APPLICATION SAW METHOD FOR GENERAL CHAMPION STUDENTS SMP NEGERI 3 KISARAN

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Abstract: Schools become educational institutions in supporting the teaching and learning process to increase student potential. In the world of education, determining the best students is still an obstacle that is often faced such as subjectivity assessment resulting in diverse mindsets. SMP Negeri 3 Kisaran which is located at Jalan Madong Lubis, Selawan, East Kisaran District, Asahan Regency. The process of determining the overall champion students still relies on conventional assessments by manual means so that it requires a long assessment time, assessment is also subjective, this tends to limit recognition of diverse student potential. The purpose of this study is to design a decision support system application in determining the overall champion students at SMP Negeri 3 Kisaran with specified criteria. The SAW method is used as a weighted summation method of the performance of each alternative across all attributes. The best alternative decision result as the General Champion Student of class IX in the Odd Semester of 2023/2024 at SMP Negeri 3 Kisaran is Naurah Ghaisani Lubis with a score of 0.906. Based on these results, it can help SMP Negeri 3 Kisaran in determining the overall champion students and become a reference in decision making.

Keywords: decision support system; simple addictive weighting; general champion students

Abstrak: Sekolah menjadi institusi pendidikan dalam mendukung proses belajar mengajar untuk meningkatkan potensi siswa. Dalam dunia pendidikan menentukan siswa terbaik masih menjadi kendala yang sering dihadapi seperti penilaian secara subjektivitas mengakibatkan pola pikir yang beragam. SMP Negeri 3 Kisaran yang beralamatkan di Jalan Madong Lubis, Selawan, Kecamatan Kisaran Timur, Kabupaten Asahan. Proses penentuan siswa juara umum masih mengandalkan penilaian konvensional dengan cara manual sehingga membutuhkan waktu penilaian yang cukup lama, penilaian juga bersifat subjektif, hal ini cenderung membatasi pengakuan atas potensi siswa yang beragam. Tujuan penelitian ini untuk merancang aplikasi sistem pendukung keputusan dalam menentukan siswa juara umum di SMP Negeri 3 Kisaran dengan kriteria yang ditentukan. Metode SAW digunakan sebagai metode penjumlahan terbobot dari kinerja setiap alternatif di semua atribut. Hasil keputusan alternatif terbaik sebagai Siswa Juara Umum kelas IX pada Semester Ganjil Tahun 2023/2024 di SMP Negeri 3 Kisaran adalah Naurah Ghaisani Lubis dengan nilai 0.906. Berdasarkan hasil tersebut dapat membantu pihak SMP Negeri 3 Kisaran dalam menentukan siswa juara umum dan menjadi acuan dalam pengambilan keputusan.

Kata Kunci: sistem pendukung keputusan; simple addictive weighting; siswa juara umum

INTRODUCTION

The advancement of technology and information allows the use of more sophisticated and objective data analysis methods with Using a personal computer to process data to solve a problem makes it valuable and useful for its users[1]. Technological developments in the industrial era 4.0 affect the world of education [2].

Schools become educational institutions in supporting the teaching and learning process to increase student potential. Students who have high academic and non-academic scores are designated as the best students [3].

In the world of education, determining the best students is still an obstacle that is often faced such as subjectivity assessment resulting in diverse mindsets. The application of computer-based information systems as a decision support is carried out to provide solutions to agencies [4].

SMP Negeri 3 Kisaran which is located at Jalan Madong Lubis, Selawan, East Kisaran District, Asahan Regency. The determination of the overall champion students still relies on conventional assessments by manual means so that it requires a long assessment time, assessment is subjective only based on the average score of the report card, this tends to limit the recognition of student potential.

The use of technology and Decision Support Systems is the right choice in welcoming a more inclusive education and oriented towards the overall progress of students. Thus, the importance of a decision support system in determining the overall champion students is expected to produce a generation that is competent on target [5].

The application of the SAW method in selecting outstanding students at Mustafa Private Vocational School in determining outstanding students is still done manually, decision support system using the SAW method designed display the ranking results of outstanding students based on SAW calculation [6]. In the decision support system selection of exemplary students using the method Simple Additive Weighting At SMK Telkom Purwokerto, it still depends on the assessment of each jury member, decision making using the SAW method used to determine student learning achievement quickly and accurately [7].

Application of the SAW Method for the Selection of the Best Students at SMPN 266 Jakarta Based on the Website still using report scores, decision support system expected to help make the best student decisions accurately and effectively [8]. Decision Support System Modeling Determination of the Best Students Using Methods Simple Addictive Weighting [9], Carried out by meeting the criteria of assessment programs in the academic and non-academic fields, using the SAW method to provide results of determining the best effective students.

By creating a system that can make it easier to determine the general champion students at SMP Negeri 3 Kisaran based on predetermined criteria using the SAW method as an alternative solution in this study so as to produce rankings that are in accordance with student competence and can be a reference in decision making [10].

METHOD

SAW method used to solve the problem of selecting the best alternative from a number of criteria used [11]. Rangking to find out the highest to lowest score [12]. The weighted summation method of the performance of each alternative across all attributes. The process of normalizing the decision matrix (X) on a scale that can be compared with all alternative ratings [13]. The formula used in normalization is as follows:

$$Rij = \frac{xij}{Max\ Xij}\ Benefit$$

$$ (1) $$

$$Rij = \frac{Min\ Xij}{xij}\ Cost$$

Information:
Rij   : Normalized performance rating
Max Xij : Largest criteria
Min Xij : Smallest criteria
Xij   : Criteria attribute
Benefit : Largest value.
Cost   : Smallest value.

Preference Formula :

$$Vi = \sum_{j=1}^{n} Wj.\ Rij \qquad (2)$$

Information:

Vi   : Alternate scorpion
Wj   : The value of rangking weight
Rij : Normalized performance rating

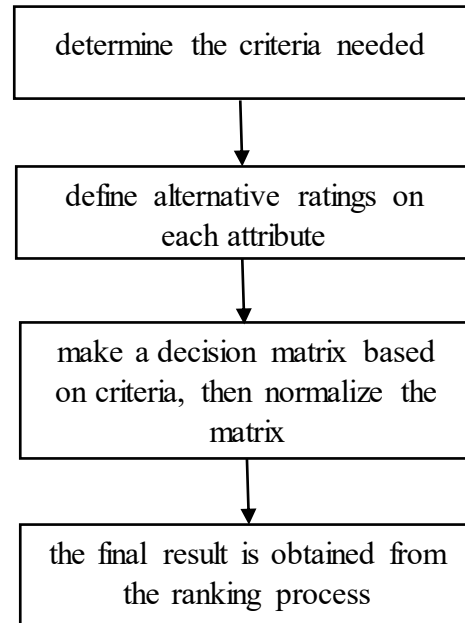The stages taken in completing this method include:

Image 1. Steps the SAW method

The following criteria data is inputted into the decision support system for determining the overall champion student of SMP Negeri 3 Kisaran. The table consists of benefits and costs which are one of the criteria in calculating SAW. where the criteria are said to be cost if the smaller the value is considered better. Likewise with benefits where the larger the value is better

Table 1. The Criteria

Code	Criterion	Weight	Normalized Weights	Information
K1	Presence	25	25/100 = 0.25	Benefit
K2	Discipline	20	20/100 = 0.20	Cost
K3	Average rating	25	30/100 = 0.25	Benefit
K4	Performance	15	15/100 = 0.15	Benefit
K5	Extracurricular	15	10/100 = 0.15	Benefit
	Total	100	1	

The calculation process of the SAW method also consists of sub-criteria along with the criteria values to determine the overall champion student. The criteria and sub-criteria values are obtained based on several aspects that have been jointly agreed upon by the teachers and principal along with existing educational regulations.

Table 2. Attendance Subcriteria

Value	Information
5	100
4	90-99
3	80-89
2	50-79
1	<50

Table 3. Disciplinary Subcriteria

Value	Information
5	100
4	90-99
3	75-89
2	50-74
1	<50

Table 4. Average Grade Subcriteria

Value	Information
5	96-100
4	90-95
3	75-89
2	51-74
1	<50

Table 5. Achievement Subcriteria

Value	Information
5	There is more than 1 in academic and non-academic
4	There are in both academic and non-academic fields

Value	Information
3	It's in academia
2	Exist in non-academic fields
1	None

Table 6. Extracurricular Subcriteria

Value	Information
5	There are more than 1 and Active
4	Existing and active
3	Presence and lack of activity
2	Existing and inactive
1	None

Determining criteria K1, K2, K3, K4, K5 is a favorable criteria, giving weight based on the importance of the criteria needed.

$$W = (5,4,5,3,3)$$

Normalization

This normalization done to calculate normalized performance rating of the alternatives above using the following formula.

$$r_{ij}= \sum \frac{\frac{X_{ij}}{Max\ X_{ij}}}{\frac{Min\ X_{ij}}{X_{ij}}} \quad \begin{matrix} \text{Benefit} \\ \text{Cost} \end{matrix} \quad (3)$$

RESULTS AND DISCUSSION

Current system still uses conventional assessment using subjective manual assessment. Implementation carried to carry out trials using the SAW method for general champion students SMP Negeri 3 Kisaran that requires several devices.

Table 7. Weight Value Data Conversion Table

Alternative	Criteria				
	K1	K2	K3	K4	K5
Naurah Ghaisani Lubis	5	5	5	2	4
M. Amadeza Zidane	4	5	4	1	1
Alif Kahdafi Syahputra	4	5	4	1	1
Fika Aulia Lubis	5	5	4	1	1
Riri Sofya Isranti	4	4	4	5	4
Cesya Agripa Cafriati Br. Hutapea	4	5	4	1	4
Naysila Kharolin Barus	5	4	4	1	1
Rafanny Aisyah Princess Harahap	4	5	4	1	1
Fadhamala Handyani	4	4	4	1	1
Dian Kurniawan	5	5	4	1	1

Table 8. Normalization of each alternative on each criteria

Alternative	Criteria				
	K1	K2	K3	K4	K5
S1	1	0.98	1	0.4	1
S2	0.80	0.98	0.80	0.2	0.25
S3	0.80	0.98	0.80	0.2	0.25
S4	1	0.98	0.80	0.2	0.25
S5	0.80	0.98	0.80	1	1
S6	0.80	0.98	0.80	0.2	1
S7	1	1	0.80	0.2	0.25
S8	0.80	0.98	0.80	0.2	0.25
S9	0.80	1	0.80	0.2	0.25
S10	1	0.98	0.80	0.2	0.25

Table 9. Alternative Assessment Results of General Champion Students

Alternative Code	Alternative	Result	Rangking
S1	Naurah Ghaisani Lubis	0.906	1
S2	M. Amadeza Zidane	0.6635	9
S3	Alif Kahdafi Syahputra	0.6635	8
S4	Fika Aulia Lubis	0.7135	5
S5	Riri Sofya Isranti	0.898	2
S6	Cesya Agripa Cafriati Br. Hutapea	0.776	3
S7	Naysila Kharolin Barus	0.7175	4
S8	Rafanny Aisyah Princess Harahap	0.6635	10
S9	Fadhamala Handyani	0.6675	7
S10	Dian Kurniawan	0.7135	6

Dashboard View

Contains menus criteria data, sub kriteria data, alternative data, assessment data, calculation data and results data.
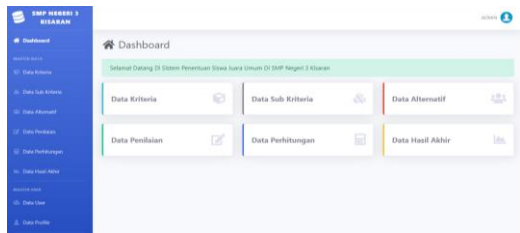

Image 2. Dashboard View

Criteria Data View

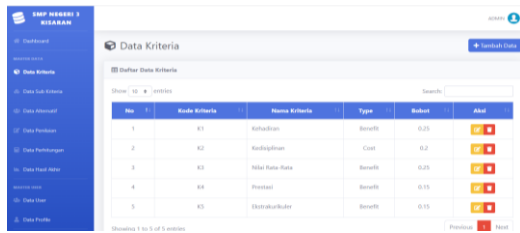Displays criteria data that can be inputted by admins and can add data, edit data and delete data.

Image 3. Criteria Data View

Sub Criteria Data View

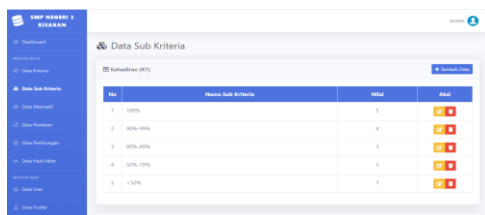Displays sub-criteria data that can be inputted by admins and can add data, edit data and delete data.

Image 4. Sub Criteria Data View

Alternate Data View

Displays alternative data can add data, edit data and delete data.
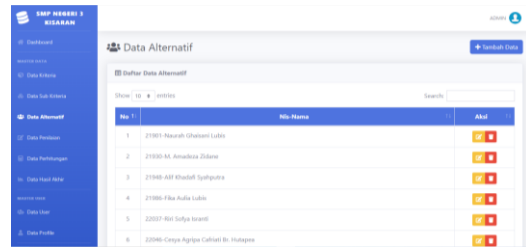
Image 5. Alternate Data View

Assessment Data View

Display assessment data on each alternative inputted by the admin and can search the data and edit the data.
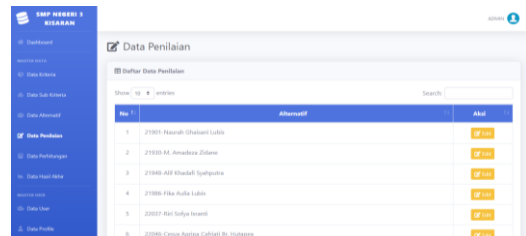
Image 6. Assessment Data View

Calculation Data Display

Displays calculation data from preference weights (W) and decision matrix (X).
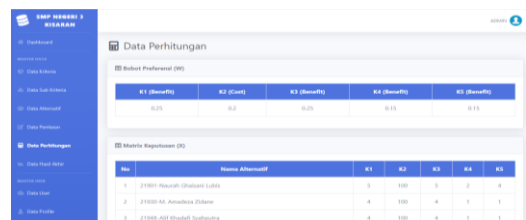

Image 7. Calculation Data Display

Final Results Data Display

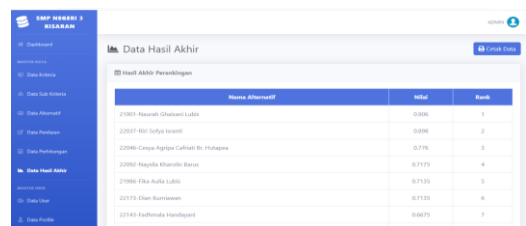Displays the final ranking result data and can print the ranking result data.

Image 8. Final Results Data Display

Print View of Reports

Displays the results of previous ranking reports.

Image 9. Print View of Reports

CONCLUSION

The Decision Support System uses the SAW method built with PHP Programming Language to get more objective results. The result of the system analysis obtained a decision on the best alternative ranking as the overall champion student at SMP Negeri 3 Kisaran is Naurah Ghaisani Lubis with a score of 0.906 become a reference in decision making. In this research it was concluded that decision making uses the SAW method was chosen as an alternative solution in determining the overall winner of class IX in the odd semester of 2023/2024 the system designed displays menus that can help the process of ranking the overall champion students.

BIBLIOGRAPHY

[1]   F. Agis, U. Batu, M. A. Sembiring, and C. Latiffani, "The Borda Method For Scoring Parking Officer In today is rapid development of technological science , the influence of information is said to be very advanced . Information systems are included in one of the technological needs in this era . Information s," vol. IX, no. 3, pp. 355–360, 2023.

[2]   A. Alimuddin, J. N. S. Juntak, R. A. E. Jusnita, I. Murniawaty, and H. Y. Wono, "Teknologi Dalam Pendidikan: Membantu Siswa Beradaptasi Dengan Revolusi Industri 4.0," *J. Educ.*, vol. 05, no. 04, pp. 36–38, 2023.

[3]   I. A. Setyani and Y. R. Sipayung, "Sistem Pendukung Keputusan Menentukan Siswa Berprestasi dengan Metode SAW (Simple Addtive Weighting)," *J. Sist. Komput. dan Inform.*, vol. 4, no. 4, p. 632, 2023, doi: 10.30865/json.v4i4.6179.

[4]   I. Kurnia, "Sistem Pendukung Keputusan Untuk Menentukan Siswa Terbaik Menggunakan Kombinasi Metode Ahp Dan Saw," *JIKO (Jurnal Inform. dan Komputer)*, vol. 4, no. 3, pp. 164–172, 2021, doi: 10.33387/jiko.v4i3.3339.

[5]   W. Saputro and A. Hafid, "Identifikasi Sistem Pendukung Keputusan Penentuan Siswa Beprestasi Menggunakan Metode Simple Additive Weighting (Saw) Pada Sma Bps&K Decision Support Identification System for Determining Student Achievement Using the Simple Additive Weighting (Saw) Metho," *J. Inf. Technol. Comput. Sci.*, vol. 5, no. 2, pp. 189–195,

2022.

[6]   M. R. Ramadhan and M. K. Nizam, "Penerapan Metode SAW (Simple Additive Weighting) Dalam Pemilihan Siswa-Siswi Berprestasi Pada Sekolah SMK Swasta Mustafa," *TIN Terap. Inform. ...*, vol. 1, no. 9, pp. 459–471, 2021, [Online]. Available: https://ejurnal.seminar-id.com/index.php/tin/article/view/655

[7]   M. Y. Fathoni, D. Darmansah, and D. Januarita, "Sistem Pendukung Keputusan Pemilihan Siswa Teladan Menggunakan Metode Simple Additive Weighting (SAW) Pada SMK Telkom Purwokerto," *J. Sisfokom (Sistem Inf. dan Komputer)*, vol. 10, no. 3, pp. 346–353, 2021, doi: 10.32736/sisfokom.v10i3.1202.

[8]   A. D. Astuti, K. F. Ramdhania, and D. Yusuf, "Penerapan Metode SAW untuk Pemilihan Siswa Terbaik pada SMPN 266 Jakarta Berbasis Web," *J. Inform. Inf. Secur.*, vol. 4, no. 1, pp. 49–64, 2023, [Online]. Available: https://ejurnal.ubharajaya.ac.id/index.php/jiforty/article/view/1299

[9]   S. Melati and G. Triyono, "Pemodelan Sistem Pendukung Keputusan Penentuan Siswa Terbaik Menggunakan Metode Simple Addictive Weighting (Saw)," *IDEALIS Indones. J. Inf. Syst.*, vol. 3, no. 2, pp. 574–580, 2020, doi: 10.36080/idealis.v3i2.2748.

[10] N. D. Apriani, N. Krisnawati, and Y. Fitrisari, "Implementasi Sistem Pendukung Keputusan Dengan Metode SAW Dalam Pemilihan Guru Terbaik," *J. Autom. Comput. Inf. Syst.*, vol. 1, no. 1, pp. 37–45, 2021, doi: 10.47134/jacis.v1i1.5.

[11] D. Librado *et al.*, "Klasterisasi penerima bantuan sosial menggunakan metode simple additive weighting," vol. 7, no. 1, pp. 30–36, 2023.

[12] Y. F. Achmad, R. K. Laday, and D. A. P. Kusuma, "Penerapan Metode Simple Additive Weighting (Saw) Pada Penilaian Kinerja Karyawan Di Pt Cirill Indonesia," *Sebatik*, vol. 25, no. 1, pp. 214–220, 2021, doi: 10.46984/sebatik.v25i1.1169.

[13] B. A. Kartiko, "Sistem Pendukung Keputusan Penentuan Penerima Beasiswa Dengan Metode Simple Additive Weighting Di Smpn 19 Tangerang," *JIKA (Jurnal Inform.*, vol. 5, no. 1, p. 41, 2021, doi: 10.31000/jika.v5i1.3662.