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PROMETHEE-Based Ranking of Participants Who Passed Tilawati Standardization

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Abstract:
Tilawati standardization is an essential instrument for maintaining the quality and consistency of Qur'an recitation skills among prospective teacher within educational institutions, including the Sunan Ampel Islamic Boarding School in Kediri City. However, the process of ranking or selecting passing participants often involves multi-criteria complexities, such as fluency, articulation (*makhraj*), science of recitation (*tajweed*), and other assessment aspects. This study aims to implement the Preference Ranking Organization Method for Enrichment Evaluation (PROMETHEE) to rank participants of the Tilawati Standardization test objectively, transparently, and in a structured manner. This study employed a quantitative descriptive approach using test result data from the Tilawati standardization conducted at the Sunan Ampel Islamic Boarding School in Kediri on May 16–17, 2026. The research data consisted of 20 participants as alternatives and seven assessment criteria. The analytical stages included determining alternatives, criteria, criterion values, selecting participants who met the graduation requirements, and processing the data using the PROMETHEE with the Usual Criterion preference function. Based on the initial processing results, 11 participants met the graduation criteria and were subsequently included in the ranking process. The results and data analysis demonstrate that this method is effective in facilitating decision-makers at the Sunan Ampel Islamic Boarding School to systematically identify top-performing participants, thereby optimizing the evaluation and standardization process of Qur'anic education quality.

Keywords: PROMETHEE, Tilawati standardization, Decision support system, Ranking, Student evaluation

Introduction

The Qur'an serves as the primary religious guidance for Muslims, encompassing teachings on *aqidah* (faith), worship, *muamalah* (social and economic interactions), *fiqh* (Islamic jurisprudence), morality, and various other aspects of life. Therefore, the ability to read and understand the Qur'an in accordance with proper recitation principles is an essential component of Islamic education. However, the state of Qur'anic literacy in Indonesia remains a concern. Data from the Ministry of Religious Affairs of the Republic of Indonesia, as cited by (Rosyid & Alimni, 2024) indicate that approximately 54% of Indonesian Muslims have not yet attained adequate Qur'anic literacy, particularly in understanding and applying *tajwid* rules in Qur'anic recitation. This condition highlights the need to strengthen systematic and sustainable Qur'anic education. Such efforts are particularly relevant given that the Qur'an serves as fundamental guidance for Muslims and should be studied and transmitted to future generations (Yanto et al., 2024)

The obligation to learn and teach the Qur'an is also emphasized in a hadith narrated by Uthman ibn Affan (may Allah be pleased with him), in which the Prophet Muhammad (peace be upon him) said: "The best among you are those who learn the Qur'an and teach it to others" (Sahih al-Bukhari, No. 5027).

Qur'anic education, therefore, should not be limited to reading proficiency but should also employ structured instructional methods to ensure that learners achieve the required competencies in accordance with proper recitation principles. One such approach is the Tilawati method, which integrates classical instruction with guided listening-and-recitation activities and has been adopted as an approach to Qur'anic education (Izzan & Barokah, 2024). Developed by Pondok Pesantren Nurul Falah, the method promotes Qur'anic learning through the concept of "Easy and Enjoyable" (*Mudah dan Menyenangkan*). One of its distinctive characteristics is the use of the *rost* melodic pattern consisting of three tones: flat, ascending, and descending (Rosyid & Alimni, 2024). The implementation of this method requires instructors to possess competencies that meet established standards to ensure consistency in the delivery of Qur'anic instruction.

In this context, the Tilawati Standardization program plays an important role as a mechanism for ensuring instructors' competence in implementing the Tilawati method. An interview with an *ustadz* at Pondok Pesantren Hidayatul Mubtadi'en, as cited by (Rosyid & Alimni, 2024), indicates that an important stage in instructional planning is ensuring that instructors meet the required qualifications. Instructors are required to participate in training and obtain a *syahadah* (certification) from the Tilawati Central Office in Surabaya. In essence, Tilawati Standardization is a selection and competency-development process designed to ensure that graduates possess the competencies required to teach the Qur'an at the basic level in accordance with the standards of the Tilawati method.

Assessment in the Tilawati Standardization program consists of two main components: the Micro Teaching Test and the Qur'anic Literacy Test. The Micro Teaching Test assesses *peraga* (instructional demonstration), the Tilawati book, and performance and song, whereas the Qur'anic Literacy Test covers *fashohah*, *tajwid*, *gharib and musykilat*, and voice and song (Rosyid & Alimni, 2024). Within the Micro Teaching component, participants are also assessed on their implementation of three distinctive Tilawati instructional techniques. Technique 1 requires the instructor to read one page while the participants follow the recitation; Technique 2 requires the instructor to read one line while the participants follow; and Technique 3 involves the instructor and participants reciting together. These techniques emphasize listening and following the recitation as integral elements of Qur'anic instruction.

All of these assessment components contribute to determining participants' eligibility to become instructors of the Tilawati method. Each component represents a distinct dimension of competency; therefore, participants' performance needs to be evaluated comprehensively. Under the current binary qualification mechanism, participants are ultimately categorized only as either passing or failing. Such a mechanism does not provide more detailed information regarding the relative standing or level of achievement among participants who have all met the passing requirements. However, information on differences in competency levels among successful participants can provide valuable input for evaluating and improving instructor quality.

This issue becomes more complex when the assessment involves multiple criteria that must be considered simultaneously. Participant qualification should be determined objectively based on the seven assessment criteria without relying on subjective judgments to identify participants with higher levels of competency (Aini et al., 2025; Djobo et al., 2024). However, evaluation processes in some institutions still rely on conventional media and relatively simple calculation approaches, which have limitations in accommodating multiple and complex assessment criteria (Aini et al., 2025). Consequently, the resulting ranking process may be suboptimal, and the results may not fully represent differences in participants' competency levels in a transparent manner (Aini et al., 2025).

Previous research has demonstrated the application of multi-criteria decision-making methods in Qur'anic education. Mubarokah et al. (2025), for instance, applied the Simple Additive Weighting (SAW) method to rank six Qur'anic Reading and Writing (BTQ) learning methods based on eight evaluation criteria, including the delivery of instructional materials, the availability of supporting textbooks, tajwid instruction, *makharij al-huruf*, and the use of melody in recitation. Their study illustrates how a structured decision-support approach can be used to evaluate alternatives in Qur'anic education. However, selecting a learning method differs from evaluating individual instructors' competencies, which requires an assessment framework tailored to the relevant competency standards.

To address this issue, a Decision Support System (DSS) based on Multi-Criteria Decision Making (MCDM) is required to systematically process multiple assessment criteria. One MCDM method that can be applied is the Preference Ranking Organization METHod for Enrichment Evaluation (PROMETHEE). PROMETHEE enables pairwise comparisons among alternatives based on preferences across multiple criteria (Aini et al., 2025; Majid et al., 2025). The ranking process involves calculating the Leaving Flow, which represents the degree to which an alternative outranks other alternatives, and the Entering Flow, which represents the degree to which an alternative is outranked by other alternatives. These two measures are subsequently used to derive the Net Flow, which serves as the basis for establishing the ranking order in a systematic and transparent manner (Aini et al., 2025).

Previous studies have demonstrated the application of PROMETHEE to various multi-criteria decision-making and selection problems (Aini et al., 2025; Lestari et al., 2025). Nevertheless, based on the studies reviewed in the present research, the application of PROMETHEE that specifically integrates an elimination mechanism based on mandatory passing criteria with multi-criteria ranking in the Tilawati Standardization program has not yet been identified. This gap provides an opportunity to develop a ranking approach that not only preserves the existing qualification mechanism but also provides information on the relative performance of participants who have fulfilled the required passing standards.

Based on this problem, this study aims to implement the PROMETHEE method to rank participants who pass the Tilawati Standardization program based on multiple assessment criteria. The proposed approach combines an elimination mechanism based on mandatory passing criteria with a subsequent PROMETHEE-based ranking process. This approach is expected to produce a more measurable, transparent, and objective ranking of qualified participants while providing additional information regarding differences in achievement among those who have met the established passing standards. Furthermore, this study is expected to contribute methodologically to the development of Decision Support Systems for evaluation and selection processes in Qur'anic educational institutions.

Methods

This study employed a quantitative descriptive approach using the *Preference Ranking Organization METHod for Enrichment Evaluation* (PROMETHEE) as a multi-criteria decision-making method. PROMETHEE was applied to rank participants in the Tilawati Standardization Examination based on multiple assessment criteria while taking into account the established passing requirements (Amirullah et al., 2023).

The PROMETHEE method starts by assessing the alternatives against the specified criteria using numerical data. Its implementation requires information about the relative importance of each criterion and the decision maker's preference functions. Such information is established by comparing the performance of alternatives with respect to each criterion. The implementation of PROMETHEE involves a sequence of computational procedures, which are outlined in this study in seven steps adapted from Abdullah et al. (2019) and Nalsa et al. (2024).

Step 1, *determine the criterion and the alternatives.* The study utilized data from participants of the Tilawati Standardization Examination conducted at Sunan Ampel Islamic Boarding School, Kediri, on May 16–17, 2026. A total of 20 participants were included as alternatives, comprising 12 male students, 4 female students, and 4 teachers from SD Plus Sunan Ampel. Data were collected through document analysis of the Tilawati Standardization assessment results and interviews with informants to obtain information regarding the examination procedures, assessment criteria, and passing requirements. The interviews were conducted online via Zoom and WhatsApp.

The participants' assessment data consisted of seven criteria: Teaching Aids/Demonstration Materials (C1), Tilawati Book (C2), Performance and Song (C3), *Fashohah* (C4), *Tajwid* (C5), *Gharib and Musykilat* (C6), and Voice and Song (C7). All seven criteria were classified as benefit criteria, meaning that higher scores indicate a higher level of achievement on the respective criterion (Azziza et al., 2026).

Step 2, *establishing the minimum passing requirements*. The minimum passing requirements are established based on the Tilawati Standardization assessment criteria. Participants must meet the minimum requirement for each criterion to remain eligible for the subsequent ranking process.

Step 3, convert participants' raw assessment scores into criterion scores according to the assessment rubric. The PROMETHEE analysis employs seven criteria, each of which is assigned a score-conversion scale based on the Tilawati Standardization assessment guidelines (Munaqisy, 2018). The conversion scales are used to transform participants' raw assessment results into numerical scores for each criterion. These scores represent the participants' performance levels according to the specified assessment standards and are subsequently used in the PROMETHEE calculations. The score-conversion scales for each criterion are presented in Table 1.

Table 1. Tilawati Standardization Assessment Guidelines and the Score-Conversion Scales

No.	Criterion (Code)	Raw Score / Assessment Result	Converted Score
1.	Teaching Aids (*Peraga*) (C1)	100%	2
		50%≤Score<100%	1
		Score<50%	0
2.	Tilawati Book (C2)	100%	3
		80%	2
		60%	1
		Score<60%	0
3.	Performance and Song (C3)	100%	5
		87,5%	4
		75%	3
		62,5%	2
		50%	1
		Score<50%	0
4.	*Fashohah* (C4)	28	4
		27	3
		26	2
		25	1
		Score<25	0
5.	*Tajwid* (C5)	45	8
		44	7
		43	6
		42	5
		41	4
		40	3
		39	2
		38	1
		Score<38	0
6.	*Gharib and Musykilat* (C6)	10	4
		9	3
		8	2
		7	1
		Score<7	0
7.	Voice and Song (C7)	7	3
		6	2
		5	1

The scores for the assessment criteria are obtained from two assessment components: the Micro Teaching process and the Qur'anic Literacy process. The scores for C1, C2, and C3 are derived from the assessment of several indicators during the Micro Teaching process. To determine the final scores for these three criteria, the total points obtained are divided by the maximum possible points, as expressed in Equation (1):

$$Final\ Score = \frac{Points\ Obtained}{Maximum\ Possible\ Points} \times 100\% \quad (1)$$

Step 4, eliminate alternatives that do not satisfy the minimum passing requirements. A score of zero indicating failure to meet the minimum requirement for the corresponding criterion.

Step 5, determine the criterion weights. The criterion weights represent the relative importance of each criterion in the decision-making process. In this study, equal weights are assigned to all seven criteria, indicating that each criterion contributes equally to the aggregated multicriteria preference index.

Step 6, select the preference function to be used and calculate the deviations and preference degrees for each pair of alternatives. PROMETHEE provides six types of preference functions for evaluating the deviations between pairs of alternatives. In this study, the Usual Criterion is selected to determine the preference degree, whereby a preference value of 1 is assigned when one alternative performs better than another, while a value of 0 is assigned otherwise.

$$H(b) = \begin{cases} 1, jika\ b > 0 \\ 0, jika\ b \leq 0 \end{cases} \tag{2}$$

Where:

$H(b)$ = the difference function for a criterion between a pair of alternatives

b = the difference in scores for a given criterion

Step 7, calculate the aggregated multicriteria preference index. At this stage, the preference degrees obtained for each criterion are aggregated into a single multicriteria preference index for each pair of alternatives. Since all seven criteria are assigned equal weights, the index is calculated as the arithmetic mean of the preference degrees across all criteria.

$$\pi(a,b) = \frac{1}{n}\sum_{j=1}^{n} P_j(a,b) \tag{3}$$

Where:

$\pi(a,b)$ = the multicriteria preference index of alternative a over alternative b

$P_j(a,b)$ = the preference degree of alternative a over alternative b with respect to the j-th criterion

n = the total number of criteria

Step 8, calculate the leaving flow and entering flow. At this stage, the leaving flow and entering flow are calculated for each alternative based on the aggregated multicriteria preference indices. The leaving flow measures the degree to which an alternative is preferred over the other alternatives, whereas the entering flow indicates the degree to which an alternative is outranked by the other alternatives.

$$\varphi^{+}(a) = \frac{1}{m-1} \sum_{b=1\ b\neq a}^{m} \pi\ (a,b) \tag{4}$$

Where:

$\varphi^{+}(a)$ = the leaving flow of alternative a

$\pi(a,b)$ = the multicriteria preference index of alternative a over alternative b

m = the total number of alternatives

$$\varphi^{-}(a) = \frac{1}{m-1} \sum_{b=1\ b\neq a}^{m} \pi\ (a,b) \tag{5}$$

Where:

$\varphi^-(a)$ = the entering flow of alternative a
$\pi(a,b)$ = the multicriteria preference index of alternative a over alternative b
m = the total number of alternatives

Step 9, calculate the net flow and establish the final ranking of participants. At this stage, the net flow for each alternative is calculated by subtracting its entering flow from its leaving flow. The alternatives are then ranked in descending order of their net flow values, with a higher net flow indicating a higher ranking.

$$\varphi\ (a) = \ \varphi^+(a) - \ \varphi^-(a) \tag{6}$$

Where:
$\varphi\ (a)$ = the net flow of alternative a
$\varphi^+(a)$ = the leaving flow of alternative a
$\varphi^-(a)$ = the entering flow of alternative a

Results and Discussion

Findings

The same assessment procedure was applied to all 20 alternatives. The scores for criteria C1, C2, and C3 were obtained from the evaluation of indicators assessed during the Micro Teaching process, whereas the scores for C4 to C7 were derived from the respective components of the Tilawati Standardization assessment. The resulting raw assessment scores for all alternatives are presented in Table 2 before being converted into criterion scores according to the prescribed assessment scales.

Table 2. Raw Assessment Scores of the Alternatives

Alternative	Criterion						
	C1	C2	C3	C4	C5	C6	C7
PT01	66,6%	80%	87,5%	24	36	6	6
PT02	66,6%	100%	87,5%	28	45	9	7
PT03	66,6%	80%	87,5%	26	41	8	6
PT04	66,6%	80%	87,5%	25	38	2	6
PT05	100%	80%	87,5%	28	44	8	7
PT06	100%	100%	100%	28	43	9	7
PT07	100%	100%	100%	27	43	8	7
PT08	66,6%	80%	87,5%	25	38	2	6
PT09	66,6%	80%	75%	24	37	2	5
PT10	100%	80%	62,5%	22	30	0	5
PT11	66,6%	80%	100%	27	42	10	6
PT12	100%	100%	100%	26	40	8	6
PT13	66,6%	80%	75%	25	39	4	6
PT14	100%	80%	87,5%	24	36	4	5
PT15	100%	100%	75%	25	37	6	6
PT16	100%	80%	100%	26	41	7	6
PT17	66,6%	60%	75%	26	40	7	6
PT18	100%	80%	62,5%	27	41	7	6
PT19	100%	100%	100%	28	44	8	7
PT20	100%	80%	75%	22	32	1	5

The raw assessment scores were subsequently converted into criterion scores using the score-conversion scales specified in the Tilawati Standardization assessment guidelines. Each criterion has its own conversion scale: C1 ranges from 0 to 2, C2 from 0 to 3, C3 from 0 to 5, C4 from 0 to 4, C5 from 0 to 8, C6 from 0 to 4, and C7 from 1 to 3. These converted scores provide a standardized numerical representation of participants' performance according to the assessment rubric and serve as the input for the subsequent PROMETHEE analysis.

Table 3. Converted Criterion Scores of the Alternatives

Alternative	Criterion						
	C1	C2	C3	C4	C5	C6	C7
PT01	1	2	4	0	0	0	2
PT02	1	3	4	4	8	3	3
PT03	1	2	4	2	4	2	2
PT04	1	2	4	1	1	0	2
PT05	2	2	4	4	7	2	3
PT06	2	3	5	4	6	3	3
PT07	2	3	5	3	6	2	3
PT08	1	2	4	1	1	0	2
PT09	1	2	3	0	0	0	1
PT10	2	2	2	0	0	0	1
PT11	1	2	5	3	5	4	2
PT12	2	3	5	2	3	2	2
PT13	1	2	3	1	2	0	2
PT14	2	2	4	0	0	0	1
PT15	2	3	3	1	0	0	2
PT16	2	2	5	2	4	1	2
PT17	1	1	3	2	3	1	2
PT18	2	2	2	3	4	1	2
PT19	2	3	5	4	7	2	3
PT20	2	2	3	0	0	0	1

Following the score-conversion process, alternatives were screened against the minimum passing requirements established for this study. An alternative was eliminated if it received a converted score of zero in at least one criterion. This screening procedure was conducted before applying PROMETHEE, ensuring that the ranking process included only alternatives that met the specified requirements across all criteria.

As a result, nine alternatives (PT01, PT04, PT08, PT09, PT10, PT13, PT14, PT15, and PT20) were eliminated. The remaining 11 alternatives were retained for the subsequent preference analysis. Their converted criterion scores are presented in Table 4.

Table 4. Alternatives Retained After the Elimination Process

Alternative	Criterion						
	C1	C2	C3	C4	C5	C6	C7
PT02	1	3	4	4	8	3	3
PT03	1	2	4	2	4	2	2
PT05	2	2	4	4	7	2	3

PT06	2	3	5	4	6	3	3
PT07	2	3	5	3	6	2	3
PT11	1	2	5	3	5	4	2
PT12	2	3	5	2	3	2	2
PT16	2	2	5	2	4	1	2
PT17	1	1	3	2	3	1	2
PT18	2	2	2	3	4	1	2
PT19	2	3	5	4	7	2	3

After the elimination process, the 11 retained alternatives were compared pairwise with respect to all seven criteria. The Usual Criterion was selected from the six available PROMETHEE preference-function types. Under this function, the preference degree is 1 when the score of one alternative is greater than that of the alternative being compared; otherwise, the preference degree is 0. Thus, equal scores produce a preference degree of zero, and any positive difference is treated as a preference regardless of its magnitude.

The preference degrees obtained from these pairwise comparisons are presented in Table 5. Each ordered pair represents a comparison between two alternatives, with the first alternative evaluated against the second.

Table 5. Preference Degrees for Pairwise Comparisons

Alternative Pair	Criterion						
	C1	C2	C3	C4	C5	C6	C7
(02,03)	0	1	0	1	1	1	1
(02,05)	0	1	0	0	1	1	0
(02,06)	0	0	0	0	1	0	0
(02,07)	0	0	0	1	1	1	0
(02,11)	0	1	0	1	1	0	1
(02,12)	0	0	0	1	1	1	1
(02,16)	0	1	0	1	1	1	1
(02,17)	0	1	1	1	1	1	1
(02,18)	0	1	1	1	1	1	1
(02,19)	0	0	0	0	1	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(19,17)	1	1	1	1	1	1	1
(19,18)	0	1	1	1	1	1	1

The preference degrees for the seven criteria were aggregated to obtain a single multicriteria preference index for each ordered pair of alternatives. Since all criteria were assigned equal weights, each criterion contributed $\frac{1}{7}$ to the aggregated index. Accordingly, the multicriteria preference index was calculated as the sum of the seven criterion-specific preference degrees divided by seven.

The resulting matrix, presented in Table 6, represents the overall preference of each alternative over every other alternative. A higher index indicates a stronger preference for the first alternative over the second under the selected preference function and equal-weighting scheme.

Table 6. Multicriteria Preference Index Matrix

Alt	PT02	PT03	PT05	PT06	PT07	PT11	PT12	PT16	PT17	PT18	PT19
PT 02	-	0,714285714	0,428571429	0,142857143	0,428571429	0,571428571	0,571428571	0,714285714	0,857142857	0,857142857	0,285714286
PT 03	0	-	0	0	0	0	0,142857143	0,142857143	0,571428571	0,285714286	0,285714286
PT 05	0,142857143	0,571428571	-	0,142857143	0,285714286	0,571428571	0,428571429	0,571428571	1	0,714285714	0
PT 06	0,285714286	1	0,428571429	-	0,285714286	0,714285714	0,571428571	0,714285714	1	0,857142857	0,142857143
PT 07	0,285714286	0,857142857	0,285714286	0	-	0,571428571	0,428571429	0,714285714	1	0,714285714	0
PT 11	0,285714286	0,571428571	0,285714286	0,142857143	0,142857143	-	0,428571429	0,428571429	0,714285714	0,428571429	0,142857143
PT 12	0,285714286	0,428571429	0,285714286	0	0	0,285714286	-	0,285714286	0,571428571	0,428571429	0
PT 16	0,285714286	0,285714286	0,142857143	0	0	0,142857143	0,142857143	-	0,571428571	0,142857143	0
PT 17	0	0	0	0	0	0	0	0	-	0,142857143	0
PT 18	0,142857143	0,285714286	0	0	0	0,142857143	0,285714286	0,142857143	0,571428571	-	0
PT 19	0,285714286	0,857142857	0,285714286	0,142857143	0,285714286	0,714285714	0,428571429	0,714285714	1	0,857142857	-

The multicriteria preference index matrix was subsequently used to calculate the leaving flow, entering flow, and net flow for each retained alternative. The leaving flow measures the extent to which an alternative is preferred over the other alternatives, whereas the entering flow measures the extent to which an alternative is outranked by the others. The net flow is obtained by subtracting the entering flow from the leaving flow and serves as the basis for the final PROMETHEE II ranking. The resulting leaving flow values are presented in Table 7.

Table 7. Leaving Flow Values

Alternative	Hasil Leaving Flow
PT02	0,557142857
PT03	0,142857143
PT05	0,442857143
PT06	0,6
PT07	0,485714286
PT11	0,357142857
PT12	0,257142857
PT16	0,171428571
PT17	0,014285714
PT18	0,157142857
PT19	0,557142857

The entering flow values, which indicate the extent to which each alternative is outranked by the other alternatives, are presented in Table 8.

Table 8. Entering Flow Values

Alternative	Entering Flow
PT02	0,2
PT03	0,557142857
PT05	0,214285714
PT06	0,057142857
PT07	0,142857143
PT11	0,371428571

PT12	0,342857143
PT16	0,442857143
PT17	0,785714286
PT18	0,542857143
PT19	0,085714286

The net flow for each alternative was then calculated as the difference between its leaving flow and entering flow. The resulting values are reported in Table 9.

Table 9. Net Flow Values

Alternative	Net Flow
PT02	0,357142857
PT03	-0,414285714
PT05	0,228571429
PT06	0,542857143
PT07	0,342857143
PT11	-0,014285714
PT12	-0,085714286
PT16	-0,271428571
PT17	-0,771428571
PT18	-0,385714286
PT19	0,471428571

The final ranking was established by arranging the alternatives in descending order of their net flow values. Alternatives with higher net flow values occupy higher positions in the ranking because they demonstrate a stronger overall preference over the other alternatives under the PROMETHEE II procedure.

As shown in Table 10, PT06 achieved the highest net flow value of 0.542857, followed by PT19 with 0.471429 and PT02 with 0.357143. These alternatives occupied the first, second, and third positions, respectively. In contrast, PT17 recorded the lowest net flow value of −0.771429 and ranked last among the 11 retained alternatives.

Table 10. Final Ranking of the Alternatives

Alternative	Net Flow	Rank
PT02	0,357142857	3
PT03	-0,414285714	10
PT05	0,228571429	5
PT06	0,542857143	1
PT07	0,342857143	4
PT11	-0,014285714	6
PT12	-0,085714286	7
PT16	-0,271428571	8
PT17	-0,771428571	11
PT18	-0,385714286	9
PT19	0,471428571	2

Overall, the results indicate that PT06 achieved the strongest relative performance among the alternatives retained after the minimum-requirement screening. This outcome reflects the aggregate comparison of the alternatives across all seven

criteria, rather than performance on any single criterion. The PROMETHEE II ranking therefore complements the initial eligibility screening by providing a more detailed comparison of participants who satisfy the specified minimum requirements.

Analysis

The results of the data processing indicate that the application of PROMETHEE produces a ranking that differs from the binary pass/fail mechanism used in the Tilawati Standardization Examination. The analysis was conducted in stages, beginning with the application of the eligibility requirements as an elimination mechanism, followed by a multi-criteria comparison of participants who satisfied all the requirements. Of the 20 participants initially considered as alternatives, nine participants, namely PT01, PT04, PT08, PT09, PT10, PT13, PT14, PT15, and PT20, were eliminated because they obtained a score of 0 on at least one criterion. Consequently, 11 participants satisfied all minimum requirements and were subsequently ranked using PROMETHEE.

The elimination stage plays an important role in separating the functions of eligibility determination and ranking within the decision-making process. Participants who failed to satisfy any of the required aspects were not further compared with those who met all requirements. Under this approach, PROMETHEE was not used to determine whether a participant met the minimum standard, but rather to determine the relative position of participants who had already satisfied that standard. Therefore, the final results represent the relative performance order among participants who fulfilled the eligibility requirements.

Following the elimination process, seven criteria were simultaneously incorporated into the comparison process, namely C1 through C7. All criteria were treated as benefit criteria, meaning that higher scores on a given criterion increased an alternative's preference over other alternatives. The scores for each criterion were first converted according to the Tilawati Standardization assessment guidelines. In constructing the multi-criteria preference index, the seven criteria were treated proportionally by averaging the preference values across the criteria. Thus, each criterion contributed equally to the multi-criteria preference index at this stage.

The calculation results reveal clear differences in the degree of dominance among participants. The *Leaving Flow* represents the extent to which a participant is preferred over other participants, whereas the *Entering Flow* indicates the extent to which that participant is dominated by other alternatives. The difference between these two measures produces the *Net Flow*, which serves as an indicator of the participant's relative position in the PROMETHEE ranking.

Based on Table 7, PT06 obtained a *Leaving Flow* of 0.600, the highest value among all alternatives. This value indicates that PT06 had a relatively high average preference when compared with the other participants. PT19 and PT02 also recorded relatively high *Leaving Flow* values, both equal to 0.557143. In contrast, PT17 had the lowest *Leaving Flow*, at 0.014286, indicating that PT17 was relatively infrequently preferred over the other alternatives.

When the *Entering Flow* values in Table 8 are considered, PT06 again exhibited a relatively low value of 0.057143. This indicates that PT06 was relatively less dominated by the other participants. A similar pattern was observed for PT19, with an *Entering Flow* of 0.085714, and PT02, with a value of 0.200000. In contrast, PT17 had an *Entering Flow* of 0.785714, the highest value among all alternatives. This indicates that PT17 experienced a relatively high degree of dominance from the other alternatives. The combination of a low *Leaving Flow* and a high *Entering Flow* resulted in PT17 occupying the lower end of the ranking.

The comparison of these two measures produced the *Net Flow* values presented in Table 9. PT06 obtained a *Net Flow* of 0.542857, followed by PT19 with 0.471429 and PT02 with 0.357143. These three participants had positive *Net Flow* values and occupied the three highest positions in the ranking. In contrast, PT17 obtained a *Net Flow* of −0.771429, the lowest value among all alternatives. A negative *Net Flow* indicates that, in aggregate, the degree to which an alternative is dominated by other alternatives is greater than the degree to which it dominates other alternatives.

The ranking results in Table 10 show that PT06 occupied the first position, followed by PT19 in the second position and PT02 in the third position. PT07 ranked fourth with a *Net Flow* of 0.342857, while PT05 ranked fifth with a value of 0.228571. These five participants had positive *Net Flow* values, indicating that each had a higher aggregate preference over the other alternatives than the aggregate preference received from those alternatives.

Among the participants with negative *Net Flow* values, PT11 ranked sixth with a value of −0.014286, followed by PT12 in seventh place with −0.085714, PT16 in eighth place with −0.271429, PT18 in ninth place with −0.385714, and PT03 in tenth place with −0.414286. PT17 ranked eleventh with a value of −0.771429. These differences demonstrate that passing the examination does not imply that all participants have the same level of achievement. Rather, PROMETHEE can identify differences in the relative positions of participants who have all satisfied the minimum requirements.

The findings also indicate that the ranking is not determined solely by performance on a single criterion but results from the aggregation of preferences across the seven criteria. For example, PT06 achieved relatively high scores across several criteria, namely C1 = 2, C2 = 3, C3 = 5, C4 = 4, C5 = 6, C6 = 3, and C7 = 3. This combination resulted in relatively strong dominance over the other alternatives while simultaneously resulting in a relatively low degree of dominance received from them. In contrast, PT17 obtained scores of C1 = 1, C2 = 1, C3 = 3, C4 = 2, C5 = 3, C6 = 1, and C7 = 2. Although PT17 satisfied all minimum criteria and was therefore not eliminated, its performance on several criteria was relatively lower than that of most other alternatives. This condition is reflected in its lowest *Net Flow* value.

Therefore, the results demonstrate that the elimination mechanism and PROMETHEE serve different but complementary functions. The elimination mechanism ensures that only participants who satisfy all minimum requirements are considered in the ranking process, whereas PROMETHEE provides information on the relative positions of participants based simultaneously on seven criteria. This approach allows the evaluation results to go beyond a simple pass/fail classification by providing information on variations in achievement levels among participants who have met the required standard.

Overall, the findings indicate that PROMETHEE can be used to process Tilawati Standardization assessment data involving multiple criteria. The resulting ranking provides additional information for the organizers regarding the relative positions of participants after they have satisfied the eligibility requirements. Such information can serve as a basis for evaluating participant achievement and identifying participants who demonstrate relatively higher or lower levels of achievement within the group that has met the required standard.

Conclusion

Based on the research findings, the application of the PROMETHEE method can rank participants in the Tilawati Standardization Examination after an initial elimination

process based on the minimum eligibility requirements. Of the 20 participants considered as the initial alternatives, nine were eliminated because they obtained a score of 0 on at least one criterion, while 11 participants satisfied all requirements and were subsequently ranked based on seven assessment criteria. The ranking results show that PT06 ranked first with a Net Flow value of 0.542857, followed by PT19 with 0.471429 and PT02 with 0.357143. Meanwhile, PT17 ranked eleventh with a Net Flow value of −0.771429. These findings indicate that participants who satisfy the same eligibility requirements may still exhibit differences in relative achievement when evaluated simultaneously across multiple criteria. Therefore, integrating the elimination mechanism with PROMETHEE provides more detailed information than a binary pass/fail mechanism, as it not only identifies participants who meet the minimum standard but also reveals their relative positions and variations in achievement.

This study contributes by integrating an elimination mechanism based on minimum eligibility requirements with the PROMETHEE method to produce a multi-criteria ranking of Tilawati Standardization participants. This approach complements the binary pass/fail mechanism by providing information on the relative positions and differences in achievement among participants who meet the required standard.

The study is limited to 20 participants from a single examination session and applies equal weights to all criteria. Future research could employ more diverse datasets and consider criterion weighting based on expert judgment or an appropriate weighting method to obtain more representative ranking results.

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