Journal of Computer Science Advancements, 2(2) - April 2024 99-113

Decision Support System for Determining Tutoring Institutions for SNBT Preparation Using the Weighted Product Method

Sandy Andika Maulana[1], Shabrina Husna Batubara[2], Wahyu Abadi Harahap[3], Debi Yandra Niska[4]
[1,2,3,4]Universitas Negeri Medan, Indonesia

Corresponding Author: Sandy Andika Maulana, E-mail; samsandi134@gmail.com

Article Information:
Received March 24, 2024
Revised April 3, 2024
Accepted April 12, 2024

ABSTRACT

There are several stages in choosing a state university, one of which is through the Joint Selection for State University Admission. To prepare for this, many SNBT candidates attend Learning Guidance Institutions. Learning guidance is a service or educational program designed to help students understand the subject matter taught in school. Its main goal is to improve students' academic abilities through various methods. This research aims to develop a Decision Support System (DSS) using the Weighted Product (WP) method to help choose the most appropriate Tutoring Institution. The system is designed to help parents and prospective students make decisions that suit their needs, taking into account factors such as teaching quality, facilities, and costs. With this DSS, it is hoped that the process of selecting Tutoring Institutions can be carried out more efficiently and accurately so that prospective participants can prepare themselves better to face SNBT. Based on the completed case study, the highest preference value is obtained by Adzkia (A4) with a value of 0.231, while the lowest preference value is Ganesha Operation (A1) with a value of 0.168. The results from the DSS built, and the manual calculations, show the same values.

Keywords: *Decision Support System, Learning Guidance, Weighted Product*

Journal Homepage https://journal.ypidathu.or.id/index.php/jcsa

How to cite: Maulana, A, S., Batubara, H, S., Harahap, A, W., & Niska, Y, D. (2024). Anxiety Description of Social Workers in Assisting Children in Conflict with the Law. *Journal of Computer Science Advancements*, 2(2).46-60 https://doi.org/10.70177/jsca.v2i2.1108
Published by: Yayasan Pendidikan Islam Daarut Thufulah

INTRODUCTION

Education is a comprehensive effort to develop children's intellectual capacity and personality to become better. Most major educational activities are carried out in formal schools, however, education in formal schools does not always run smoothly and does not always bring the expected results (Santoso & Rusmawati, 2019).

The level of education is one measure of a nation's progress, the better the level of education the better the quality of a nation becomes. To support the quality of learning, many academic and non-academic educational institutions have emerged. From various levels of educational institutions outside schools such as courses, tutoring, or tutoring places for prospective SBMPTN participants (Mawarni et al., 2022)

National Selection Based on Tests (SNBT) is a selection method for prospective students who wish to enter state universities. The SNBT, which will be introduced in 2023 (Sunarto et al., 2023), is a scholastic test that aims to measure the academic abilities of prospective students. This test includes several basic competency tests such as the Citizenship Insight Test (TWK), General Intelligence Test (TIU), and Personality Character Test (TKP) (Syah, 2020). This selection process is considered important to improve the quality of graduates and ensure that prospective students have the readiness to continue higher education (Permana, 2020).

Tutoring is one of the most effective alternatives that parents can use who want to provide additional courses or tutoring to their children considering that learning at school is less effective if only obtained at school, especially for students who want to continue their tertiary education so students need additional tutoring to deepen the material so that they can later graduate from higher education desired. Tutoring is an activity that involves teaching students to make them achieve maximum academic achievement or learning outcomes at the institution or place they study (Sriwahyuni Hutagalung et al., 2023).

If a person gets the right education, a better life and vast knowledge are opened up to him. Especially to prepare for your dream college. One of them is an educational institution which is a place for informal learning outside of school, namely learning that takes place outside of school for further education. Every year, educational institutions continue to develop and start in various cities with different institutional names and also in different places (Lubis & Hakim, 2023).

Joining a tutoring agency provides an alternative way to learn outside the traditional school environment. There are several reasons students choose to join this institution, including to help them prepare for the college entrance exam, or Test-Based National Selection (SNBT). Through tutoring, students can improve their overall understanding of subjects, overcome learning deficiencies, and prepare for exams. However, the information available for students and parents to choose an appropriate tutoring institution is often inadequate. Therefore, implementing a decision support system is very important to help students choose the right tutoring institution for SNBT exam preparation (Ayudya, 2024)

To prepare for this, many prospective SBMPTN participants study at Tutoring Institutions. There are several tutoring locations in the Medan area such as Ganesha Operation (GO), Nurul Fikri, Sony Sugema College (SSC), Adzkia, and Brain Academy (Mawarni et al., 2022). This makes it difficult for students to choose a suitable LBB. These institutions offer different facilities and infrastructure depending on the needs of the students. Students should choose and join a suitable tutoring institution to avoid

regrets later. Therefore, a decision support system is needed that helps students find appropriate tutoring facilities (Mustafidah & Mayasari, 2019).

Decision Support System are often used to support human decisions in various important fields, such as transportation, and infrastructure management (Guarino et al., 2023) and decision support systems are used to improve decision-making capabilities that focus on resilience resilience (Shi et al., 2024). Decision-making often involves large amounts of data and although it may seem simple, the process can be complex. To make this process easier, people use Decision Support Systems (DSS).

DSS is a system designed to solve problems effectively and efficiently. Decision-making usually considers the ratio of benefits and costs in every decision taken. Computerized DSS aims to handle various types of unstructured or semi-structured problems by providing relevant information and model analysis. The main goal of DSS is to provide the necessary tools for decision-makers so that they can solve problems using specific data and models more effectively (Gede Iwan Sudipa et al., 2022).

The Weighted Product (WP) method is a decision-making approach that uses multiplication to combine attribute ratings, where the rating of each attribute is first raised to the power of its respective weight (Supiyandi et al., 2020). This method assigns weight to each criterion to reflect the level of importance or preference of each criterion in the context of decision-making. Next, the WP method multiplies the criteria values by their weights to produce a total score for each alternative. The alternative with the highest score is considered the best solution or most desirable option in the given context (Senika et al., 2022).

WP is known as one machine learning approach used for deciding regarding solving a problem with the use of multiplication techniques to connect the attribute rating, where is the value Each attribute rating must be ranked first with the attribute weights concerned (Utomo et al., 2022)

In previous research on Decision Support Systems designed to be worn in support decision-making in printing companies Subur Graphics is a Weighted Product Method which is a decision-making method multi-criteria (Siregar et al., 2021). For instance, (Xu et al., 2023) utilized the Fuzzy Analytical Hierarchy Process (AHP) method for determining the best teaching. Similarly, (Widayati & Maria, 2020) demonstrated the Effectiveness of Management Decisions in Performance Appraisals Employees Apply the Weighted Product (WP) Method. However, to date, no studies have specifically applied the WP method for selecting tutoring institutions in the context of SNBT preparation, highlighting the novelty and significant contribution of this research.

This study aims to fill this gap by developing a DSS utilizing the WP method to help students choose tutoring institutions. The hypothesis is that the WP method can provide more accurate and preference-aligned recommendations compared to other methods. The variables investigated include teaching quality, cost, facilities, and location of the tutoring institutions. The research methods involve data collection through surveys, weight assignment to each criterion, and the implementation of the WP method to generate recommendations.

This research is based on previous research, namely research discussing the development of a Decision Support System (DSS) for selecting Tutoring Institutions using the Weighted Product (WP) approach which was studied by (Irfan et al., 2022). Later this research will be developed by looking at unsatisfactory aspects of the weighting or implementation of the system and covering more detailed areas and more specific object goals.

The background and identification of the problem have explained everything so that the problem formulation is obtained, namely "How to build a Decision Support System for determining web-based tutoring institutions using the Weighted Product method". The objectives to be achieved in writing this research include designing and building a Decision Support System for determining web-based tutoring institutions using the Weighted Product method to make it easier and prepare students and their parents to determine tutoring that suits their needs.

RESEARCH METHODOLOGY

The target population for this study comprises students in Indonesia preparing for the Seleksi Nasional Berdasarkan Tes (SNBT). A stratified sampling approach was utilized to ensure representation from various regions and backgrounds. Data was collected based on direct observation in the field by directly observing the tutoring location which is useful for gathering information on factors influencing the choice of tutoring institutions, such as teaching quality, cost, facilities, and location.

Before starting research, it is important to plan the steps that will be taken so that the research objectives can be achieved effectively. In this research, each stage was designed systematically and is displayed clearly in Figure 1.

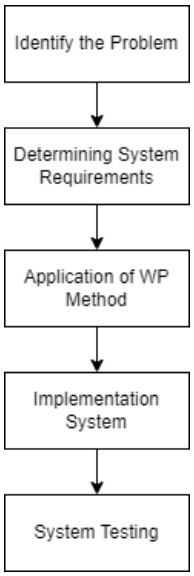


Figure 1. Stages

Based on Figure 1 above, the following is an explanation for each stage:

Identify the Problem

The initial step in this research is to clearly define the problem and identify decision criteria. This includes defining the decision problem, setting goals to be achieved, and paying attention to existing constraints (Demir et al., 2024).

Problem identification is carried out through observation and interviews to find out the problems faced by parents or prospective students in choosing a tutoring institution. The findings show that parents and students need detailed information regarding the profile and services offered by each tutoring institution. In addition, they must adapt their specific needs to the services provided by the selected Tutoring institution. This tutoring institution can take quite a long time and is complex to determine the right choice. Therefore, there is an urgent need for a system that can provide recommendations and options that suit the needs of prospective students or parents who want to enroll their children in Tutoring institutions. In this context, an effective system is needed to help users find the best tutoring institution that suits their criteria and needs.

Determining System Requirements

Analyzing requirements is determining with certainty whether stated requirements are unclear, solving problems that arise, ensuring requirements are complete, and so on (Gunawardhana, 2019). This stage is very important to explore and identify essential needs to solve problems that have been identified from the results of the previous analysis. Here, detailed statements will be prepared about the functions that the system must have to overcome the challenges faced by users. By identifying needs in detail, it is hoped that the resulting solution can provide effective and relevant support for users in solving problems. In other words, this stage will produce the specifications and facilities needed in the development system.

Application of the Weighted Product (WP) Method

The Weighted Product (WP) method is an approach to multi-criteria decision-making that assesses performance based on multiplying the value of each attribute and its respective weight. This method is known for its efficiency and ease of calculation, as well as the ability to normalize weights so that it can handle weights that have similar values. The Weighted Product method has the advantage of being simple and easy to understand. However, this method also has weaknesses, namely that it is very sensitive to changes in weights and data order. Therefore, care is needed in determining weights and normalizing data (Sabandar & Ahmad, 2023).

Implementation System

The execution and implementation of this process, including optimization steps, constitutes the ‘Do’ phase. The ‘Inspection’ phase involves measuring and evaluating the process according to predetermined specifications and requirements (Derendorf, 2024).

The goal of the implementation stage is to convert the design into code in a specific programming language to produce software. In terms of developing a Decision Support System (DSS) for selecting web-based Tutoring Institutions, the tools used are Visual Studio Code with the PHP programming language and MySQL database.

System Testing

Testing Process

Testing Process is an important step in software development to ensure that the final product is error-free and can be used smoothly by users. In this process, black-box testing techniques are used, where the software is thoroughly tested based on the features that have been designed to verify its performance. The main goal of testing is to identify and address potential issues or bugs that may arise during the use of the application.

Black-box testing is a method where the tester does not need to access or know the code being tested. This approach focuses on examining the dynamic behavior of the program and is usually faster and easier to perform than white-box testing (Skalka & Drlik, 2023). Black-box testing is a testing method that focuses on the functional specifications of the software being developed. Testers have no difficulty in setting input conditions and testing the functional specifications of the program (Ramadhani et al., 2024). By using black-box testing techniques, developers can ensure that the software meets the desired specifications and functions properly under a variety of possible usage conditions.

The WP method is known to have a fast and efficient calculation process. In general, decision-making with the WP approach is based on the following steps:

Determine weight normalization

At this stage, the weights will be normalized using equation (1).

$$w_j = \frac{w_j}{\sum w_j} \quad (1)$$

By generating value wj = 1 untuk j = 1, 2, ..., n, which represents the number of alternatives, while $\sum wj$ shows the total weight.

Determine the Value of Vector S

To find the value of vector S, it can be calculated using equation (2).

$$S_i = \prod_{j=1}^{n} X_{i_j}^{w_j} \quad (2)$$

To get a vector value, each criterion is multiplied by an alternative that is increased by normalized weights. The weights are increased according to the nature of the criteria involved: if the criterion has an advantage, the weights are raised positively; if the criterion has a cost, the weight is lifted negatively. The profit criterion is the criterion where a higher value is considered more profitable, while the cost criterion is the criterion where a lower value is considered more profitable. In this way, the vector value obtained reflects the contribution of each alternative to the final decision, taking

into account the balance between benefits and costs involved in the decision-making process.

1. Finding the Vector V Value

What will be the preference value for each alternative is vector V. To find vector V, equation (3) can be used.

$$V_i = \frac{\prod_{j=1}^{n} x_{i_j}^{w_j}}{\prod_{j=1}^{n} x_{i_j}^{w_j} \times w_j} \quad \text{atau} \quad V_i = \frac{S_i}{\sum S_i} \tag{3}$$

The highest preference value indicates the most favored alternative. This value is not only an indicator but also a basis for waging war against the available alternatives.

The study is limited to students preparing for the SNBT in Indonesia, Although the WP method is effective, it may not cover all differences and could be complemented by other methods in future research

RESULT AND DISCUSSION

The Weighted Product method requires various criteria and weights to carry out calculations to determine the best alternative (Wardana & Sulaiman, 2021). Based on the analysis carried out, a series of criteria and internal value weights were obtained Each criterion will be used to make decisions in selecting tutoring best for students (Supiyandi et al., 2020). System implementation is the final activity of the system implementation process, where this system will be operated in its entirety. Before the system can be used well, the system must go through the analysis and results testing stage first to ensure that no problems arise when the system is used (Permadi et al., 2021). After making observations directly, interviews and literature studies produce a decision support system with the Weighted product method for providing the best tutoring place (Natanael & Kusumaningsih, 2021). WP Method Will build an application or software to select the best tutoring every year based on predetermined criteria (Supardi & Sudarsono, 2023).

Later the calculation starts by entering alternatives and subsequent criteria Enter the indicator value weights based on the sub-indicators of each indicator. The input value will be calculated using the Weighted Product (WP) algorithm (Warnars & Adyana, 2021). The next step is to implement the system, where the results of the analysis and design are applied to the decision support system. The system developed is realized in the form of a website, which was built using the PHP programming language so that users can easily access it. The Decision Support System (DSS) for selecting Tutoring Institutions has been well-designed and structured. The usage process begins with a login process, where users will be asked to enter the username and password they have previously created. This login page is represented in Figure 2, which is the starting point for users to access and use the system comfortably.

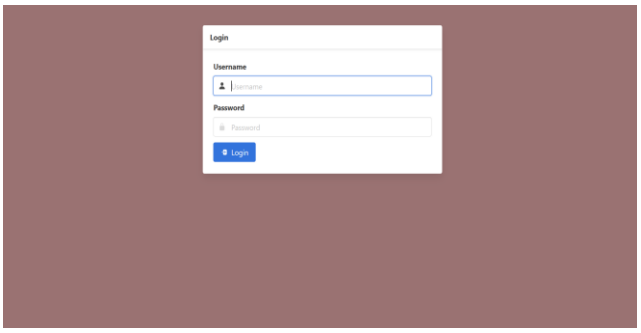


Figure 2. Home Page

Then the user will be directed to the home page, then some options allow the user to choose the steps to be taken. Of course, the user's first step will be to determine what alternatives will be included in this decision support system. On this website, users can input, edit, and delete codes and alternative place names. This will be shown in Figure 3.

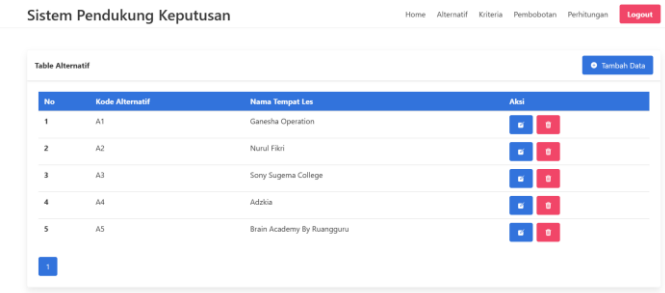


Figure 3. Alternative Table

Next, there is a criteria page where users will be given the same access as the alternative page, namely, users can input, edit, and delete criteria data, weights, and status criteria. This is shown in Figure 4.

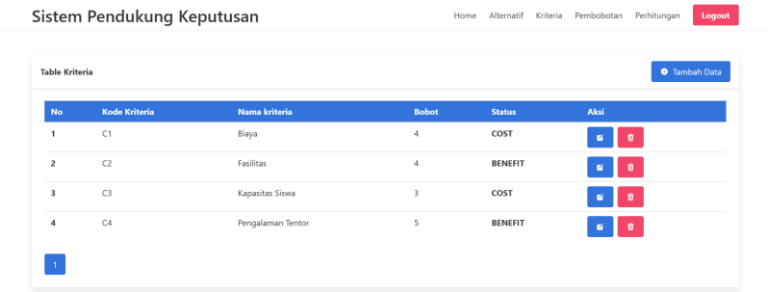
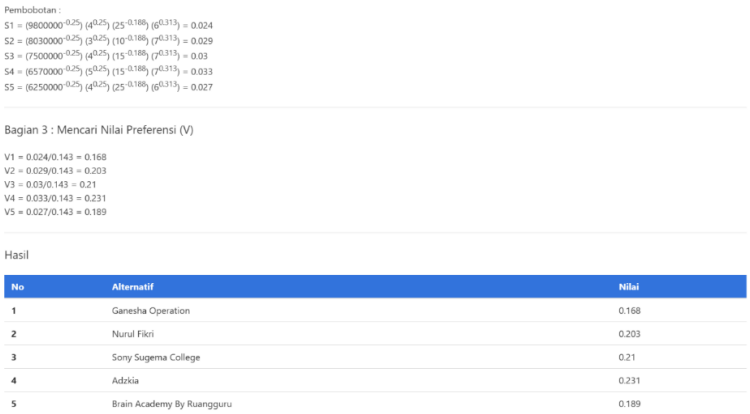


Figure 4. Criteria Table

After all the data has been managed, finally there is a calculation page where all alternative data, criteria, and weighting will be processed using the Weighted Product method. This is shown in Figure 5.



Pembobotan :

S1 = $(9800000^{-0.25})$ $(4^{0.25})$ $(25^{-0.188})$ $(6^{0.313})$ = 0.024
S2 = $(8030000^{-0.25})$ $(3^{0.25})$ $(10^{-0.188})$ $(7^{0.313})$ = 0.029
S3 = $(7500000^{-0.25})$ $(4^{0.25})$ $(15^{-0.188})$ $(7^{0.313})$ = 0.03
S4 = $(6570000^{-0.25})$ $(5^{0.25})$ $(15^{-0.188})$ $(7^{0.313})$ = 0.033
S5 = $(6250000^{-0.25})$ $(4^{0.25})$ $(25^{-0.188})$ $(6^{0.313})$ = 0.027

Bagian 3 : Mencari Nilai Preferensi (V)

V1 = 0.024/0.143 = 0.168
V2 = 0.029/0.143 = 0.203
V3 = 0.03/0.143 = 0.21
V4 = 0.033/0.143 = 0.231
V5 = 0.027/0.143 = 0.189

Hasil

No	Alternatif	Nilai
1	Ganesha Operation	0.168
2	Nurul Fikri	0.203
3	Sony Sugema College	0.21
4	Adzkia	0.231
5	Brain Academy By Ruangguru	0.189

Figure 5. Calculation Page

In Figure 5, the analysis results are presented which show the highest preference value for each alternative evaluated. Alternative Adzkia (A4) received the highest preference score of 0.231, followed by Latis Sony Sugema College (A3) with a score of 0.21, Nurul Fikri (A2) with a score of 0.203, Brain Academy By Ruangguru with a score of 0.189, and Ganesha Operation (A1) with a value of 0.168. These results show the ranking order of the alternatives evaluated in the decision support system (DSS). It is important to note that the results obtained from DSS, whether obtained automatically via the website or manually, produce consistent values. This shows that the comparison between the two calculation methods provides similar and reliable results. In this way, the reliability and consistency of DSS in providing the best recommendations for users can be maintained.

The results obtained refer to the problems that occurred in the selection of tutoring institutions for SNBT. Starting with determining the criteria finding alternatives and then weighting for each criterion. The criteria used include 5 assessment weights, namely: (1) Very unimportant, (2) Less important, (3) Important, (4) Very important, (5) Very very important. Then, the selection of weights is determined as follows:

1. Cost = 4 (Very Important)
2. Facilities = 4 (Very Important)
3. Student Capacity = 3 (Important)
4. Tentor Experience = 5 (Very Very Important)

After the weights are determined, the next step is to normalize the weights using the Weighted Product formula:

$w1 = 4\ (4 + 4 + 3 + 5) = 0.25$
$w2 = 4\ (4 + 4 + 3 + 5) = 0.25$
$w3 = 3\ (4 + 4 + 3 + 5) = 0.19$
$w4 = 5\ (4 + 4 + 3 + 5) = 0.31$

Please note that if the weight calculation results are equal to 1. Then the calculation results are correct. The results of the weight calculations have been structured in Table 1.

Table 1. Weight Calculation

Code	Criteria	Weight	Weight Normalization
C1	Cost	4	0,25
C2	Facility	4	0,25
C3	Student Capacity	3	0,19
C4	Tentor Experience	5	0,31

In Table 1 the criteria have been determined along with their weights and weight normalization, then the next alternative table will be described in Table 2. Which contains: (A1) Ganesha Operation, (A2) Nurul Fikri, (A3) Sony Sugema Collage, (A4) Adzkia , (A5) Brain Academy By Ruangguru.

Table 2. Criteria, Weights, And Weight Normalization

Alternative Code	Alternative	C1	C2	C3	C 4
A1	Ganesha Operation	Rp 9.800.000	4	25	6
A2	Nurul Fikri	Rp 8.030.000	3	10	7
A3	Sony Sugema Collage	Rp 7.500.000	4	15	7
A4	Adzkia	Rp 6.570.000	5	15	7
A5	Brain Academy By Ruangguru	Rp 6.250.000	4	25	6

The scale given to C2 is: (1) Very Incomplete, (2) Incomplete, (3) Complete, (4) Very Complete, (5) Very Very Complete. In Table 2 you can see the assessment results for each alternative.

Next is to find the Vector (S) value. In the previous stage, the normalization of the criteria weights was calculated, where it was obtained that w = {0.25; 0.25; 0.19, 0.31}. From the weight values of these criteria, the benefit criteria are Facilities (C2) and Tentor Experience (C4), while the cost criteria are Cost (C1) and Participant Capacity (C3). For the benefit criteria, the weight ranking is positive, whereas the cost criteria for the weight ranking are negative.

Weighting:

S1 = (9800000-0.25) (40.25)(25-0.188) (60.313) = 0.024
S2 = (8030000-0.25) (30.25)(10-0.188) (70.313) = 0.029
S3 = (7500000-0.25) (40.25)(15-0.188) (70.313) = 0.03
S4 = (6570000-0.25) (50.25)(15-0.188) (70.313) = 0.033
S5 = (6250000-0.25) (40.25)(25-0.188) (60.313) = 0.27

After the vector S value is obtained, the next step is to calculate the vector V value which is used as the preference value. Here's the calculation:

Finding Preference Value (V)

V1 = 0.024/0.143 = 0.168
V2 = 0.029/0.143 = 0.203
V3 = 0.03/0.143 = 0.21
V4 = 0.033/0.143 = 0.231

V5 = 0.027/0.143 = 0.189

The results obtained from calculating the vector of the highest V (preference) value are the best alternative. The vector V values obtained are presented in Table 3.

Table 3. Vector V Values

Alternative Code	Alternative	Vector Value V	Ranking
A1	Ganesha Operation	0.168	5
A2	Nurul Fikri	0.203	3
A3	Sony Sugema Collage	0.21	2
A4	Adzkia	0.231	1
A5	Brain Academy By Ruangguru	0.189	4

It can be seen in Table 3, that the highest preference value obtained is A4(0.231) so A4 is ranked first in the ranking followed by A3(0.21) as the 2nd rank, A2(0.203) as the 3rd rank, A5 (0.189) in the 4th rank, and A1(0.168) in the last rank, namely 5th.

Table 4. Black Box Testing

No	**Function**	**Testing**	**Conclusion**
1.	Login Form	Users can enter the system after entering the appropriate username and password.	Done
2.	Main Menu Form	Shows the main features available in SPK Selection of Tutoring Institutions.	Done
3.	Criteria Form	Users can manage criteria data, such as input, change, and delete criteria data	Done
4.	Alternative Form	Users can manage alternative data, such as adding, changing, and delete alternative data	Done
5.	Alternative Assessment Form	Users can manage alternative assessment data, such as adding, changing, and deleting value data alternative	Done
6.	Calculation WP Form	The system displays the selection calculation process for Tutoring Institutions using the WP method and displays the final calculation results	Done

CONCLUSION

This research succeeded in developing a Decision Support System (DSS) for selecting Tutoring Institutions using the Weighted Product (WP) method. The results obtained from the case study show that the WP method is effective in determining the best alternative based on preference values. Adzkia (A4) got the highest preference score, namely 0.231, followed by Latis Sony Sugema College (A3) with a score of 0.21, Nurul Fikri (A2) with a score of 0.203, Brain Academy By Ruangguru with a score of 0.189, and Ganesha Operation (A1) with value 0.168. The calculation results on the built DSS show harmony with manual calculations, confirming the validity of the system developed.

However, there is a need for development for further research, namely the development of more specific and relevant criteria and sub-criteria that will increase the accuracy and relevance of the results of selecting tutoring institutions. And integrating DSS with broader educational information systems, such as student achievement data and user feedback, can provide greater benefits.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to the members of their research team for their dedication and hard work throughout this project. Specifically, the authors would like to thank Sandy Andika Maulana, Shabrina Husna Batubara, and Wahyu Abadi Harahap, undergraduate students in Computer Science at Medan State University, for their diligent efforts in data collection, analysis, and manuscript preparation. The authors are also grateful to Sir Deby Yandra Niska S.Kom, M.Kom. lecturer in Computer Science, for his expert guidance, insightful feedback, and unwavering support during the course of this study.

REFERENCES

Ayudya, A. G. (2024). *IMPLEMENTASI METODE FUZZY AHP (ANALYTICAL HIERARCHY PROCESS) UNTUK REKOMENDASI PENENTUAN LEMBAGA BIMBINGAN BELAJAR BAGI CALON PESERTA SELEKSI NASIONAL BERBASIS TES (SNBT)*. UPN" Veteran" Yogyakarta.

Demir, G., Chatterjee, P., & Pamucar, D. (2024). Sensitivity analysis in multi-criteria decision making: A state-of-the-art research perspective using bibliometric analysis. *Expert Systems with Applications*, *237*, 121660. https://doi.org/https://doi.org/10.1016/j.eswa.2023.121660

Derendorf, L. (2024). *Development, Implementation and Evaluation of a Quality Management System for Cross-Sectoral Psycho-Oncological Care in Germany*. Universität zu Köln.

Gede Iwan Sudipa, I., Junifer Pangaribuan, J., Trihandoyo, A., Aristo Jansen Sinlae, A., Putra Barus, O., Umar, N., Chyan, P., Herdiyan Saputra, R., Sukwika, T., Mallu, S., Pratama, D., Yahya, K., Teguh Suseno, A., Susilowati, T., & Arni, S. (2022). *Sistem Pendukung Keputusan PT. MIFANDI MANDIRI DIGITAL*.

Guarino, S., Oliva, G., Pietro, A. Di, Pollino, M., & Rosato, V. (2023). A Spatial Decision Support System for Prioritizing Repair Interventions on Power Networks. *IEEE Access*, *11*(April), 34616–34629.

https://doi.org/10.1109/ACCESS.2023.3264686

Gunawardhana, L. K. P. D. (2019). Process of Requirement Analysis Link to Software Development. *Journal of Software Engineering and Applications*, *12*(10), 406–422. https://doi.org/10.4236/jsea.2019.1210025

Irfan, M., Yanuardi, & Yudaningsih, N. (2022). Implementasi Metode Weighted Product Pada Sistem Pendukung Keputusan Pemilihan Lembaga Bimbingan Belajar. *Bulletin of Computer Science Research*, *3*(1), 37–44. https://doi.org/10.47065/bulletincsr.v3i1.195

Lubis, J. H., & Hakim, F. N. (2023). Penerapan Metode WASPAS (Weighted Aggregated Sum Product) dan ROC (Rank Oder Centroid) Dalam Penentuan Bimbingan Belajar Terbaik. *KLIK: Kajian Ilmiah Informatika Dan Komputer* , *3*(6), 1031–1039. https://doi.org/10.30865/klik.v3i6.945

Mawarni, I., Taufik, M., & Mulyono, S. (2022). Sistem Pendukung Keputusan Pencarian Tempat Bimbingan Belajar Bagi Calon Peserta SBMPTN Menggunakan Metode AHP. *Jurnal Transistor Elektro Dan Informatika (TRANSISTOR EI)*, *4*(2), 119–131. http://repository.unissula.ac.id/21728/

Mustafidah, H., & Mayasari, R. P. (2019). Sistem Pendukung Keputusan Menggunakan Metode TOPSIS untuk Pemilihan Lembaga Bimbingan Belajar. *Sainteks*, *15*(1), 39–53. http://jurnalnasional.ump.ac.id/index.php/SAINTEKS/article/view/6172

Natanael, M. H., & Kusumaningsih, D. (2021). Penerapan Metode Weighted Product Pada Sistem Penunjang Keputusan Untuk Pemilihan Anggota Terbaik Naposo. *Technologia: Jurnal Ilmiah*, *12*(1), 41. https://doi.org/10.31602/tji.v12i1.4181

Permadi, A., Panjaitan, Z., & Kusnasari, S. (2021). Sistem Pendukung Keputusan Penentuan Lokasi Baru Usaha Laundry Sepatu di BECKS Menggunakan Metode WP (Weighted Product). *Jurnal Cyber Tech*, *1*(3), 1–11. https://ojs.trigunadharma.ac.id/index.php/jct/article/view/4760

Permana, W. A. (2020). Manajemen Rekrutmen Peserta Didik Dalam Meningkatkan Mutu Lulusan . *Jurnal Isema : Islamic Educational Management*, *5*(1), 83–96. https://doi.org/10.15575/isema.v5i1.5989

Ramadhani, S. P., Saputra, A. F., Dwiansyah, F., & Veritawati, I. (2024). Pengujian Sistem Informasi Akademik (NeoSiak) Berbasis Website Menggunakan Equivalence Partitioning dan Metode Black Box. *STORAGE –Jurnal Ilmiah Teknik Dan Ilmu Komputer*, *3*(1), 18.

Sabandar, V. P., & Ahmad, R. (2023). Sistem Pendukung Keputusan Penentuan Produk Terbaik Menggunakan Weighted Product Method. *Jurnal Ilmiah Computer Science*, *1*(2), 58–68. https://doi.org/10.58602/jics.v1i2.7

Santoso, A., & Rusmawati, Y. (2019). Pendampingan Belajar Siswa di Rumah melalui Kegiatan Bimbingan Belajar di Desa Guci Karanggeneng Lamongan. *Jurnal Abdimas Berdaya : Jurnal Pembelajaran, Pemberdayaan Dan Pengabdian Masyarakat*, *2*(02), 36–43. https://doi.org/10.30736/jab.v2i02.7

Senika, A., Rasiban, R., & Iskandar, D. (2022). Implementasi Metode Naïve Bayes Dalam Penilaian Kinerja Sales Marketing Pada PT. Pachira Distrinusa. *Jurnal Media Informatika Budidarma*, *6*(1), 701. https://doi.org/10.30865/mib.v6i1.3331

Shi, W., Liang, H., & Bittner, M. (2024). Decision Support for Smart Distribution System Against Natural Disasters During Health Pandemics Considering Resilience. *IEEE Access*, *12*(May), 66335–66351. https://doi.org/10.1109/ACCESS.2024.3397892

Siregar, V. M. M., Sonang, S., & Damanik, E. (2021). Sistem Pendukung Keputusan

Penentuan Pelanggan Terbaik Menggunakan Metode Weighted Product. *Jurnal Teknik Informasi Dan Komputer (Tekinkom)*, *4*(2), 239. https://doi.org/10.37600/tekinkom.v4i2.392

Skalka, J., & Drlik, M. (2023). Development of Automatic Source Code Evaluation Tests Using Grey-Box Methods: A Programming Education Case Study. *IEEE Access*, *11*(October), 106772–106792. https://doi.org/10.1109/ACCESS.2023.3317694

Sriwahyuni Hutagalung, Dinda Saputri Gea, Dwina Pri Indini, & Mesran. (2023). Penerapan Metode MOORA Dalam Pemilihan Bimbingan Belajar Terbaik. *Journal of Informatics Management and Information Technology*, *3*(1), 1–7. https://doi.org/10.47065/jimat.v3i1.226

Sunarto, M. J. D., Hariadi, B., Soetomo, E., & Nurcahyawati, V. (2023). Meningkatkan Kesiapan Calon Mahasiswa Sukses di Perguruan Tinggi: Pengenalan Tes Skolastik melalui Pendekatan LMS. *Society : Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, *4*(1), 81–88. https://doi.org/10.37802/society.v4i1.402

Supardi, R., & Sudarsono, A. (2023). Penerapan Metode Weighted Product (WP) Dalam Sistem Pendukung Keputusan Pemilihan Karyawan Terbaik Pada PT. Agrodehasen Bengkulu. *Jurnal Media Infotama*, *19*(1), 141–147. https://doi.org/10.37676/jmi.v19i1.3505

Supiyandi, Nasrul Fuad, R., Hariyanto, E., & Larasati, S. (2020). Sistem Pendukung Keputusan Pemberian Kredit Koperasi Menggunakan Metode Weighted Product. *Jurnal Media Informatika Budidarma*, *4*(4), 1132–1139. https://doi.org/10.30865/mib.v4i4.2367

Syah, R. D. (2020). Metode Decision Tree Untuk Klasifikasi Hasil Seleksi Kompetensi Dasar Pada Cpns 2019 Di Arsip Nasional Republik Indonesia. *Jurnal Ilmiah Informatika Komputer*, *25*(2), 107–114. https://doi.org/10.35760/ik.2020.v25i2.2750

Utomo, Y. B., Yuliana, D. E., & Kurniadi, H. (2022). Sistem Pendukung Keputusan Dalam Menentukan Ketua Himaprodi Menggunakan Metode Weighted Product. *Jurnal Teknik Informasi Dan Komputer (Tekinkom)*, *5*(2), 501. https://doi.org/10.37600/tekinkom.v5i2.703

Wardana, A. W., & Sulaiman, R. (2021). Sistem Pendukung Keputusan Pemilihan Smartphone Android Menggunakan Metode If-Topsis. *MATHunesa: Jurnal Ilmiah Matematika*, *9*(1), 133–140. https://doi.org/10.26740/mathunesa.v9n1.p133-140

Warnars, H. L. H. S., & Adyana, L. (2021). Sistem Pendukung Keputusan Penentu Penerima Reward Guru Dengan Metode Weighted Product (WP). *Petir*, *14*(2), 122–129. https://doi.org/10.33322/petir.v14i2.899

Widayati, T., & Maria, N. S. B. (2020). Efektifitas Keputusan Manajemen Dalam Penilaian Kinerja Karyawan Menerapkan Metode Weigthed Product (WP). *Jurnal Media Informatika Budidarma*, *4*(3), 612. https://doi.org/10.30865/mib.v4i3.2176

Xu, S. li, Yeyao, T., & Shabaz, M. (2023). Multi-criteria decision making for determining best teaching method using fuzzy analytical hierarchy process. *Soft Computing*, *27*(6), 2795–2807. https://doi.org/10.1007/s00500-022-07554-2