Identification of Extracurricular Suitability with Students' Interests and Talents Through the Profile Matching Method at SMPN 5 Lubuk Pakam

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Abstract

Kegiatan ekstrakurikuler memiliki peranan krusial dalam mengoptimalkan potensi, minat, dan Extracurricular activities play a crucial role in optimising students' potential, interests, and talents outside of curricular activities. However, at SMPN 5 Lubuk Pakam, the selection of extracurricular activities is still based on temporary desires, peer pressure, or guidance without in-depth analysis. As a result, many students engage in activities that do not align with their talents, leading to suboptimal participation and achievement. This study aims to design and develop a decision support system that can identify the suitability of extracurricular activities with students' interests and talents through the Profile Matching method. The calculation process is carried out through steps of mapping the gap values between the student profile and the ideal profile for each extracurricular activity, determining the weight of the gap values, calculating the core and secondary factor values, setting the total value, and ranking. Research findings indicate that the Profile Matching method can provide the most appropriate extracurricular recommendations for each student in an objective and measurable manner. The developed system supports educational institutions in placing students in extracurricular activities more accurately, quickly, and efficiently, allowing for the optimal development of students' interests and talents.

***Keywords**: Decision Support System, Profile Matching, Extracurricular Activities, Interests and Talents, Gap Analysis.*

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Introduction

Education is not solely aimed at improving students' academic abilities, but also at comprehensively developing all their potential, including non-academic potential. One of the facilities provided by educational institutions for this purpose is the extracurricular program. According to the Minister of Education and Culture Regulation Number 62 of 2014, extracurricular activities are held to enhance students' potential, talent, interest, ability, character, collaboration, and independence. The same regulation distinguishes between mandatory extracurricular activities and optional extracurricular activities, where optional extracurricular activities are designed and implemented by educational institutions based on students' talents and interests, after identifying students' needs, potential, and interests [1] Therefore, the alignment between the extracurricular activities participated in and the personal attributes of the students is a prerequisite for these activities to truly serve as tools for self-development.

Interest and talent are two internal elements that greatly influence students' success in participating in an activity. Interest drives participation and perseverance, while talent determines how quickly and effectively a student's abilities can develop in a particular field. [2] indicate that students' interest plays a crucial role in their participation in sports extracurricular activities. On the contrary, if students engage in activities that do not align with their interests and talents, participation tends to decline, motivation decreases, and their potential cannot be maximally utilised.

In its implementation, the selection process for extracurricular activities in several schools still faces obstacles. [3] menegaskan bahwa seleksi kegiatan ekstrakurikuler sering dilakukan secara subyektif dan tidak mempertimbangkan semua kriteria dengan memadai. [4] emphasise the significance of selecting extracurricular activities based on students' interests and talents with a measurable approach. The same condition was identified by [5], who stated that the diverse extracurricular options at school actually make it difficult for students to choose activities that can hone their personality, talents, and skills outside of academics. As a result, students often make choices based on peer pressure, the popularity of an activity, or impulsive decisions, rather than considering their own potential.

The same issue was also found at SMP Negeri 5 Lubuk Pakam. Based on initial observations and interviews with extracurricular activity supervisors and the deputy principal for student affairs, the school organises various types of extracurricular activities, including Scouts, Paskibra, futsal, dance arts, PMR, and others. The process of allocating students to extracurricular activities is still done manually and depends on the students' choices without a systematic evaluation of their interests and talents. Moreover, the educational institution does not yet have a system capable of providing recommendations that are objective, efficient, and accountable.

To solve decision-making problems that involve various criteria, a Decision Support System (DSS) can serve as a solution. SPK membantu pengambil keputusan dalam memproses data sesuai dengan kriteria yang telah ditetapkan, sehingga menghasilkan rekomendasi yang lebih objektif. Various Decision Support System (DSS) methods have been applied in extracurricular selection, including Simple Additive Weighting (SAW) at SMP Negeri 15 Semarang [6], a combination of SMART and MOORA methods [4], and Preference Selection Index (PSI) with criteria of interest, talent, achievement, and parental approval [3]. However, these methods essentially rank alternatives based on criterion weights, rather than matching individual profiles with the ideal profile required by each activity.

The Profile Matching method provides a more precise approach to the issue of fit. This method works by analysing the comparison between a person's actual profile and the predetermined ideal profile, then calculating the difference (gap) between the two. The lower the gap value, the higher the individual's alignment with the desired profile. The calculation process includes gap mapping, converting gap values into weights, grouping criteria into main and secondary factors, calculating total scores, and ranking. This method has proven successful

in the educational context, including in the selection of outstanding students [7], determination of scholarship recipients [8], selection of majors based on students' interests, talents, and abilities [9], as well as the identification of interests and talents of outstanding students [10].

Specifically, the implementation of Profile Matching in extracurricular selection has shown positive results. [5] implemented it to provide extracurricular activity selection recommendations at SMK Insan Aqilah 4 Jakarta. [11] utilised it to identify athletic extracurricular branches according to student talent at SMP Negeri 17 in Cirebon City, achieving a calculation success rate of 100%. [12] menggunakannya untuk mengidentifikasi kegiatan ekstrakurikuler di bidang olahraga berdasarkan minat dan bakat siswa. A recent study by [13] at SMP Negeri 1 Kerinci, with a core factor composition of 60% and a secondary factor of 40%, indicates that the Profile Matching-based system can improve the accuracy of extracurricular selection by up to 85% compared to the manual method.

However, the majority of previous research has focused on one type of extracurricular activity. The criteria applied vary and may not align with the characteristics of students as well as the types of extracurricular activities offered at other educational institutions. Therefore, a study is needed to formulate an optimal profile for each extracurricular activity at SMP Negeri 5 Lubuk Pakam in detail, by combining elements of student interest and talent as the basis for evaluation, so that the resulting recommendations align with the actual needs of the school.

Literature Review

1. Extracurricular Activities

Extracurricular activities refer to student engagements conducted outside of intramural and co-curricular instructional periods, overseen by educational institutions. Permendikbud Number 62 of 2014 delineates its aims, specifically to maximally cultivate the potential, aptitude, interests, capabilities, character, collaboration, and autonomy of learners. The regulation categorizes extracurricular activities into two classifications. Initially, compulsory extracurricular pursuits, namely scouting education. Secondly, elective extracurricular pursuits, which are formulated by educational institutions based on the abilities and preferences of the students. The initiation of elective extracurricular programs commences with the assessment of students' needs, capabilities, and interests [1]

Numerous research efforts underscore the significance of extracurricular activities in fostering personal growth. [14] determined via a literature analysis that extracurricular activities enhance the development of students' potential, interests, and abilities by providing diverse activities, concepts, and guidelines that cater to students' requirements. [15] discovered that pupils exhibit heightened enthusiasm when allowed to select extracurricular activities that pique their interest. [16] shown that educational institutions can promote the growth of students' abilities in academic and non-academic areas by integrating compulsory and optional extracurricular activities.

2. Students' Interests and Talents

Interest is the tendency and attraction of an individual towards an object or activity, which encourages them to participate voluntarily and sustainably. Talent is an inherent ability that is potential in nature, which must be trained and developed to become concrete achievements. These two ideas support each other. Interest sets the direction and level of student engagement, while talent determines the extent to which abilities can optimally develop in a particular field.

Important factors that encourage student participation in sports extracurricular activities. identified a correlation between the types of extracurricular activities chosen by students and their interests and talents, where students tend to choose activities that align with their inclinations. However, the structured introduction of interests and talents has not yet become a habit in educational institutions. [17] indicate that educational institutions effective

in managing the development of talents and interests first gather information, for example through counsellors and potential evaluations, before placing students. [18] also notes that obstacles in the development of interests and talents in schools are often related to limited resources and supportive policies.

3. Decision Support System (DSS)

A Decision Support System (DSS) is a computer-driven framework that assists decision-makers in analyzing data and models to address semi-structured or unstructured issues. [19] underscores that Decision Support Systems (DSS) serve as instruments to augment decision-making abilities, although do not supplant the discernment of decision-makers. Noted that a Decision Support System (DSS) constitutes a component of an information system that proficiently aids the decision-making process, particularly in educational settings like identifying students' interests and fields of study.

In the realm of extracurricular selection, various decision assistance techniques have been utilized. For instance, there exists Simple Additive Weighting, or SAW, which merges SMART and MOORA, in addition to the Preference Selection Index, or PSI. These techniques provide rankings according to criterion weights. The challenge in this study lies in aligning student attributes with the requirements of each extracurricular endeavor. Consequently, a technique reliant on profile alignment is required.

4. Profile Matching Method

Profile Matching is an approach in decision-making that assumes the existence of an optimal level of predictor variables that must be met by the evaluated individual. This method analyses the comparison between a person's actual profile and the desired profile, then calculates the difference or gap between the two. The narrower the gap, the higher the degree of conformity.

Research Methodology

This research is an applied study that uses a descriptive quantitative approach combined with system development. The quantitative approach is applied because data on students' interests and talents are evaluated in numerical form through a rating scale, and then mathematically analysed using the Profile Matching method.

1. Sampel

Sampel ditentukan melalui rumus Slovin dengan margin of error 5% atau 10%:

$$n = N / (1 + N \cdot e^2)$$

Explanation:
n = sample size, N = population size, e = margin of error (0.05 or 0.10)

2. Research Instrument

Here is the draft of the assessment aspects and criteria. This plan needs to be confirmed with the supervising teacher before use.

Table 1. Aspect Criteria

Aspect	Code	Criteria	Type of Factor	Instrument
Interest (aspect weight 50%)	M1	Interest in extracurricular activities	*Core Factor*	survey
	M2	Willingness to dedicate time and participate in training	*Core Factor*	survey
	M3	Motivation and support from one's environment (parents/friends)	*Secondary Factor*	survey
Talent (aspect weight 50%)	B1	Specialized skills relevant to the field	*Core Factor*	Tes/penilaian guru

	B2	Basic field skills	*Core Factor*	Tes/penilaian guru
	B3	Physical/supporting conditions	*Secondary Factor*	Tes/dokumentasi
	B4	Related experience or achievements	*Secondary Factor*	Dokumentasi/angket

3. Research Instrument

The focus of this research is the issue of extracurricular selection at SMP Negeri 5 Lubuk Pakam, which is still done subjectively and manually. Unlike prioritising students' interests and talents, the choices are based on momentary desires or friends' recommendations. As a result, some students participate in activities that do not align with their potential, leading to poor participation and self-development.

This study uses two types of input to address the issue. The first input is the student profile, which includes scores for each aspect of interest (M1–M3) and talent (B1–B4), calculated through questionnaires, basic skills tests, teacher assessments, and documentation. The ideal profile of each extracurricular activity is the second input. The target score for each criterion is set by the supervising teacher based on the needs of the activity.

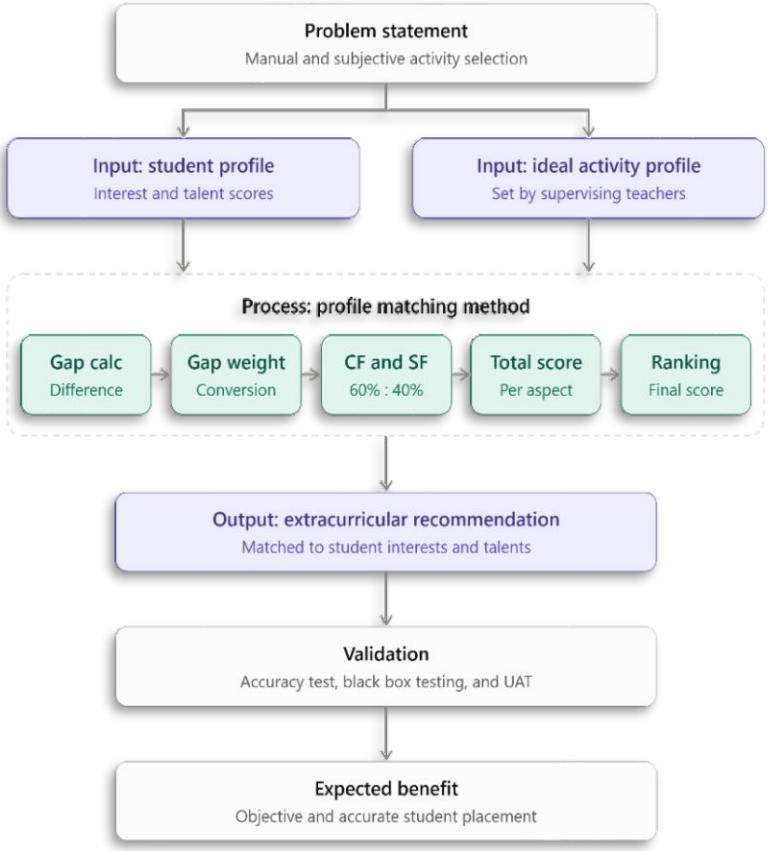


Figure 1. Research Framework

The Profile Matching method in five stages is used to process both inputs. First, calculate the difference between the student's profile and the ideal profile. Second, use the conversion table to change the gap value into a weight. Third, calculate the core factor value with a 60% and 40% proportion. Fourth, you must calculate the total value for each component. Fifth, rank the interest and talent scores for each extracurricular activity after combining them into a final score.

The output of this process is the most suitable extracurricular suggestions for each student, along with the available order and categories. Next, the recommendation results are validated through accuracy testing against the assessments of the supervising teachers, black box testing to ensure that the system functions correctly, and user acceptance testing.

In this way, this research is expected to make the placement of students' extracurricular activities more objective, accurate, and efficient. This is expected to allow students' interests and talents to develop optimally in accordance with the goals of extracurricular activities.

Results

1. Results of Criteria Determination and Ideal Profile

Based on interviews with the school authorities and the supervising teachers, the assessment of extracurricular suitability is determined in two aspects, namely the interest aspect and the talent aspect, each with a weight of 50%. The interest aspect consists of three criteria: interest in the field (M1) and willingness to participate in training (M2) as core factors, and motivation and environmental support (M3) as secondary factors. The talent aspect consists of four criteria: special abilities (B1) and basic skills (B2) as core factors, and physical condition (B3) and related experience or achievements (B4) as secondary factors. The proportion of core factor and secondary factor is set at 60% and 40%.

Futsal, Paskibra, Dance Arts, and PMR are the four chosen extracurricular profiles that are considered excellent. La principal diferencia en el perfil óptimo está en el aspecto del talento. Paskibra indica el nivel más alto de condición física (B3 = 5) y disponibilidad de entrenamiento (M2 = 5). Futsal reveals certain abilities and physical conditions at a high level (B1 = 4; B3 = 4). Dance emphasises specialised skills (B1 = 4) without high physical demands (B3 = 3). PMR indicates a good foundation of skills (B2 = 4) with specialised and physical abilities at high levels.

2. Profile Matching Calculation Results

The calculation is carried out with regard to six students by comparing each student's profile to the ideal profile of the four extracurricular activities. Gap mapping, gap conversion to weight, calculation of core factor and secondary factor values, calculation of total values for each aspect, up to final values and ranking are all included. Hasilnya ditunjukkan dalam Tabel 2. Final Value Matrix of Student Suitability for Extracurricular Activities.

Tabel 2. Final Value Matrix of Student Suitability for Extracurricular Activities

Student	Futsal	Paskibra	Seni Tari	PMR	Recommendation
Andi	4,625	**4,675**	4,525	4,675	Paskibra
Budi	4,625	**4,900**	4,525	4,675	Paskibra
Citra	4,725	4,325	**4,825**	4,675	Seni Tari
Dewi	4,375	4,275	4,475	**4,625**	PMR
Eko	**4,600**	4,275	4,550	4,475	Futsal

Every kid obtains a unique appropriateness score for every extracurricular activity, as Table 2, demonstrates. For the Paskibra extracurricular, Budi received the highest final score of 4.900, while Dewi and Eko received the lowest score of 4.275. This demonstrates how one extracurricular activity could be ideal for one youngster while being less appropriate for another.

It is suggested that Andi and Budi join Paskibra, Citra join Dance Arts, Dewi join PMR, and Eko join Futsal based on the ranking. The final Paskibra and PMR scores for Andi are both 4.675. The extracurricular activity with a higher talent aspect score is given priority in order to resolve a tie, under the specified guidelines. Paskibra is the major recommendation and PMR is the backup because Andi's talent score in Paskibra (4.80) is greater than in PMR (4.50).

Tabel 3. Data on Criteria and Factor Grouping

Aspect (Weight)	Code	Criteria	Factor
Interest (50%)	M1	Interest in the field	*Core*
	M2	Willingness to participate in training	*Core*
	M3	Motivation and environmental support	*Secondary*
Talent (50%)	B1	Special ability	*Core*
	B2	Basic skills	*Core*
	B3	Physical/supporting conditions	*Secondary*
	B4	Relevant experience/achievements	*Secondary*

Tabel 4. Ideal Extracurricular Profile

Extracurricular	M1	M2	M3	B1	B2	B3	B4
Futsal	4	4	3	4	4	4	3
Paskibra	4	5	3	3	4	5	3
Seni Tari	4	4	3	4	4	3	3
PMR	4	4	3	3	4	3	3

Tabel 5. Student Profile Data

Student	M1	M2	M3	B1	B2	B3	B4
Andi	5	4	3	3	4	5	2
Budi	4	5	4	3	4	5	3
Citra	4	4	3	5	4	2	3
Dewi	3	4	4	3	5	3	4
Eko	4	3	3	4	3	4	2

Tabel 6. Gap Mapping

Student	M1	M2	M3	B1	B2	B3	B4
Andi	5−4 = 1	4−4 = 0	3−3 = 0	3−4 = −1	4−4 = 0	5−4 = 1	2−3 = −1
Budi	0	1	1	−1	0	1	0
Citra	0	0	0	1	0	−2	0
Dewi	−1	0	1	−1	1	−1	1
Eko	0	−1	0	0	−1	0	−1

Tabel 7. Weight Conversion

Student	M1	M2	M3	B1	B2	B3	B4
Andi	4,5	5	5	4	5	4,5	4
Budi	5	4,5	4,5	4	5	4,5	5
Citra	5	5	5	4,5	5	3	5
Dewi	4	5	4,5	4	4,5	4	4,5
Eko	5	4	5	5	4	5	4

Tabel 8. Recommended Order Student

Student	Ranking 1	Ranking 2	Ranking 3	Ranking 4
Andi	**Paskibra** (4,675)*	PMR (4,675)	Futsal (4,625)	Seni Tari (4,525)
Budi	**Paskibra** (4,900)	PMR (4,675)	Futsal (4,625)	Seni Tari (4,525)
Citra	**Seni Tari** (4,825)	Futsal (4,725)	PMR (4,675)	Paskibra (4,325)

Dewi	**PMR** (4,625)	Seni Tari (4,475)	Futsal (4,375)	Paskibra (4,275)
Eko	**Futsal** (4,600)	Seni Tari (4,550)	PMR (4,475)	Paskibra (4,275)

According to the tie-breaking rule, Andi received a score of 4.675, the same as Paskibra and PMR. Because talent is more decisive in the success of training, a rule has been established that extracurricular activities with a higher Talent Score (N Bakat) are prioritised. With Andi's talent score for Paskibra (4.80) being higher than PMR (4.50), Paskibra becomes the main recommendation and PMR the alternative choice.

Conclusion

The research results show that the suitability of extracurricular activities with students' interests and talents at SMP Negeri 5 Lubuk Pakam can be identified using the profile matching method. Interests and talents are two evaluation components; each is divided into core factors and secondary factors with proportions of 60% and 40%, respectively. Each student receives different extracurricular recommendations according to their characteristics. This process includes gap mapping, weight conversion, calculating core and secondary factor values, calculating total values per aspect, and finally ranking. Each main recommendation falls into the Very Suitable category, with final scores ranging from 4.600 to 4.900, averaging 4.725. Students with the highest extracurricular profile in Paskibra received the highest scores.

Furthermore, the research results indicate that, rather than the overall high-low grades of students, recommendations are based on how closely a student's profile aligns with the ideal profile in each extracurricular activity. For example, students who have exceptional special abilities but do not have good physical condition receive the highest scores in dance arts and the lowest scores in the marching band, which requires very good physical condition. Ranking produces additional suggestions beyond the main recommendation, which the school can use after the extracurricular quota has been fulfilled. Therefore, the use of the Profile Matching method makes the placement of students into extracurricular activities more objective, measurable, and accountable compared to manual selection. This allows students' interests and talents to be developed optimally.

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