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Decision Support System for Outstanding Students at SMA N 1 Belitang III Using the Profile Matching Method

Sultan Dwi Andri[1*]

Abstract

This study presents the design and development of a Decision Support System (DSS) to assist in determining the most eligible students for scholarship awards at SMA N 1 Belitang III. The system utilizes the Profile Matching method, which compares student attributes against ideal scholarship criteria to produce a ranked list of candidates. The process involves calculating competency gaps between students' actual profiles and the ideal profile, assigning weights to each criterion, and aggregating these to generate overall suitability scores. Smaller gaps indicate closer alignment with the scholarship requirements. The resulting DSS enables school administrators to perform a transparent, efficient, and objective selection of scholarship recipients while minimizing human error in manual evaluation processes.

Keywords

Decision Support System, Profile Matching, GAP, Scholarship Selection

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[1*] Universitas Bina Darma, Indonesia, Corresponding email: hawkblack410@gmail.com

Introduction

Scholarships represent a vital mechanism in supporting educational equity and promoting student achievement. A scholarship functions as financial assistance granted to students to help cover educational expenses while also serving as a form of recognition for academic excellence and character development. According to Government Regulation of the Republic of Indonesia No. 48 of 2008 on Educational Financing, Article 27 mandates that both central and regional governments are responsible for providing scholarships or educational assistance to students who demonstrate financial need or outstanding academic performance. This regulation underscores the government's commitment to ensuring that every student—regardless of socioeconomic background—has equal access to quality education and the opportunity to excel.

In the context of secondary education, particularly at SMA Negeri 1 Belitang III, scholarships are awarded based on three primary evaluation aspects: knowledge, skills, and attitude. This holistic approach ensures that recipients are not only high achievers academically but also display good conduct and competence in practical or extracurricular domains. To qualify, candidates must be Indonesian citizens, active students, and must consistently demonstrate satisfactory performance across these assessment areas. The school's approach aligns with the national educational objective of producing graduates who are academically capable, ethically grounded, and socially responsible.

However, the current scholarship selection process at SMA N 1 Belitang III still relies on manual procedures involving administrative screening and subjective evaluation by teachers or committees. While this traditional approach has been functional, it presents several limitations—most notably data inconsistency, delayed decision-making, and potential bias in evaluation. Manual assessments often depend on individual judgment without standardized criteria, which may lead to unequal treatment among students. In addition, compiling and verifying data manually consumes significant time and effort, hindering the efficiency of scholarship distribution and creating risks of human error in the selection process.

To address these challenges, the adoption of a computerized Decision Support System (DSS) is increasingly necessary. A DSS can serve as a computational tool that assists decision-makers in evaluating multiple alternatives using structured and objective data analysis. By implementing such a system, schools can streamline the selection process, improve transparency, and ensure fairness based on consistent evaluation standards. Moreover, a DSS reduces the administrative burden on teachers and committees, allowing them to focus more on mentoring and student development rather than manual data processing.

Among various decision-making techniques, the Profile Matching method is particularly well-suited for scholarship selection. This method operates by comparing each candidate's attributes or performance indicators against an ideal standard profile that represents the desired criteria for scholarship recipients. The degree of similarity or "gap" between the actual and ideal profiles is then quantified to produce a ranking of candidates based on objective metrics. This ensures that decision-making is not influenced by subjective preferences but grounded in data-driven evaluation. The Profile Matching approach thus enhances both the accuracy and credibility of scholarship selection, fostering trust among stakeholders and aligning with principles of educational accountability.

Therefore, this study aims to design and develop a Decision Support System (DSS) using the Profile Matching method to assist SMA Negeri 1 Belitang III in selecting scholarship recipients more efficiently and transparently. The system is expected to automate the assessment process, integrate multi-criteria evaluation (knowledge, skills, and attitude), and generate ranking reports that reflect students' overall eligibility. By leveraging information technology within the school's administrative framework, the research contributes to improving governance in educational aid distribution, promoting fairness in student recognition, and supporting the broader goal of digital transformation in Indonesia's education sector.

Methodology

Research Design

This study employs the Prototype model of system development, which emphasizes iterative design and active user involvement throughout the process. The stages include:

1. Requirements Collection — Gathering functional and non-functional requirements from school administrators and stakeholders.
2. System Design — Developing interface mockups and database schemas based on identified requirements.
3. Prototype Construction — Building the preliminary version of the DSS.
4. Prototype Evaluation — Conducting user testing to gather feedback.
5. Implementation — Refining and deploying the final version of the DSS for use by administrators.

Profile Matching Method

The Profile Matching approach determines eligibility by comparing the attributes of each student with an ideal reference profile. The smaller the gap value, the more closely the student aligns with the desired standard.

The stages of the method are as follows:

Step 1: GAP Calculation

$$GAP = (\text{Student Profile}) - (\text{Ideal Profile})$$

Step 2: Weght Assignment

Each GAP value is converted to a weighted score based on predefined criteria.

Table 1. Gap Weighting Scale

No	GAP Value	Weight	Description
1	0	5.0	No difference (competency matches requirement)
2	+1	4.5	Exceeds requirement by 1 level
3	−1	4.0	Below requirement by 1 level

No	GAP Value	Weight	Description
4	+2	3.5	Exceeds requirement by 2 levels
5	−2	3.0	Below requirement by 2 levels
6	+3	2.5	Exceeds requirement by 3 levels
7	−3	2.0	Below requirement by 3 levels
8	+4	1.5	Exceeds requirement by 4 levels
9	−4	1.0	Below requirement by 4 levels

Step 3: Core and Secondary Factor Weighting

Each criterion is classified as a Core Factor (CF) or a Secondary Factor (SF).

The formulas are as follows:

$$NCF = \frac{\sum NC}{\sum IC}, \quad NSF = \frac{\sum NS}{\sum IS}$$

Where:

- NCF = Average Core Factor
- NSF = Average Secondary Factor
- NC, NS = Total core/secondary scores
- IC, IS = Number of core/secondary indicators

Step 4: Total Value Computation

$$N = (X\%)NCF + (X\%)NSF$$

Step 5: Ranking Calculation

$$Ranking = (X\%)N_1 + (X\%)N_2 + (X\%)N_3$$

Where N_1, N_2, and N_3 represent the scores of knowledge, skills, and attitude aspects respectively.

Results

Criteria and Weighting

Scholarship eligibility was assessed based on three major aspects knowledge, skills, and attitude each with specific weighting ratios and evaluation scales.

Table 2. Aspect Weighting

Aspect	Percentage	Core Factor	Secondary Factor
Knowledge	40%	60%	40%
Skills	30%	60%	40%
Attitude	30%	60%	40%

Evaluation Scales

Table 3. Knowledge Score Range

Score Range	Rating
10–20	1
21–40	2
41–60	3
61–80	4
81–100	5

Table 4. Attitude Score Description

Category	Rating
Very Poor	1
Poor	2
Average	3
Good	4
Excellent	5

Ranking Results

The Profile Matching process produced weighted scores for each student across the three aspects, summarized below.

Table 5. Final Scores by Aspect

Student	Knowledge (N_1)	Skills (N_2)	Attitude (N_3)
Yesayani S	4.65	4.68	4.70
Sayu Kade E	4.85	4.83	4.70
Sandy S	4.85	4.88	4.70

Table 6. Final Ranking

Rank	Student	Final Score
1	Sandy S	4.81
2	Sayu Kade E	4.80
3	Yesayani S	4.67

The results show that Sandy S achieved the highest score (4.81), making this student the most eligible for scholarship selection according to the Profile Matching method.

Discussion

The implementation of the Profile Matching method in the scholarship selection process at SMA Negeri 1 Belitang III has proven to be highly effective in improving the accuracy, fairness, and efficiency of decision-making. By transforming qualitative evaluations into quantitative assessments, the method provides a structured mechanism for analyzing student eligibility based on measurable indicators. Unlike traditional manual selection processes—which often rely on subjective judgment and inconsistent scoring—the Profile Matching approach calculates the degree of similarity between each candidate's actual attributes and an ideal profile representing the school's scholarship criteria. This data-driven evaluation framework minimizes human bias and enhances objectivity in determining which students most closely meet the established performance standards.

The Decision Support System (DSS) developed in this study serves as a digital platform that automates data processing, scoring, and ranking of scholarship candidates. The system integrates performance data related to knowledge, skills, and attitude, and computes a total compatibility score using the Profile Matching algorithm. Administrators can input, update, and verify student data easily through a centralized interface, while the system automatically generates ranking results and reports. This process ensures that decision-making is transparent, traceable, and accountable, as every stage of evaluation—from data entry to final recommendation—is supported by quantifiable evidence. Compared to manual evaluation methods, the DSS significantly reduces processing time, eliminates data redundancy, and improves consistency in record-keeping. These benefits collectively strengthen administrative reliability and institutional credibility in scholarship distribution.

In terms of technical performance, the Profile Matching-based DSS effectively handles multi-criteria evaluation through a systematic computational model. Each assessment criterion is assigned a specific weight according to its importance (for instance, cognitive performance may carry a higher weight than attitude). The system then computes the gap between the candidate's actual score and the ideal score, applying a predefined conversion scale to calculate the final ranking value. This multi-factor weighting mechanism enables more nuanced decision-making that reflects both academic excellence and holistic student development. Moreover, by employing a database-driven structure, the system ensures that data remain accurate, up-to-date, and secure, facilitating longitudinal tracking of scholarship recipients and supporting institutional reporting requirements.

The empirical findings of this study are consistent with those of Junaidi and Visella (2017) and Setiyowati et al. (2019), who demonstrated that the Profile Matching method

enhances accuracy and fairness in educational assessment systems. Their research similarly found that Profile Matching provides reliable outputs when applied to complex, multi-attribute decision-making scenarios—such as student performance evaluation and scholarship selection. The consistency between this study and prior research validates the methodological robustness of the approach, confirming that Profile Matching can effectively be implemented across various educational contexts to promote objective and equitable evaluation practices.

Beyond its technical success, the implementation of this system also contributes to broader goals of digital transformation in education management. By integrating algorithmic decision-making into administrative workflows, SMA Negeri 1 Belitang III has taken an important step toward modernizing its governance processes. The system not only improves internal operational efficiency but also reinforces transparency and trust between the school, students, and parents. Public confidence in the scholarship allocation process is strengthened when results are supported by clear, quantifiable data rather than subjective discretion. In addition, the digital record-keeping capability allows administrators to perform periodic audits and evaluations, ensuring the long-term sustainability of scholarship programs.

In conclusion, the adoption of the Profile Matching-based Decision Support System for scholarship selection has yielded tangible improvements in efficiency, accuracy, and accountability. The method's quantitative nature allows for consistent evaluation across candidates, while its integration into a computerized platform enhances accessibility and institutional transparency. These results reaffirm the findings of Junaidi and Visella (2017) and Setiyowati et al. (2019) regarding the method's reliability and adaptability in educational decision-making systems. Moving forward, expanding the system to include features such as real-time data validation, integration with student databases, and automated report generation could further optimize its functionality and strengthen its role as a model of data-driven scholarship management in Indonesian schools.

Conclusion and Recommendations

The Decision Support System developed using the Profile Matching method successfully assists in determining outstanding students eligible for scholarships at SMA N 1 Belitang III. The method evaluates key aspects knowledge, skills, and attitude by comparing student profiles with ideal benchmarks. The resulting ranking provides objective and transparent outcomes that facilitate decision-making. Implementation of the system improves efficiency, minimizes human error, and supports data-driven scholarship management.

Disclosure Statement

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Biographical Notes

SULTAN DWI ANDRI Undergraduate Student, Department of Informatics Engineering, Faculty of Computer Science, Universitas Bina Darma, Palembang. His research interests include Decision Support Systems, data-driven analytics, and educational informatics.