of the government, for example, the contrast of time, progress in fortifying natural areas. The underlying measure used in the Village Fund Direct Assistance (BLT-DD) standard is beneficiaries who have not received social assistance such as PKH and lost their salaries due to COVID-19.(Erfly & Maun, 2020)

Regulation of the Minister of Finance (PMK) No. 50 / PMK.07 / 2020 concerning the Assignment of BLT-DD. This activity is expected to accelerate the implementation of BLT-DD assistance provided in the form of real money. In addition, the strategy for the beneficiaries of this assistance is subject to the continued effect of guarantees by municipal specialists in accordance with the activities established by openly trained professionals. (Pratiwi, 2016)

As for recovery during the COVID-19 pandemic, city assets can be used for Village Fund Cash Direct Assistance (BLT-DD) given to persecuted families for some time with subtleties in the initial 3 months of 600,000 rupiah and in the second month 300,000 rupiah.(Akib, 2017)

Decision Support System

According to Pratiwi, explaining that "The Decision Support System is a framework with an intuitive PC base to have the option to help every dynamic by using information and models in dealing with unstructured problems." [5] Meanwhile, according to Firmanto, "The decision support system is a data creation framework that focuses on specific problems that must be addressed by the head in decision making".(Firmanto, 2020)

From the above understanding, it can be concluded that the Decision Support System is not a dynamic device, but is a framework that works with leaders by equipping them with data from information and reality prepared with standards and expected to solve choices about problems more quickly, surely and precisely. So this framework is not expected to replace the situation of the individual as a leader in the decision-making process. (Malabay, 2019)

SMART Method

Simple Attribute Rating Technique (SMART) is a strategy or strategy with different properties in a dynamic framework." The SMART strategy was created in 1977 by Edward. This multi-trait dynamic procedure can be used to assist the leader in choosing among several other options, each leader must choose a choice that is suitable for the predetermined goal. Each choice consists of a group of qualities and each property has a value. This value comes to the midpoint on a certain scale. (Santosa, 2017)

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022 e-ISSN : 2541-2019
DOI : https://doi.org/10.33395/sinkron.v7i4.11794 p-ISSN : 2541-044X

Each quality has a weight that describes how significantly a trait is contrasted with a different trait. This weighting and positioning is used to survey each option to get the other best option. The Linear Utility function model used by SMART is as follows:

$$Maximize \sum_{j=1}^{k} w_j . u_{ij} \quad ,\forall i = 1, \dots, n$$

Where:

1. wj is the weighting value of the j-th Criterion of k Criteria,
2. uij is the utility value of Alternative I on Criterion j.
3. Choice determination is to distinguish which of the n options has the greatest capacity esteem.

This capacity value can also be used to rank n Alternatives. (Rohayani, 2015)

UML (*Unified Modeling Language*)

Unified Modeling Language is one of the instruments that can be used in object programming dialects, nowadays Unified Modeling Language will begin to become the future norm for the framework/programming development industry. Because basically Unified Modeling Language is used by many goliath organizations such as IBM, Microsoft, etc. Unified Modeling Language is a framework structure that has many sequences, for that the understanding of Unified Modeling Language is a product improvement strategy using a graphical strategy. and is a language for perception, detail, development, and documentation. (Suginting, 2018)

1. Modeling Language Brought together is a language that has turned into the norm for imagining, characterizing, fabricating and archiving the importance of product frameworks.
2. Modeling Languages Brought together can be characterized as languages that have turned into business standards for imagining, planning and recording programming frameworks. (Nugraha, 2020)
3. Bound together Modeling Language is a standard demonstration language consisting of an assortment of graphics, created to help programming frameworks and designers to get work done, for example,

- Specifications
- Visualization
- Architectural plan
- Construction
- Simulation and testing
- Documentation

METHOD

This research was compiled as an inductive research, namely looking for and collecting data in the field and from existing studies with the intention of obtaining supporting data in determining potential recipients of cash direct assistance on target. No. 12

1. Planning

   More emphasis on the feasibility study aspect of system development (feasibility study). The existing activities include:

   - Formation and consolidation of the development team.
   - Defining the purpose and scope of development.
   - Identify whether existing problems can be solved through system development.
   - Determine and evaluate the strategies to be used in the development of the system.

2. Problem Analysis

   a. Problem Identification

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022 e-ISSN : 2541-2019
DOI : https://doi.org/10.33395/sinkron.v7i4.11794 p-ISSN : 2541-044X

In identifying problems, this system consists of providing assistance funds for the community with the type of direct cash assistance carried out by the government for the community.

b. Understanding of The System

The processed system is about better processing of government aid funds.

c. Analysis of Weaknesses and Needs

In the system that is built has the disadvantage of having this system still using the php format, the need of this system where this system requires official recognition from the government by processing the determination of aid funds for direct cash assistance.

d. Results Report

The results of the processed report on the community conducted the SMART Method assessment and the families who are entitled to the assistance fund from the government.

3. Design

In the design display of direct cash assistance processing using UML (Unified Modeling Language), consisting of Use Case Diagrams, Activity Diagrams, Class Diagrams, and Sequence Diagrams, and several menus or parts of the application work process including input display, output display, application main view and program final results in the application. No. 12

4. Implementation

The components needed in system implementation are hardware, software, the hardware and software needed are the following system needs:

a. Hardware

- Core i3 Processor
- 2 GB memory
- Mouse
- Keyboard
- Monitor

b. Software

- Windows 10 Operating System
- Adobe Dreamweaver CS3
- Microsoft Word 2016
- Xampp
- Google Chrome

5. Maintenance

Maintenance Programming activities in programming are carried out by administrators who are tasked with keeping the framework ready to work accurately through the capacity of the framework to adjust as needed.

RESULTS

Based on the observations obtained by researchers from Sentang Village, Nibung Hangus District, Batu Bara Regency, which is one of the villages that has implemented the Program in accordance with the provisions of the Village Minister and the provisions of regional regulations, namely the Village BLT. However, in terms of implementation, there are still some people who do not understand the terms and conditions to be determined as recipients of direct cash assistance for village funds. Of course, it is very difficult for the village to record who will receive village fund assistance to select each community if they still use the manual method.

SMART Method Analysis

SMART *(Simple Multi Attribute Rating Technique)* is a multi-criteria decision-making method. This multi-criteria decision-making technique is based on the theory that each alternative consists of a number of criteria that have values and each criterion has a weight that describes how important it is compared to other criteria.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022 e-ISSN : 2541-2019
DOI : https://doi.org/10.33395/sinkron.v7i4.11794 p-ISSN : 2541-044X

This weighting is used to assess each alternative in order to obtain the best alternative. Namely A1: Abdul Wahab, A2 : Zulkifli Sinaga, A3: Abd Rasyid, A4: Suwandi, A5: Abd Rahman, A6 : Amran Moran.

There are 5 criteria divided from 100 weights that become a reference for making decisions, namely:
1. Income: 30 (Weights)
2. Number of families: 30 (Weight)
3. House Building Type: 20 (Weight)
4. Type of Residential Floor: 10 (Weight)
5. Valuables: 10 (Weights)

In general in SMART, the steps taken in decision making are as follows:

1. Calculates the normalization of the weight of the criteria.

Table 4.1 Normalization criteria

Criterion		Normalization
K1	30	0,3
K2	30	0,3
K3	20	0,2
K4	10	0,1
K5	10	0,1

Formula:

$$nwj = wj \Big/ \sum_{1=0}^{n} wn$$

Information :

nwj : normalization of the weight of the j-th criterion
wj : the weight of the criteria to be calculated
k : number of criteria

wn : nth criterion weight

Here's the calculation process:

$$K1 \frac{30}{100} = 0.3$$
$$K2 \frac{30}{100} = 0.3$$
$$K3 \frac{20}{100} = 0.2$$
$$K4 \frac{10}{100} = 0.1$$
$$K5 \frac{10}{100} = 0.1$$

2. Calculate the utility value of the sub criteria.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022
DOI : https://doi.org/10.33395/sinkron.v7i4.11794
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Table 4.2 Utility Values Sub Criteria

Criterion	**Sub Criteria**		**Utility**
Income	4 Million and above	5	0
	3-4 Million	4	25
	2-3 Million	3	50
	1-2 Million	2	75
	Less than 1 Million	1	100
Criterion	**Sub Criteria**		**Utility**
Number of families	Don't have children yet	5	0
	1 Children	4	25
	2 Children	3	50
	3 Children	2	75
	4 Children or older	1	100
Criterion	**Sub Criteria**		**Utility**
Types of House Buildings	Permanent walls and levels	5	0
	Permanent wall	4	25
	Semi-permanent wall	3	50
	Semi-permanent bamboo	2	75
	Soil and bamboo	1	100
Criterion	**Sub Criteria**		**Utility**
Types of Residential Floors	Granite flooring	5	0
	Ceramic flooring and plaster	4	25
	Plaster flooring	3	50
	Wood Flooring	2	75
	Soil	1	100
Criterion	**Sub Criteria**		**Utility**
Valuables	Car, Motor, Cow, laptop, tv, refrigerator, etc.	5	0
	Motor, Cow, laptop, tv, refrigerator, bicycle	4	25
	Motor, Cow, tv, refrigerator, bicycle	3	50
	Motor, tv, refrigerator, bicycle	2	75
	Motor, tv, bicycle	1	100

Formula:

$$uij = 100\frac{(C\max - XCout)}{(C\max - C\min)}$$

Information:

U_{ij} : utility value of jth criterion for i-th alternative
C_{max} : maximum sub criterion value
C_{min} : minimum sub criterion value
$C_{cout\ i}$: i-th criterion value

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022
DOI : https://doi.org/10.33395/sinkron.v7i4.11794
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Here's an example of the calculation:

$$S5 = 100x\frac{(5-5)}{(5-4)} = 0$$

$$S4 = 100x\frac{(5-4)}{(5-4)} = 25$$

$$S3 = 100x\frac{(5-3)}{(5-4)} = 50$$

$$S2 = 100x\frac{(5-2)}{(5-4)} = 75$$

$$S1 = 100x\frac{(5-1)}{(5-4)} = 100$$

3. Calculate the value of the utility.

Table 4.3 Range of Values

No.	Range of Values	Information
1	80 – 100	Very Worthy
2	55 – 79	Proper
3	35 – 54	Considered
4	0 – 34	Not Worth It

Formula:

$$Maximize = \sum_{J=1}^{k} nwj\ uij$$

$$\forall i = 1,2,\ldots\ldots k$$

Abdul Wahab = (0.3x100) + (0.3x100) + (0.2x100) + (0.1x100) + (0.1x100)

= 30 + 30 + 20 + 10 +10

= 100 (Very Worthy)

Zulkifli Sinaga = (0.3x100) + (0.3x75) + (0.2x75) + (0.1x100) + (0.1x100)

= 30 + 22.5 + 15 + 10 + 10

= 87.5 (Very Worthy)

Abd Rasyid = (0.3x25) + (0.3x50) + (0.2x75) + (0.1x75) + (0.1x75)

= 7.5 + 15 + 15 + 7.5 + 7.5

= 52.5 (Considered)

Suwandi = (0.3x75) + (0.3x50) + (0.2x75) + (0.1x50) + (0.1x100)

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022 e-ISSN : 2541-2019
DOI : https://doi.org/10.33395/sinkron.v7i4.11794 p-ISSN : 2541-044X

= 22.5 + 15 + 15 + 5 + 10

= 67.6 (Worth)

Abd Rahman = (0.3x0) + (0.3x0) + (0.2x50) + (0.1x50) + (0.1x75) = 0 + 0 + 10 + 5 + 7.5

= 22.5 (Not Worth it)

Amran Moran = (0.3x100) + (0.3x75) + (0.2x50) + (0.1x50) + (0.1x100)

= 30 + 22.5 + 10 + 5 + 10

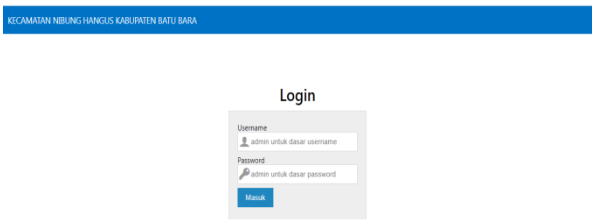
= 77.5 (Worth it)

B. Implementation on Web-based Applications

In the implementation of the application can be seen as follows:

1. Login Menu Display

The login menu is a menu that will appear when the admin runs the application, then input the username and password, along with the appearance of the login menu when the login menu is selected.



2. Main Menu Display

The main menu contains alternative menus, criteria, sub-criteria, rankings, reports, operators and change passwords, these menus serve to process data in the system. Here's what the main menu of the designed app looks like

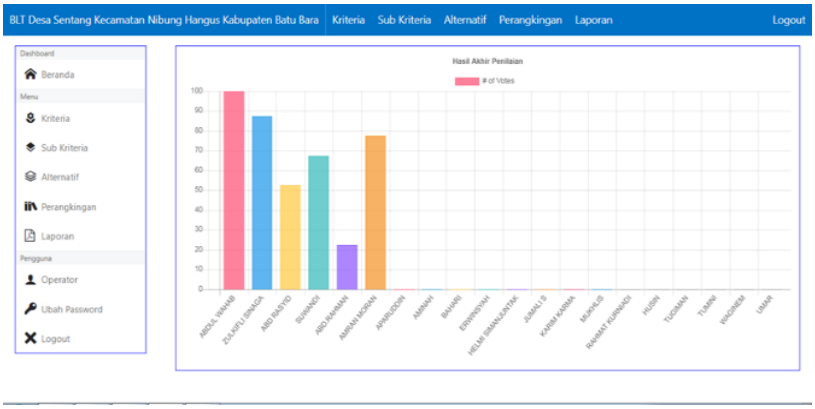


Figure 4.2.1 Main Menu Page

3. Criteria Menu Display

The criteria menu is used to process assessment criteria data such as Income, Number of families, Type of house building, Type of residential floor, and Valuables. Here's what the designed application criteria menu looks like.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022
DOI : https://doi.org/10.33395/sinkron.v7i4.11794
e-ISSN : 2541-2019
p-ISSN : 2541-044X

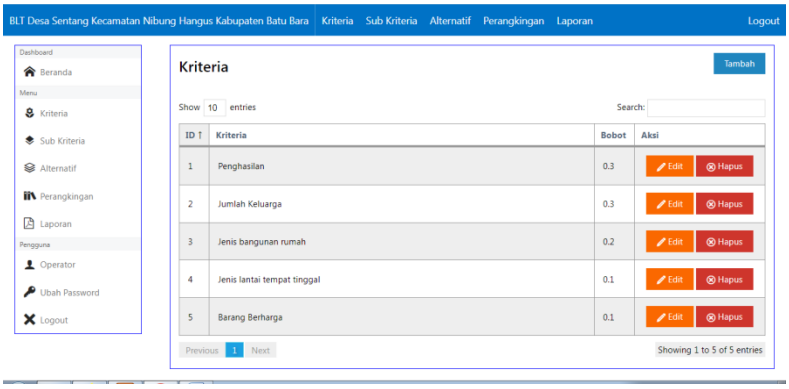


Figure 4.2.2 Criteria Menu Display

4. Sub Criteria Menu Display

The sub criteria menu is used to process the data of the scoring sub criteria and give weight values. Here's what the sub criteria menu is designed to look like.

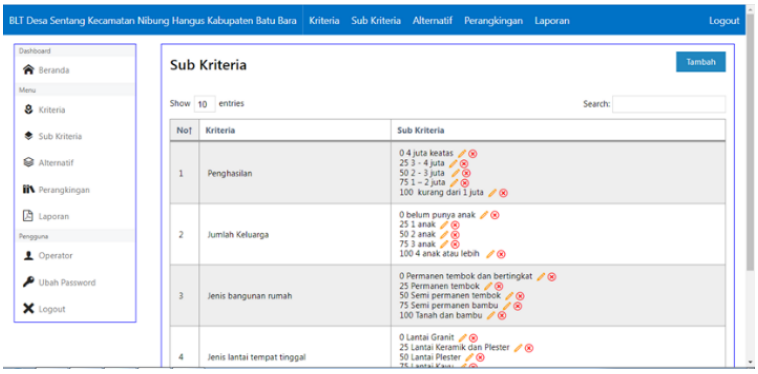


Figure 4.2.3 Sub Criteria Menu Display

5. Alternate Menu Display

The alternative menu is used to input community data, community name data later as a sempel in analyzing the feasibility of getting BLT assistance. Here's what the designed menu looks like.

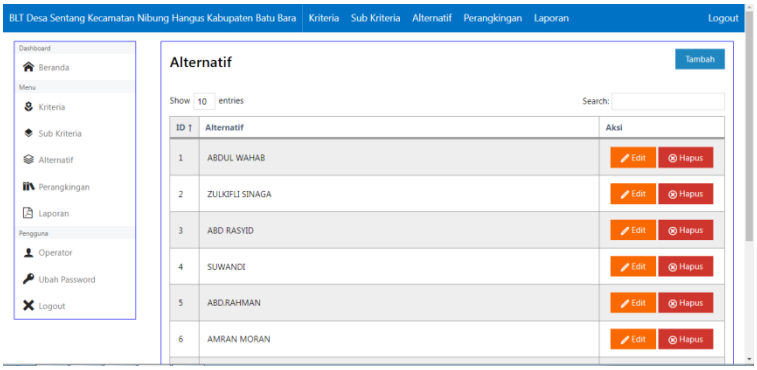
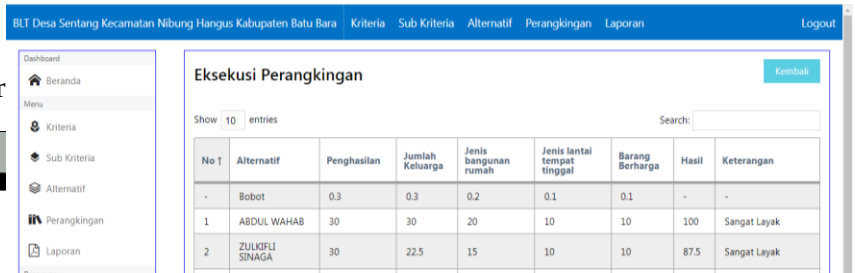


Figure 4.2.4 Alternative Menu Display

6. Ranking Menu Display

The ranking menu is used to input the value obtained based on the assessment. Here's what the ranking menu of the designed application looks like.



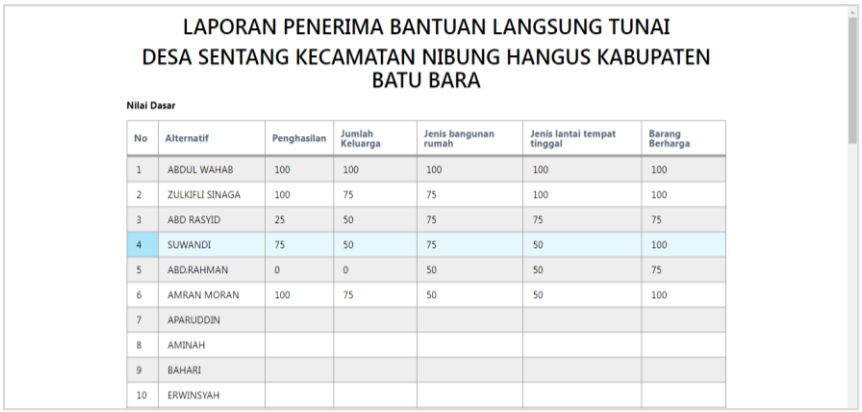
*name of cor

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 6, Number 4, October 2022
DOI : https://doi.org/10.33395/sinkron.v7i4.11794
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Figure 4.2.5 Ranking Menu View

7. Report Menu Display

The report menu is used to print the calculation results of the assessment match obtained from the assessment on the ranking menu. Here's what the report menu of the designed app looks like.



LAPORAN PENERIMA BANTUAN LANGSUNG TUNAI
DESA SENTANG KECAMATAN NIBUNG HANGUS KABUPATEN BATU BARA

Nilai Dasar

No	Alternatif	Penghasilan	Jumlah Keluarga	Jenis bangunan rumah	Jenis lantai tempat tinggal	Barang Berharga
1	ABDUL WAHAB	100	100	100	100	100
2	ZULKIFLI SINAGA	100	75	75	100	100
3	ABD RASYID	25	50	75	75	75
4	SUWANDI	75	50	75	50	100
5	ABD.RAHMAN	0	0	50	50	75
6	AMRAN MORAN	100	75	50	50	100
7	APARUDDIN					
8	AMINAH					
9	BAHARI					
10	ERWINSYAH					

Figure 4.2.6 Report Menu View

CONCLUSION

From the results of the previous discussion that has been described, the researchers draw the following conclusions In building a decision support system for recipients of direct cash assistance for village funds using the simple multi attribute rating technique (SMART) method. Researchers carry out the design stages starting from the design of the application work system, designing the appearance design to describing the application interface that is already running. This application has also been embedded with the SMART algorithm so that in determining decisions it is feasible to use. The Decision Support System made can facilitate the performance of the village to determine the recipients of direct cash assistance because this application has worked optimally in determining decisions so that the admin only assesses potential beneficiaries. From the results of the test sample of 6 residents of Sentang Village, Nibung Hangus District, Batu Bara Regency, there was a final score of Abdul Wahab = 100 (Very Decent), Zulkifli Sinaga = 87.5 (Very Decent), Abd Rasyid = 52.5 (Considered), Suwandi = 67.6 (Feasible), Abd Rahman = 22.5 (Not Feasible), Amran Moran = 77.5 (Feasible).

REFERENCES

Akib, S. I. (2017). Direct Cash Assistance. Bandung.

*name of corresponding author

Erfly, C., & Maun, F. (2020). THE EFFECTIVENESS OF DIRECT CASH ASSISTANCE FOR THE POOR AFFECTED BY COVID-19 IN TALAITAD VILLAGE, SULUUN TARERAN DISTRICT, SOUTH MINAHASA REGENCY.

Firmanto, A. (2020). SYSTEM FOR DETERMINING RECIPIENTS OF DIRECT CASH ASSISTANCE (BLT) WITH THE SAW (Simple Additive Weighting) METHOD.

Herman Firdaus, I., Abdillah, G., Renaldi, F., & Jenderal Achmad Yani Jl, U. (2016). THE DECISION SUPPORT SYSTEM FOR DETERMINING THE BEST EMPLOYEES USES THE AHP AND TOPSIS METHODS. National Seminar on Information and Communication Technology, 2089–9815.

Malabay, C. D. P. (2019).

Nugraha, B. (2020). THE DECISION SUPPORT SYSTEM IN DETERMINING THE RECIPIENTS OF THE FAMILY HOPE PROGRAM (PKH) SOCIAL ASSISTANCE USES THE MULTI-EXPERT MULTI-CRITERIA DECISION MAKING (MEMCDM) METHOD (Case Study: Sinduadi Village, Mlati District).

Pratiwi, H. (2016). Textbook: Decision Support Systems theory and implementation. Yogyakarta: Deepublish.

Riyanto, T. S. D. (2015). Information System for The Selection of Residential Houses in Housing Using the SAW Method. Science Technology, 13.

*name of corresponding author