

Decision Support System Of Provision Of Assistance To Unable Students In SMP Pab 6 Lubuk Pakam With Analytical Hierarchy Process (AHP) Method

D K Giawa¹, M Jannah²

¹Department of Informatics Engineering, STMIK Pelita Nusantara, Medan, Indonesia

²Department of Digital Business, STMIK Pelita Nusantara, Medan, Indonesia

E-mail: desicristinagiawa@gmail.co.id

Abstract. This research is based on the observations and experiences of researchers, that the provision of student assistance still does not cover all students who need it and supports the government's commitment to increase education participation rates in poor districts or cities and to remote areas. In addition, the expanded and enlarged assistance for underprivileged students will be able to suppress students from poor families/communities dropping out of school. Provision of Special Assistance for Underprivileged Students which is intended for students who are economically disadvantaged to pay school fees at SMP PAB 6 Lubuk Pakam. The number of criteria used to determine the provision of assistance makes it difficult to make decisions to assist underprivileged students. In addition, the assessment process is not always decided based on calculations that take a long time, so the determination of the provision of assistance to underprivileged students at SMP PAB 6 Lubuk Pakam still experiences many obstacles and delays. For this reason, a decision support system was built using a method that was appropriate to the existing problems. Therefore, the Analytical Hierarchy Process (AHP) method is used. This method is a framework for making effective decisions on problems by simplifying and accelerating the decision-making process by breaking the problem into its parts, arranging these parts or variables in a hierarchical arrangement, assigning numerical values to subjective judgments about the importance of each variable, and synthesizing them. these considerations determine which variable has the highest priority and act to influence the outcome of the situation. Decision Support System (DSS) with this AHP method can solve problems in determining assistance for underprivileged students. With the SPK assistance for underprivileged students so I can simplify and speed up decision making. SPK assistance for underprivileged students only provides recommendations for decisions to the school, for the next process, it is handed back to the school.

Keywords— AHP, Special Assistance, Poor Students, Decision Support System

1. Introduction

Assistance for Underprivileged Students is a National Program that aims to help underprivileged students gain access to proper educational services, prevent dropping out of school to help students meet their needs in learning activities, and support compulsory education programs. in education.



Content from this work may be used under the terms of the [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work and journal citation.

SMP PAB 6 is a school that distributes assistance to underprivileged students to help students get a proper education so far the school is still using the manual method so that the process of receiving aid to underprivileged students becomes ineffective. This is because the school takes a long time to be able to determine which students are entitled to receive assistance for the underprivileged.

In assisting underprivileged students at SMP PAB 6 Lubuk Pakam there are 5 criteria used, namely: the poor, orphans, poor cards, housing eligibility, and broken homes, these criteria will later help the school in determining which students are eligible. eligible to receive assistance from underprivileged students. The development of information technology has grown more rapidly from year to year and almost all circles of society can now feel the technology that is developing at this time. Information technology is used to process data, including processing, compiling and storing, and manipulating data in various ways to produce quality information. One application of information technology in the form of a decision support system. A decision support system is a system that can provide problem-solving and communication skills for problems with semi-structured and unstructured conditions. Many algorithms are used in building a decision support system, one of which is AHP. (Herdiansah, 2020) in his research which states that the Decision Support System for Selection of Engineering Destinations in Higher Education for Class XII Science Students Using the AHP Method states that the decision support system program is very helpful in determining majors when continuing education at the tertiary level, especially those who I want to continue my studies at the Faculty of Engineering. (Anggoro & Supriyanti, 2019) in their research entitled the application of a decision support system using the AHP method for the selection of outstanding students at SMAN Kebakkramat stated that the decision support system application program can help to select students who excel at SMAN Kebakkramat using the Lazarus IDE with a MySQL database.

2. Literature Review

2.1. Artificial Intelenge

Suparno (2019) in his research stated Artificial intelligence is a branch of computer science that studies how to use computers to simulate and extend the functions of the human brain. The correct definition for artificial intelligence is that computer systems have human knowledge and behavior with abilities such as learning, deviation, judgment, problem-solving, memory, knowledge, and understanding of human natural language and are increasingly intelligent because of the ability to learn through the introduction of big data algorithms or abilities. processing data and computing power.

2.2. Decision Support System

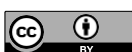
Ari Basuki and Andharini (2020) in their research stated that a decision support system is an interactive computer-based system that helps make decisions using data and models to solve unstructured problems and helps management decision making by combining data, models, and analytical tools. complex and user-friendly software into one powerful system that can support semi-structured or unstructured decision-making.

2.3. Help for Underprivileged Students

Dwika Assrani et al (2018) in their research stated that underprivileged student assistance aims to help underprivileged students to attend school and obtain services from proper education and attract students who drop out of school due to lack of funds to be able to continue school again and meet the needs in learning activities and expand access to quality primary and secondary education for students from poor/poor families

2.4. Analytical Hierarchy Process (AHP)

Luhmade and Wijaya (2019) stated that AHP is a decision-making process using pairwise comparisons to explain evaluation factors and weighting factors in multi-factor conditions.



3. Research Method

According to the results of research at the PAB 6 Lubuk Pakam Junior High School, it has been determined and agreed on the criteria and alternatives that will be used to determine underprivileged students. There are 5 criteria used, namely the Poor, Orphan Status, Poor Card, House Eligibility, Broken Home.

Table 1. beneficiary criteria

No	Kode kriteria	Kriteria	Bobot
1	K1	fakir miskin	26%
2	K2	Yatim/piatu	23%
3	K3	Kartu miskin	21%
4	K4	Kelayakan Rumah	17%
5	K5	Broken home	13%

3.1. AHP Method Analysis

1. Determining the Priority of Pairwise Comparison Matrix Criteria At this stage, a comparison assessment is carried out between one criterion and another. The subcriteria used are:

Table 2. Beneficiary Sub-criteria

No	Criteria	Sub Criteria	Bobot
1	Fakir Miskin	Miskin	5
		Kurang mampu	3
		Mampu	1
2	Yatim/piatu	Yatim	3
		Tidak yatim	2
		bersama saudara/wali	1
3	Kelayakan rumah	Layak huni	1
		Tidak layak huni	3
		Keadaan rumah sedang	5
4	Broken Home	Broken home	3
		Tidak broken home	2
		Mengalami masalah	1
5	Kartu Miskin	Memiliki kartu	5
		Tidak memiliki Kartu	1

2. Create a Criteria Paired Comparison Matrix

The pairwise comparison process will take the form of a matrix. This paired comparison stage will be used when looking for or calculating the weight of each criterion and the weight of each alternative for each assessment criterion. The steps taken to form a pairwise comparison matrix are: Determining the importance value of each criterion The results of the importance of each importance can be seen in the following table:



Table 3. Paired Criteria Score

No	Criteria	Intensity	Description
1	Fakir miskin	5	This element is the main determinant of receiving assistance for the underprivileged
2	Yatim /piatu	4	This one element is the second condition for receiving assistance for the underprivileged
3	Kartu miskin	3	This one element is the third condition in receiving assistance for the underprivileged
4	Kelayakan Rumah	2	This element is a consideration in determining underprivileged recipients of assistance
5	Broken home	1	This element is a complementary factor for the beneficiary

then do each comparison of the row criteria values against the column criteria values

There is also a normalized pairwise comparison matrix calculation in the following way:

First row: K1 : $1/1 = 1$

$1/2 = 0.5$

$1/3 = 0.3$

$1/4 = 0.25$

$1/5 = 0.2$

Next, do the matrix calculations up to column 5 in the same way. Then to find the column number in the table, it is obtained from the results of adding to each column as follows:

Number of first column : $1+0, 5+0, 3+0, 25+0, 2 = 2.25$

Next, add another column to get the value of each column in the same way, as shown in the following table:

Table 4. Beneficiary Pairwise Comparison Matrix

Criteria	K1	K2	K3	K4	K5
K1	1	2	3	4	5
K2	0.5	1	1.5	2	2.5
K3	0.3	0.6	1	1.3	1,6
K4	0.25	0.5	1	1	1.25
K5	0.2	0.4	0.6	0.8	1
Amount	2.25	4.5	7.1	9.1	11.35

The Criteria value matrix is obtained from the results of the number of

$K1 = 0.0444 / 0.422 / 0.439 / 0.442 = 2.189$ and performs calculations until K5

Table 5. Matrix of Criteria Normalization Value

Criteria	K1	K2	K3	K4	K5	Amount
K1	0.444	0.444	0.422	0,439	0,440	2.189
K2	0.222	0.222	0.211	0,219	0,220	1.094
K3	0.133	0.133	0.140	0,142	0,140	0.688
K4	0.111	0.111	0.140	0,109	0,110	0.581
K5	0.088	0.088	0.084	0,087	0,088	0.435

3. The following table shows the results of the multiplication of underprivileged student aid recipients, a value above 0.3 is said to be feasible and below 0.3 is said to be inappropriate.



Table 6. Beneficiary Multiplication Result

No	Alternatives	No induk	Amount
1	Rino	20490	0,494
2	Julinta	20424	0,501
3	Putri	20482	0,157
4	intan	20423	0,330
5	Ikmal	20470	0,143

Table 7. Student Recipient Data

No	Alternatives	No induk	Description
1	Rino	20490	worthy
2	Julinta	20424	worthy
3	Putri	20482	worthy
4	intan	20423	worthy
5	Ikmal	20470	worthy

3.2. UseCase Diagram

Use case or use case diagram is a model for the behavior (behavior) of the information system to be made. The use case describes an interaction between one or more actors with the information system to be created. Below is a use case diagram model on a decision support system assisting underprivileged students

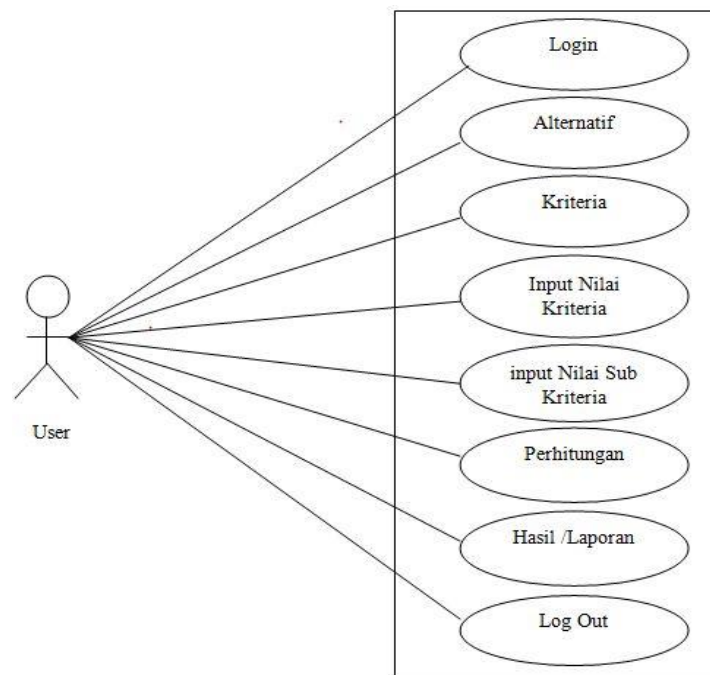


Figure 1. UseCase Diagram



4. Result and Discussion

The decision process is carried out through the user interface of the system. The system start page can be seen in the explanation below:

4.1. User Interface



Figure 2. Login

The picture above describes the login page display, where the admin inputs the username and password, to enter the system.

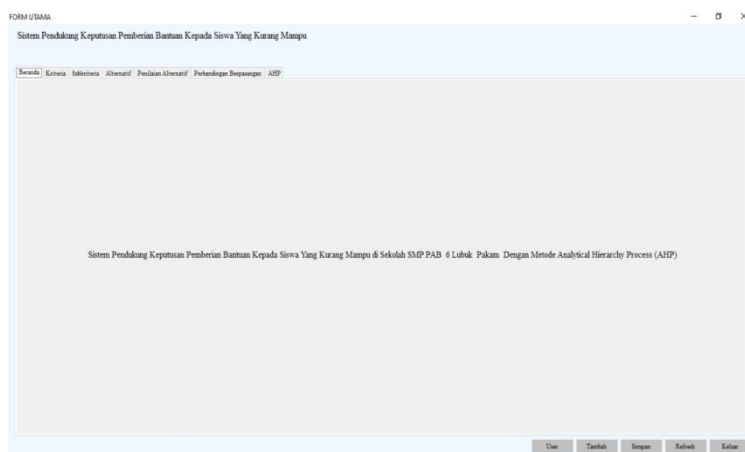


Figure 3. Main Form

On the main page, there are several menus including the Home Menu, Criteria, Sub-criteria, Alternative, Alternative Assessment, Pairwise Comparison, and AHP Calculation Results, where the admin can process the data according to system needs



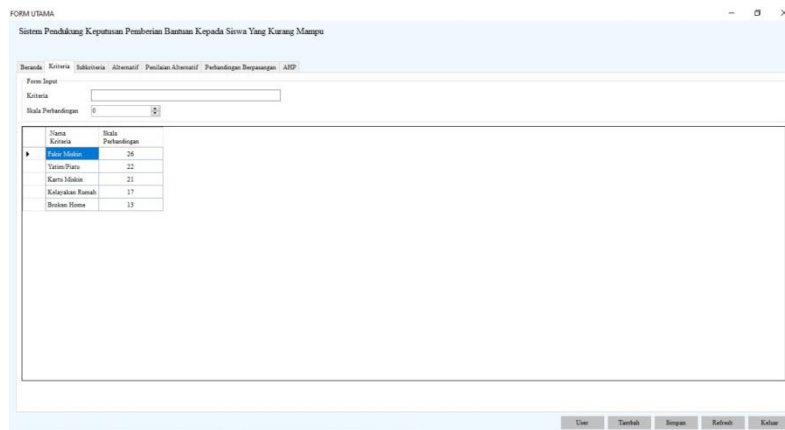


Figure 4. Criteria Form

On the criteria page, the admin can process criteria data such as adding, deleting, and editing the criteria data.

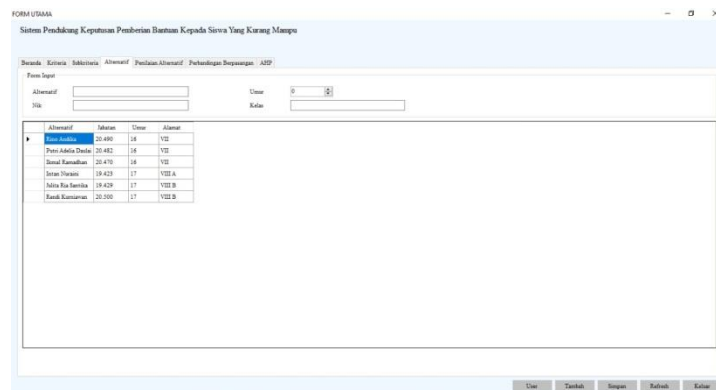


Figure 5. Alternative Form

The alternative page displays student data which is a sample calculation. In this menu, the admin can also process the data according to system needs.

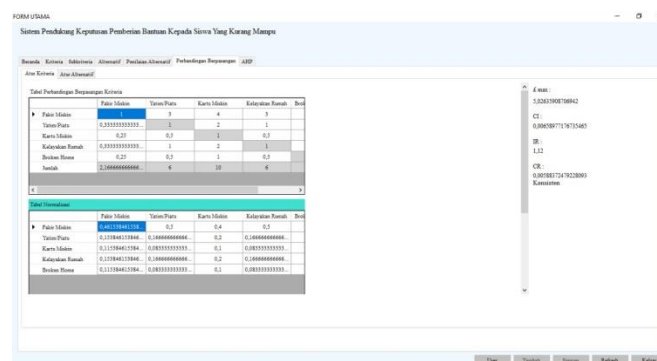


Figure 6. Comparison Form

On the comparison page, admins can pair comparisons between criteria with criteria, and alternatives with alternatives.



No	Nama Siswa	Nilai Rata-Rata	Status	Tingkat
1	Rani Laila	61,24	Tidak Berprestasi	1
2	Mika Ra Nurita	62,27	Tidak Berprestasi	1
3	Rani Kusuma	62,73	Tidak Berprestasi	1
4	Dani Ramadhani	63,73	Tidak Berprestasi	1
5	Isma Nurani	62,22	Tidak Berprestasi	1
6	Prita Anisa Devita	61,22	Tidak Berprestasi	1

Figure 7. Result Form

These results display the results of calculations using the AHP method

5. Conclusion

The application of the AHP method in the decision support system for assisting students of SMP PAB 6 Lubuk Pakam, of the 6 students who became the sample, none of them deserved assistance or as recipients of assistance. This system can be easily used by the SMP PAB 6 Lubuk Pakam school .In performing system calculations by automatically quickly displaying the calculation results. System user data can be automatically stored/backed up by the database. In updating data on the system still manually if you want to update data.

6. References

- [1] A. S., Rosa dan Shalahuddin, M. 2013. *Rekayasa Perangkat Lunak Terstruktur Dan Berorientasi Objek*. Bandung: Informatika.
- [2] Affandi, E., & Syahputra, T. (2018). Pemodelan Uml Manajemen Sistem Inventory. *Jurnal Teknologi Sistem Informasi Dan Sistem Komputer TGD*, 1(2), 14–25.
- [3] A. I., Rohaniah², Sulistiani³, H., & Priandika⁴, A. T. (2019). Sistem Pendukung Keputusan Untuk Pemilihan Tempat Servis Komputer di . *Jurnal Teknokompak* .
- [4] Anggoro, D. A., & Supriyanti, W. (2019). Aplikasi Sistem Pendukung Keputusan dengan Metode AHP untuk Pemilihan Siswa Berprestasi di SMAN Kebakkramat. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat UNSIQ*, 6(3), 163–171. <https://doi.org/10.32699/ppkm.v6i3.777>
- [5] Assrani¹, D., Huda¹, N., Sidabutar¹, R., Saputra², I., & Sulaiman³, O. K. (2018). Penentuan Penerima Bantuan Siswa Miskin Menerapkan Metode Multi . *Jurnal Riset Komputer (JURIKOM)* .
- [6] Basuki, A. , & Cahyani, D, A. 2020. sistem pendukung keputusan. group penerbit CV BUDI, Yogyakarta.
- [7] Gustina¹, D. (2017). SISTEM PENUNJANG KEPUTUSAN PEMILIHAN ROUTER MIKROTIK . *JURNAL ILMIAH FIFO* .
- [8] Habibi, I., & Maulana S.I.P., M. A. (2018). Implementasi Pelayanan Sosial Fakir Miskin
- [9] Herdiansah, A. (2020). Sistem Pendukung Keputusan Referensi Pemilihan Tujuan Jurusan Teknik Di Perguruan Tinggi Bagi Siswa Kelas Xii Ipa Menggunakan Metode Ahp. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, 19(2), 223–234. <https://doi.org/10.30812/matrik.v19i2.579>
- [10] Heriyanto, Y. (2018). Perancangan Sistem Informasi Pada PT.APM Rent Car. *Jurnal Intra-Tech*, 2(2), 64–77.
- [11] Putra, D. W. T., & Andriani, R. (2019). Unified Modelling Language (UML) dalam Perancangan Sistem Informasi Permohonan Pembayaran Restitusi SPPD. *Jurnal Teknoif*, 7(1), 32.



- [12] Ridwan, N. (2017). STRATEGI KOMUNIKASI DAKWAH YAYASAN WAHYU .
- [13] Rohaeni1, N. E., & Saryono2, O. (2018). Implementasi Kebijakan Program Indonesia Pintar (PIP). *Indonesian Jurnal Of Education Management & Administration Review* .
- [14] Septilia1, H. A., & Styawati2. (2020). Sistem Pendukung Keputusan Pemberian Dana . *Jurnal Teknologi Dan Sistem Informasi (JTSI)* .
- [15] Suparno, P. (2019). Menyikapi Penggunaan Artificial Intelligence (AI, Kecerdasan Buatan) Dalam Pendidikan Fisika. *Seminar Pendidikan Nasional*, 1–12.
- [16] Asril, V. (2018). Sistem Pendukung Keputusan Pemilihan Penerimaan . *Journal Of Information Technology And Computer Science* .
- [17] Wiliani, N., & Fahmi, A. (2017). Digital Menu Pada X Cafe Berbasis Desktop Graphical User. *Jurnal Rekayasa Informasi* .
- [18] Yulyantari, M. L. , & Wijaya, P, I. 2019 Manajemen Model Pada Sistem Pendukung Keputusan, Penerbit Andi. Yogyakarta.

