

## Article

# Decision Support System for Muhammadiyah Pekuncen Islamic Junior High School in Determining Excellent Students Using the AHP Method

Felinda Aprilia Rahma<sup>1</sup>, Faoziyah Fahiya Diniyati<sup>2</sup>, Septi Oktaviani Nur Hidayah<sup>3</sup>, Imam Tahyudin<sup>4\*</sup>

<sup>1,2,3,4</sup>Department of Informatics, Faculty of Computer Science, Amikom Purwokerto University, Indonesia

\* Corresponding Author: [imam.tahyudin@amikompurwokerto.ac.id](mailto:imam.tahyudin@amikompurwokerto.ac.id)

## Abstract:

Muhammadiyah Pekuncen Islamic Junior High School is one of the Islamic Junior High Schools in the Banyumas Regency area, where each year determines superior students and gets a 50% tuition discount for these students to motivate students to become even better. Excellent students are students with high achievement, noble character, and good behavior. Determination of superior students at Muhammadiyah Pekuncen Islamic Junior High School is still done manually, namely by deliberation between the teacher council, which results in differences of opinion. Therefore we need a system that can determine superior students reasonably without taking sides with any party and can be accepted by teachers and students. This study will produce data on students selected to be superior with five criteria, including attitude, attendance, social, activity, and achievement, based on the AHP algorithm process. A Decision Support System using the Analytical Hierarchy Process method produces accurate values in determining superior students at Muhammadiyah Pekuncen Islamic Junior High School with a total value of 0.4464. a class IX student named Seftria Salsabila Putri was selected as an excellent student.

**Keywords:** Excellent Student, Decision Support System, AHP Method, selection process, Data Collection



**Citation:** Felinda.A.R, Faoziyah.F.D, Septi O.N.H, Imam, T, "Implementation of the FP-Growth Algorithm in Sales Transactions for Menu Package Recommendations at Warung Oemah Tani". *Iota*, 2022, ISSN 2774-4353, Vol.02, 02, <https://doi.org/10.31763/iota.v2i2.564>

Academic Editor : P.D.P.Adi

Received : April, 06 2022

Accepted : April, 15 2022

Published : May, 20 2022

**Publisher's Note:** ASCEE stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by authors. Licensee ASCEE, Indonesia. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

## 1. INTRODUCTION

Muhammadiyah Pekuncen Islamic Junior High School is one of the Islamic Junior High Schools in the Banyumas Regency area. There is learning that involves a teacher educating his students in the process of self-maturity in the form of delivering material both in theory and practice. The teaching that is done is to develop cognitive abilities and be effective. To motivate students Muhammadiyah Pekuncen Islamic Junior High School provides 50% tuition discount relief to the best students. But for now, the determination of these students is still manually, namely by deliberation between the teacher council, which results in differences of opinion. So it requires a Decision Support System (SPK) to determine superior students. A Decision Support System (DSS) is a program of problem-solving skills that provides solutions to a decision in both structured and unstructured circumstances [1]; the existence of DSS has helped a lot of human work in various fields, not least in the field of education. The

process of determining superior students at Muhammadiyah Pekuncen Islamic Junior High School is still manual, and errors often occur. In addition, the problem is that the determination process is still slow and does not have new criteria; using the average value method results in the importance of the requirements being neglected. The closeness of students, parents, and teachers makes it not objective to give assessments to students. Therefore using SPK can help these Islamic Junior High schools provide solutions to make decisions. Decision support systems involve the interaction of intelligence between humans and computer intelligence to correct a decision.

Similar research has been carried out by [2], namely, analysis using the Simple Additive Weighting method. Then concerning the assessment based on predetermined criteria, namely having a noble character, being active in class, having the highest report card grades, being absent, and being responsible. The highest score will be the best student. Thus, to determine the best student, it is not enough to take the academic assessment into account but also to take into account the non-academic assessment.

Based on the problems and analysis that has been done, the research team selected and designed a decision support system (DSS) using the Analytical Hierarchy Process (AHP) method. This method is considered the most appropriate and structured to manage and analyze complex decisions mathematically and assist in determining the priority weight of class distribution.

## 2. THEORY

Research that discusses a similar theme has been conducted by Eka Mala Sari [3] entitled "*Decision Support System of Poor Community Category in Sampang District using AHP (Analytical Hierarchy Process)*." The AHP method is applied to a decision-making system to categorize the poor based on electricity criteria, the number of dependents in the family, the type of wall, and the land area of the house. And it can be used by the Central Bureau of Statistics to distribute government assistance to which is categorized as poor. Then the results obtained are that the method has proven to be effective and appropriate for identifying the poor and helping the Bureau Statistics Center Administrator.

In addition, research was conducted by Rudi Hermawan [4] entitled "*Decision Support System For The Best Employee Selection Recommendation Using Ahp (Analytic Hierarchy Process) Method*." It aims to assist the company in determining the best employees in the company. The method used is the Fuzzy Analytical Hierarchy Process(AHP) because it is considered the most appropriate for choosing the best employees. By using the AHP method, the research was proven to produce the highest rank of 440 points for the best employee named Bambang Wijaya.

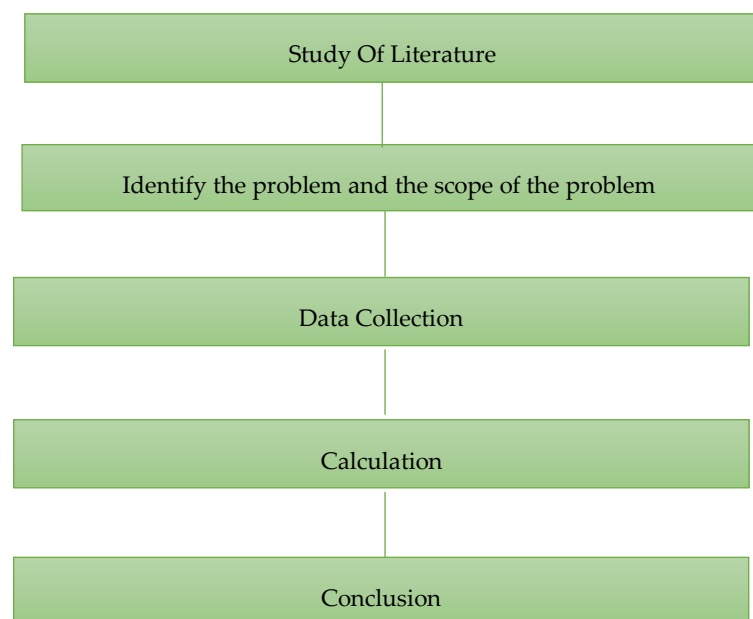
Further research conducted by Imam Tahyudin et al.[5] with the title "*Decision Support System for the Selection of Islamic Boarding Schools in Purwokerto*." The Analytical Hierarchy Process(AHP) is used to develop a prototype system and basic visual programming language. This research concluded that an SPK had

been built and designed to select Islamic boarding schools in Purwokerto using the AHP method used by STAIN Purwokerto students. In addition, the reports obtained are in the form of criterion value data, sub-criteria values, and data on the STAIN Purwokerto Islamic boarding school, which may be needed and needed at any time through the application.

### 3. RESEARCH METHOD

In this study, the descriptive analytical method is used by presenting the results survey in the form of a questionnaire, which helps provide an overview of an object under study. Next, the data will be processed using the AHP method (Analytic Hierarchy Process), a functional hierarchy where the main input comes from human perception. The application of AHP in this study was to determine the best students at MTs Muhammadiyah Pekuncen.

Furthermore, the stages that took place in this study began with collecting library data, determining the problem, selecting criteria, computing AHP, calculating data using Ms. Excel, and the latter concluding. The stages of the research are described in the following chart in figure 1.



**Fig 1.** Research stage

A research team carried out the literature study in this study by collecting data via the internet, literature books, journals, and articles so that the information obtained was accurate and could be used to complement research data needs.

The research team found solutions to problems by explaining the difficulties encountered and measuring and relating them to this research. Then, Before determining the criteria, the writing team decided on choices from the results of the Principal's questionnaire, Class IX Homeroom Teacher, Guidance Teacher, and Religion Teacher. Based on the data collected, 22 superior student candidates were produced, as following in table 1.

**Table 1.** Featured student candidates

| No. | Initials | Name                      |
|-----|----------|---------------------------|
| 1.  | A01      | Adriansyah Asta Nugraha   |
| 2.  | A02      | Alfi Salsa Bila           |
| 3.  | A03      | Alfiatun Nisa             |
| 4.  | A04      | Andin Junika Laily        |
| 5.  | A05      | Angga Saputra             |
| 6.  | A06      | Anshit Bima Ittiba        |
| 7.  | A07      | Arli Bagus Prasetio       |
| 8.  | A08      | Cesa Riaputri             |
| 9.  | A09      | Emira Asna Noura Setiawan |
| ... | ...      | ...                       |
| 22. | A22      | Wafadhan Fariz Akhyar     |

Furthermore, to determine excellent students, criteria are defined as a comparison as following in table 2.

**Table 2.** Criteria for superior student

| No. | Criteria Name | Initials | Information |
|-----|---------------|----------|-------------|
| 1.  | Kriteria 1    | K1       | Attitude    |
| 2.  | Kriteria 2    | K2       | Presence    |
| 3.  | Kriteria 3    | K3       | Social      |
| 4.  | Kriteria 4    | K4       | Liveliness  |
| 5.  | Kriteria 5    | K5       | Performance |

In this stage, calculations are carried out using the AHP method with the following steps:

- Calculating paired matrices
- Calculating the normalization of the pairwise comparison matrix
- Calculating the max eigenvalue and testing the consistency index and
- Consistency ratio on each criterion. With the following formula :

$$CI = \frac{(\lambda_{\max} - n)}{(n-1)} CR = \frac{CI}{RI} \quad (1)$$

CR: Consistency Ratio

CI: Consistency Index

IR: Random Consistency Index

The Random Consistency Index in this study is based on the IR values as follows:

**Table 3.** Random Index Values

| Size Matriks | Indeks Random |
|--------------|---------------|
| 1,2          | 0,00          |
| 3            | 0,58          |
| 4            | 0,90          |
| 5            | 1,12          |
| 6            | 1,24          |
| 7            | 1,32          |
| 8            | 1,41          |
| 9            | 1,45          |
| 10           | 1,49          |
| 11           | 1,51          |
| 12           | 1,48          |
| 13           | 1,56          |
| 14           | 1,57          |
| 15           | 1,59          |

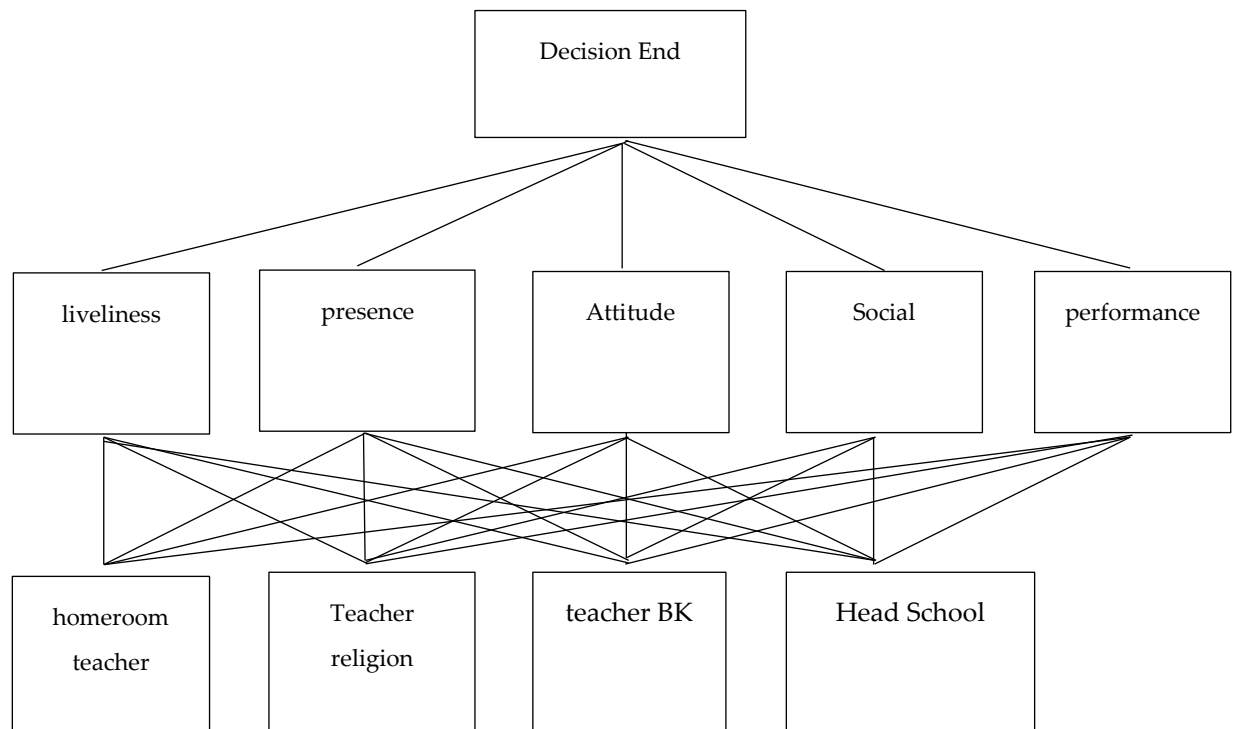
Determining the intensity of interest between criteria is based on the decision maker's policy through the level of importance of one element with another element. Pairwise comparison process, starting with the lowest level of the hierarchy.

**Table 4.** Intensity of interest

| Intensity Interest | Information                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------|
| 1                  | Both elements are equally important.                                                                    |
| 3                  | One element is slightly more important than the other elements.                                         |
| 5                  | One element is more important than the other elements.                                                  |
| 7                  | One element is more essential than the other elements                                                   |
| 9                  | One element is more important than the others.                                                          |
| 2,4,6,8            | Compromise value between the values above.                                                              |
| Kibd               | If, for an activity, I get one point compared to activity j, then j gets the opposite value compared to |

This study resulted in a decision support system to select the best students at MTs Muhammadiyah Pekuncen using the AHP method based on data taken in the field.

Furthermore, In the first stage, determine the hierarchical structure as the Figure 2.



**Fig 2.** AHP hierarchical structure

#### 4. RESULT AND DISCUSSION

This decision was taken by four decision-makers and 22 students of class IX at Muhammadiyah Pekuncen Islamic Junior High School. By applying the AHP concept, decisions are taken optimally and without taking sides with any party. Therefore, the selection of the best students can be made relatively. Furthermore, it will be explained from each of the criteria that are the conditions for determining superior students in Table 5.

**Table 5.** Global comparison matrix

| Parameter  | Attitude | Presence | Social | Liveliness | Performance |
|------------|----------|----------|--------|------------|-------------|
| Attitude   | 1        | 1        | 3      | 5          | 5           |
| Presence   | 1        | 1        | 1      | 1          | 1           |
| Social     | 0,33     | 1        | 1      | 3          | 3           |
| liveliness | 0,2      | 1        | 0,33   | 1          | 5           |

| Parameter   | Attitude | Presence | Social | Liveliness | Performance |
|-------------|----------|----------|--------|------------|-------------|
| Performance | 0,2      | 1        | 0,33   | 0,2        | 1           |
| Amount      | 2,73     | 5        | 5,67   | 10,20      | 15          |

**Table 6.** Criteria matrix

| Parameter   | Attitude | Presence | Social | liveliness | Performance | Jumlah | Prioritas |
|-------------|----------|----------|--------|------------|-------------|--------|-----------|
| Attitude    | 0,37     | 0,20     | 0,53   | 0,49       | 0,33        | 1,92   | 0,38      |
| Presence    | 0,37     | 0,20     | 0,18   | 0,10       | 0,07        | 0,91   | 0,18      |
| Social      | 0,12     | 0,20     | 0,18   | 0,29       | 0,99        | 0,99   | 0,20      |
| liveliness  | 0,07     | 0,20     | 0,06   | 0,10       | 0,76        | 0,76   | 0,15      |
| Performance | 0,07     | 0,20     | 0,06   | 0,02       | 0,42        | 0,42   | 0,08      |

**Table 7.** Finding the CR value

| Parameter   | Jm per brs | Priority | Results |
|-------------|------------|----------|---------|
| Attitude    | 2,32       | 0,38     | 2,70    |
| Presence    | 1,00       | 0,18     | 1,18    |
| Social      | 1,20       | 0,20     | 1,40    |
| liveliness  | 0,87       | 0,15     | 1,03    |
| Performance | 0,43       | 0,08     | 0,52    |

Based on Tables 6 and 7, calculations obtained:

- Sum (number of result columns) = 6.82
- Number of criteria  $n = 5$
- $\max(\text{sum}/n) = 1.36$
- CI value  $((\max - n) / n) = -0.91$
- CR value  $(CI/IR) = -0.81$  Nilai CR  $(CI / IR) = -0,81$

Because the CR value is -0.91 and  $<0.1$ , it can be concluded that the consistency ratio of the calculation is acceptable.

Furthermore, the criteria for achieving students can be seen from several parameters in Table 8-12, and the best student attitude criteria can be seen in Table 8, then the level of student attendance is shown in Table 9.

**Table 8.** Attitude Criteria Matrix

| Indicator | Good | Enough | Less | Σrow | Priority |
|-----------|------|--------|------|------|----------|
| Good      | 0,59 | 0,57   | 0,63 | 1,78 | 0,59     |
| Enough    | 0,29 | 0,29   | 0,25 | 0,83 | 0,28     |
| Less      | 0,12 | 0,14   | 0,13 | 0,39 | 0,13     |

**Table 9.** Matrix of Attendance Criteria

| Indicator | Good | Enough | Less | $\Sigma$ row | Priority |
|-----------|------|--------|------|--------------|----------|
| Good      | 0,61 | 0,57   | 0,70 | 1,88         | 0,63     |
| Enough    | 0,30 | 0,29   | 0,20 | 0,79         | 0,26     |
| Less      | 0,09 | 0,14   | 0,10 | 0,33         | 0,11     |

**Table 10.** Matrix of Social Criteria

| Indicator | Good | Enough | Less | $\Sigma$ row | Priority |
|-----------|------|--------|------|--------------|----------|
| Good      | 0,68 | 0,69   | 0,64 | 2,01         | 0,67     |
| Enough    | 0,22 | 0,23   | 0,27 | 0,73         | 0,24     |
| Less      | 0,10 | 0,08   | 0,09 | 0,26         | 0,09     |

**Table 11.** Matrix of Activeness Criteria

| Indicator | Good | Enough | Less | $\Sigma$ row | Priority |
|-----------|------|--------|------|--------------|----------|
| Good      | 0,65 | 0,69   | 0,56 | 1,90         | 0,63     |
| Enough    | 0,22 | 0,23   | 0,33 | 0,78         | 0,26     |
| Less      | 0,13 | 0,08   | 0,11 | 0,32         | 0,11     |

**Table 12.** Matrix of Achievement Criteria

| Indicator | Good | Enough | Less | $\Sigma$ row | Priority |
|-----------|------|--------|------|--------------|----------|
| Good      | 0,67 | 0,69   | 0,60 | 1,96         | 0,65     |
| Enough    | 0,22 | 0,23   | 0,30 | 0,75         | 0,25     |
| Less      | 0,11 | 0,08   | 0,10 | 0,29         | 0,10     |

They are, furthermore, Calculating the final result by multiplying the value of each criterion by the global criteria, shown in tables 13 and 14.

**Table 13.** Priority Values per criteria

| Priority criteria |          |        |            |             |
|-------------------|----------|--------|------------|-------------|
| attitude          | presence | social | liveliness | performance |
| 0,38              | 0,18     | 0,2    | 0,15       | 0,08        |

**Table 14.** Priorities per sub-criteria

| Priority sub-criteria |          |        |            |             |
|-----------------------|----------|--------|------------|-------------|
| attitude              | presence | social | liveliness | performance |
| B                     | B        | B      | B          | B           |
| 0,59                  | 0,63     | 0,67   | 0,63       | 0,65        |
| C                     | C        | C      | C          | C           |
| 0,28                  | 0,26     | 0,24   | 0,26       | 0,25        |
| K                     | K        | K      | K          | K           |
| 0,13                  | 0,11     | 0,09   | 0,11       | 0,10        |

**Table 15.** Questionnaire Results

| No. | Student | K1 | k2 | K3 | K4 | K5 |
|-----|---------|----|----|----|----|----|
| 1   | A01     | K  | C  | K  | C  | K  |
| 2   | A02     | C  | C  | C  | C  | K  |
| 3   | A03     | K  | B  | C  | C  | C  |
| 4   | A04     | C  | B  | B  | C  | C  |
| 5   | A05     | K  | C  | C  | C  | K  |
| 6   | A06     | C  | C  | C  | C  | K  |
| 7   | A07     | K  | C  | K  | C  | K  |
| 8   | A08     | C  | B  | C  | C  | C  |
| 9   | A09     | K  | C  | K  | K  | K  |
| ... | ...     |    |    |    |    |    |
| 22  | A22     | K  | C  | K  | K  | K  |

**Table 16.**Final calculations

| No. | Student | K1     | K2     | K3    | K4     | K5    |
|-----|---------|--------|--------|-------|--------|-------|
| 1.  | A01     | 0,0494 | 0,0486 | 0,018 | 0,039  | 0,008 |
| 2.  | A02     | 0,1064 | 0,0486 | 0,048 | 0,039  | 0,008 |
| 3.  | A03     | 0,0494 | 0,1152 | 0,048 | 0,039  | 0,02  |
| 4.  | A04     | 0,1064 | 0,1152 | 0,134 | 0,039  | 0,02  |
| 5.  | A05     | 0,0494 | 0,0486 | 0,048 | 0,039  | 0,008 |
| 6.  | A06     | 0,1064 | 0,0486 | 0,048 | 0,039  | 0,008 |
| 7.  | A07     | 0,0494 | 0,0486 | 0,018 | 0,039  | 0,008 |
| 8.  | A08     | 0,1064 | 0,1152 | 0,048 | 0,039  | 0,02  |
| 9.  | A09     | 0,0494 | 0,0486 | 0,018 | 0,0165 | 0,008 |
| ... | ...     |        |        |       |        |       |
| 22. | A22     | 0,0494 | 0,0486 | 0,018 | 0,0165 | 0,008 |

## 5. CONCLUSIONS

Based on this research, it can be concluded that the Decision Support System can simplify and help work become faster and more efficient in determining superior students who previously were still manual. The calculation of the Decision Support System to determine excellent students using the Analytical Hierarchy Process (AHP) method can produce accurate results. The results obtained were 0.4464 for the superior student of class IX named Seftria Salsabila Putri at Muhammadiyah Pekuncen Islamic Junior High School.

## AUTHOR CONTRIBUTIONS

Conceptualization Felinda Aprilia Rahma [F.A.R], Faoziyah Fahiya Diniyati [F.F.D], Septi Oktaviani Nur Hidayah [S.O.N.H], Imam Tahyudin [I.T];

methodology; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; validation; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; formal analysis; [F.A.R],[F.F.D],[S.O.N.H],[I.T] investigation; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; data curation; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; writing—original draft preparation; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; writing—review and editing; [F.A.R],[F.F.D],[S.O.N.H],[I.T]; visualization; [F.A.R],[F.F.D],[S.O.N.H],[I.T], supervision project administration; [F.A.R],[F.F.D],[S.O.N.H],[I.T] funding acquisition; [F.A.R],[F.F.D],[S.O.N.H],[I.T], have read and agreed to the published version of the manuscript.

## ACKNOWLEDGMENTS

Thank you to the research team at the Department of Informatics, Faculty of Computer Science, Amikom Purwokerto University, Indonesia

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

1. F. H. Aminuddin, A. R. Riyanda, and T. Djauhari, "Sistem Pendukung Keputusan Penentuan Wali Kelas Berdasarkan Prestasi Guru Dengan Metode Analytical Hierarchy Process (AHP) Berbasis Web," *J. Media Inform. Budidarma*, vol. 6, no. 1, p. 728, 2022, doi: 10.30865/mib.v6i1.3461.
2. E. Pratama, L. S. Dewi, and T. Prihatin, "Sistem Penunjang Keputusan Penentuan Siswa Terbaik Dengan Menggunakan Metode Weighted Product," *J I M P - J. Inform. Merdeka Pasuruan*, vol. 5, no. 2, pp. 7–11, 2021, doi: 10.37438/jimp.v5i2.262.
3. E. Rochman et al., "Decision Support System of Poor Community Category in Sampang District using AHP (Analytical Hierarchy Process)," pp. 16–23, 2019, doi: 10.4108/eai.24-10-2018.2280560.
4. 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.
5. N. A. Fitriani and I. Tahyudin, "Pesantren di Purwokerto (Studi Kasus : Mahasiswa Stain Purwokerto)," *Semin. Nas. Inform.*, pp. 509–513, 2015.
6. M. Rohandi, M. Y. Tuloli, and R. T. Jassin, "Priority Determination of Underwater Tourism Site Development in Gorontalo Province using Analytical Hierarchy Process (AHP)," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 306, no. 1, 2018, doi: 10.1088/1757-899X/306/1/012085.
7. Y. A. Singgalen and D. Manongga, "Mangrove-based Ecotourism Sustainability Analysis using NDVI and AHP Approach," *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 16, no. 2, p. 125, 2022, doi: 10.22146/ijccs.68986.
8. A. S. P. Dona Katarina, Aji Nurrohman, Wibisono, Priatno, "Decision Support System For The Best Student Selection Recommendation Using Ahp ( Analytic Hierarchy Process ) Method," pp. 1210–1217, 2021.
9. N. K. Y. Suartini, I. M. A. Wirawan, and D. G. H. Divayana, "DSS for 'E-Private' Using a Combination of AHP and SAW Methods," *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 13, no. 3, p. 251, 2019, doi: 10.22146/ijccs.46625.
10. A. D. Handayani and R. Wardoyo, "DSS for Keyboard Mechanical Selection Using AHP and Profile Matching Method," *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 15, no. 4, p. 369, 2021, doi: 10.22146/ijccs.67813.

11. Ardison, A. Ramadhanu, L. N. Rani, and S. Enggari, "Hybrid DSS for recommendations of halal culinary tourism west Sumatra," *IAES Int. J. Artif. Intell.*, vol. 10, no. 2, pp. 273–283, 2021, doi: 10.11591/ijai.v10.i2.pp273-283.
12. Z. Servini, I. Nedelkovski, and J. Servini, "Application of Ahp Based Dss for Strategic Planning of Local Sustainable Development," no. June 2011, 2011, doi: 10.13033/isahp.y2011.082.
13. L. Sabrina, F. Rakhmawati, I. Husein, and L. Sabrina, "Zero : Jurnal Sains, Matematika, dan Terapan Implementation Of Decision Selection In The Selection Of Transportation Modes Among Workers And Students In Medan City Using Ahp And Electric Methods Corresponding Author ," vol. 6, no. 1, pp. 24–31, 2022.
14. Z. Polkowski and U. J. Wyzykowski, "GDSS online dengan metode AHP untuk memudahkan pengambilan keputusan," no. April 2014, 2016.
15. S. Şahin, N. P. Alakoç, and B. Keçeci, "A DSS-based selection of solar panels for different regions of Turkey," *10th Int. Conf.* September, 2010, [Online]. Available: [https://www.researchgate.net/profile/Baris\\_Kececi/publication/287994618\\_A\\_DSS\\_BASED\\_SELECTION\\_OF\\_SOLAR\\_PANELS\\_FOR\\_DIFFERENT\\_REGIONS\\_OF\\_TURKEY/links/567bbc1908aebccc4dfddc5d/A-DSS-BASED-SELECTION-OF-SOLAR-PANELS-FOR-DIFFERENT-REGIONS-OF-TURKEY.pdf](https://www.researchgate.net/profile/Baris_Kececi/publication/287994618_A_DSS_BASED_SELECTION_OF_SOLAR_PANELS_FOR_DIFFERENT_REGIONS_OF_TURKEY/links/567bbc1908aebccc4dfddc5d/A-DSS-BASED-SELECTION-OF-SOLAR-PANELS-FOR-DIFFERENT-REGIONS-OF-TURKEY.pdf)
16. P. T. Bpr and P. Hombar, "Decision Support System for Determining Recipients of Rewards ( Bonuses ) Based on Employee Performance with the Analytical Hierarchy Process ( AHP ) Method ( Case Study ;," vol. 8, no. 4, pp. 126–131, 2020.
17. E. H. Gede Surya Mahendra, "Implementation of AHP-MAUT and AHP-Profile Matching Methods in OJT Student Placement DSS," *J. Tek. Inform. C.I.T Medicom*, vol. 1, no. 13, pp. 13–23, 2021, [Online]. Available: <https://www.medikom.iocspublisher.org/index.php/JTI/article/view/56/27>
18. R. Umar, A. Fadlil, and Y. Yuminah, "Sistem Pendukung Keputusan dengan Metode AHP untuk Penilaian Kompetensi Soft Skill Karyawan," *Khazanah Inform. J. Ilmu Komput. dan Inform.*, vol. 4, no. 1, p. 27, 2018, doi: 10.23917/khif.v4i1.5978.
19. Yulianti, I., Tahyudin, I., & Nurfaizah, N. (2014). Sistem Pendukung Keputusan Seleksi Beasiswa Pendidikan Menggunakan Metode Simple Additive Weighting. *Telematika*, 7(1). <https://ejournal.amikompurwokerto.ac.id/index.php/telematika/article/viewFile/242/217>
20. Tahyudin, I., Putra, I. M., & Syafa'at, A. Y. (2021). *Data Mining dan Data Warehouse Menggunakan Aplikasi Knime* (Vol. 1). Zahira Media Publisher.