



Triangular OverConorm with MCDM Methodology for Association Between Speaking Proficiency and Self-Assurance in English Language and Literature

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Abstract: A multifaceted assessment methodology for English language and literature courses in postsecondary educational institutions is presented in this study. The model incorporates qualitative and quantitative indicators across six fundamental criteria—Curriculum Design, Instructional Quality, Student Engagement, Research Output, Cultural Integration, and Language Proficiency Development—in recognition of the variety of educational techniques. These criteria are used to evaluate the efficacy of 18 options that reflect different departments, instructional approaches, or institutions. The multi-criteria decision-making (MCDM) methodology is used to deal with different criteria and alternatives. This study uses the COPRAS methodology to rank the alternatives. The triangular OverConorm is used in this study to deal with interval values of each criterion and alternatives. The sensitivity analysis is conducted to show the ranks of alternatives under different cases. We proposed six cases in weights criteria. The results contribute to the continuous improvement of the quality of humanities education by illuminating important program strengths and areas for improvement.

Keywords: Triangular OverConorm; MCDM Methodology; Self-Assurance; English Language and Literature.

1. Introduction

Speaking is a crucial supplementary tool in communication and one of the four fundamental language skills, the others being listening, writing, reading, and speaking—that is of paramount importance in day-to-day living. Speaking has numerous obstacles as a practical outcome, including psychological, physiological, physical, systematic, and attitudinal ones. While some are

external, such as physiological, physical, or systemic barriers, others are internal, such as psychological and attitude barriers. Lack of confidence can be categorized as psychological or attitude hurdles that make it difficult for learners to communicate in their own tongue or even in a foreign language[1], [2].

McIntyre proposed that a learner's propensity to speak in a foreign language is strongly influenced by their level of self-confidence. High levels of self-confidence are necessary for speaking, which entails being certain of one's actions and avoiding shyness and aggression in social settings. Therefore, self-confidence is one of the keys that unlock some significant communication hurdles to being a native-like speaker of a foreign language[3], [4].

Studies on language proficiency and instruction are overrepresented in the body of research on English Language Teaching (ELT). Even while speaking necessitates physiological competence and a physically adequate setting, it would be more reasonable to classify the studies under the headings of speaking skill and self-confidence[5], [6].

Self-confidence is characterized by a person's acceptance of his own skills, love for himself, and emotional intelligence. The researcher breaks down self-confidence into two subcategories, extrinsic and intrinsic, and goes on to explain these in the following manner: Intrinsic self-confidence refers to the feelings and ideas that people have about being happy or at peace with themselves. Positive thinking, articulating specific goals, self-love, self-knowledge, and self-esteem are the components of intrinsic self-confidence. Behavior and attitude toward other people are also examples of extrinsic self-confidence. Emotional regulation and communication are building blocks of extrinsic self-confidence. Extrinsic and intrinsic self-confidence were identified as two factors in a study to create a self-confidence measure[7], [8].

There are two categories of self-confidence: inner confidence and outer confidence. Love for oneself, self-awareness, goal-setting, and optimistic thinking are the components that make up inner confidence. An individual's thoughts and emotions that demonstrate how happy and content they are with themselves are known as inner confidence. Communication and the ability to regulate emotions are the components that make up exterior confidence. People with high levels of inner confidence are content with who they are and have a high sense of self-worths[9], [10].

Speaking, a generally overlooked aspect of language instruction, must be one of the primary priorities in an EFL context as communication and travel opportunities increase and national borders are eliminated. In communication, particularly speaking, self-confidence is becoming more and more important as a facilitator of accurate and fluent speech in both the mother tongue and the target language.

Considering all the previously mentioned factors, the current study intends to retest whether a relationship between speaking ability and self-confidence exists. Some measures to lower or

increase self-confidence in accordance with the research findings could be implemented after examining the correlation.

Then, using user-defined importance weights or other objective approaches applied to the criteria, multi-criteria decision-making (MCDM) algorithms choose the best option from the decision matrix. Several MCDM strategies have been used in numerous studies to determine parameter configurations for different machining performance goals[11], [12].

To ascertain the ranking agreement of various MCDM methodologies, comparative studies employ methods such as Spearman's rank correlation coefficient. These strategies support the validity of these techniques in determining the best machining parameters for a range of materials and performance requirements[13], [14]. As a result, MCDM approaches have shown success; they often use experimental data and methods like as ANOVA to evaluate how cutting parameters affect performance criteria. These methods are capable of efficiently determining appropriate machining parameters[15], [16].

This study suggests a novel framework for determining the Association between speaking proficiency and self-assurance in English language and literature by utilizing COPRAS MCDM approaches. The performance of MCDM parts made using the determined ideal criteria will be compared to a baseline set of parameters to assess the framework. This study's scope includes the following: Experiments and data collection are the first steps in the process. The average method is used to show the best creation. MCDM methods are used to achieve the appropriate optimal solution, considering COPRAS techniques[17], [18]. The triangular OverConorm is used to integrate the different decision matrix between the criteria and alternatives.

The suggested approach offers students substantial advantages by determining the ideal alternative and criterion. This method balances several performance goals to improve Association between speaking proficiency and self-assurance in English language and literature. The results also offer useful information for future studies on English language and literature.

2. Triangular OverConorm

We show the definitions of the triangular OverConorm in this section[19].

We can define the triangular OverConorm on the interval $[0, \theta]$, $\theta > 1$

$$T_{overconorm}: [0, \theta] \times [0, \theta] \rightarrow [0, \theta] \text{ where } \theta > 1 \quad (1)$$

$$\text{And for any } (G, H) \in [0, \theta] \times [0, \theta] \quad (2)$$

$$T_{overconorm}(G, H) = T_{overconorm}(H, G), \text{ commutativity} \quad (3)$$

$$T_{overconorm}(G, T_{overconorm}(H, I)) = T_{overconorm}(T_{overconorm}(G, H), I) \text{ associativity} \quad (4)$$

$$\text{if } H \leq I, \text{ then } T_{overconorm}(G, H) \leq T_{overconorm}(G, I) \text{ monotonicity} \quad (5)$$

$$T_{overconorm}(G, 0) = G, \text{ or the neutral elements is zero} \quad (6)$$

$$T_{overconorm}(G, H) = \max(G, H) \quad (7)$$

$$C(x) \circ^{\wedge} c(y) = \min\{c(x), c(y)\}$$

$$C(x) \circ^{\vee} c(y) = \max\{c(x), c(y)\}$$

The algebraic product T-norm and T-conorm

$$T - norm(x, y) = x \cdot y$$

$$T - conorm(x, y) = x + y - x \cdot y$$

The bounded $T - norm(x, y) = x \cdot y$

$$T - norm(x, y) = \max\{0, x + y - 1\}$$

$$T - conorm(x, y) = \min\{1, x + y\}$$

$$c(x) \circ^{\wedge} c(y) = \max\{\sigma, c(x) + c(y) - \rho\}$$

$$c(x) \circ^{\vee} c(y) = \min\{\rho, c(x) + c(y)\}$$

The neutrosophic offcomplement of T,I,F can be determined as:

$$< F, \sigma_I + \rho_I - I, T >$$

$$< \sigma_T + \rho_T - T, I, \sigma_F + \rho_F - F >$$

$$< \sigma_T + \rho_T - T, \sigma_I + \rho_I - I, \sigma_F + \rho_F - F >$$

The fuzzy complement

$$c(T) = 1 - T$$

$$c_0(T) = \sigma_T + \rho_T - T$$

$$c_0(I) = \sigma_I + \rho_I - I$$

$$c_0(F) = \sigma_F + \rho_F - F$$

We can define the neutrosophic N-offnorm and neutrosophic N-offconorm by three functions such as:

$$T_o \subseteq [\sigma_T, \rho_T]$$

$$I_o \subseteq [\sigma_I, \rho_I]$$

$$F_o \subseteq [\sigma_F, \rho_F]$$

$$\sigma_T, \sigma_I, \sigma_F, \leq 0$$

$$\rho_T, \rho_I, \rho_F \geq 1$$

Then we show the steps of the COPRAS method to rank the alternatives.

Create the decision matrix.

The decision matrix is created using the interval between 0 and greater than 1. Then we use the $T_{overconorm}$ to combine the decision matrix.

Compute the criteria weights by the average method.

Compute the normalized decision matrix

$$H_{ij} = \frac{x_{ij}}{\sum_{i=1}^n x_{ij}} \quad (8)$$

Compute the weighted decision matrix.

$$K_{ij} = H_{ij}w_j \quad (9)$$

The mini and max numbers are computed for positive and cost criteria.

$$Q_{+i} = \sum_{j=1}^g K_{ij} \quad (10)$$

$$Q_{-i} = \sum_{j=g+1}^n K_{ij} \quad (11)$$

Compute the relative numbers

$$R_o = Q_{+i} + \frac{\sum_{i=1}^m Q_{-i}}{Q_{-i} \sum_{i=1}^m \frac{1}{Q_{-i}}} \quad (12)$$

Rank the alternatives.

3. Case Study

This study proposed a case study to show the validation of the proposed approach. We use six criteria and 18 alternatives such as:

- Curriculum Design (C1):
- Assesses the comprehensiveness, coherence, and modern relevance of offerings.
- Instructional Quality (C2):
- Evaluates the pedagogical effectiveness and innovation of faculty teaching methods.
- Student Engagement (C3):
- Measures classroom participation, discussion quality, and learner motivation.
- Research Output (C4):
- Considers faculty and student involvement in academic research, publications, and presentations.
- Cultural Integration (C5):
- Assesses how well the program incorporates global and local cultural texts, contexts, and perspectives.
- Language Proficiency Development (C6):
- Focuses on student progress in critical language skills: reading, writing, speaking, and listening.
- ✓ A1: Program A from University 1

- ✓ A2: Program B from University 2
- ✓ A3: Project-based Learning Model
- ✓ A4: Literature Focused Curriculum
- ✓ A5: Communicative Language Teaching Approach
- ✓ A6: Hybrid Online-English Literature Program
- ✓ A7: Multicultural Literature Emphasis Program
- ✓ A8: Performance and Drama Integration Curriculum
- ✓ A9: British Literature Specialization
- ✓ A10: American Literature Specialization
- ✓ A11: Postcolonial Studies Emphasis
- ✓ A12: Linguistics-Integrated Literature Program
- ✓ A13: Critical Theory-Driven Instruction
- ✓ A14: Undergraduate Honors Program
- ✓ A15: Experiential Fieldwork and Internships Focus
- ✓ A16: Research-Intensive Graduate Program
- ✓ A17: Interdisciplinary English Studies Track
- ✓ A18: International Exchange-Based English Program

Three experts create the decision matrix between the criteria and alternatives as shown in Table 1. These decision matrices are combined using the $T_{overconorm}$. Then we compute the criteria weights.

C1 – (Weight: 0.1682)

This criterion holds significant weight, indicating that the structure, coherence, and relevance of the curriculum are crucial in evaluating program effectiveness. Emphasis is placed on whether the curriculum covers contemporary topics, classical literature, and skills development.

C2 – (Weight: 0.1649)

Slightly lower than Curriculum Design, this reflects the importance of teaching methods, faculty expertise, and classroom dynamics. Programs are evaluated based on how well instructors engage students and deliver content.

C3 – (Weight: 0.1632)

This weight shows a balanced yet slightly lesser emphasis on how actively students participate in learning. It includes involvement in discussions, collaborative projects, and literary activities.

C4 – (Weight: 0.1651)

Close in value to Instructional Quality, this criterion assesses both faculty and student contributions to scholarly publications, conference presentations, and literary research projects.

C5 – (Weight: 0.1678)

This weight underscores the value of incorporating global, local, and diverse cultural texts and perspectives. It assesses how well the program connects literature with real-world cultural dynamics.

C6 – (Weight: 0.1709)

The highest among all, this criterion reflects the top priority: enhancing students' skills in reading, writing, listening, and speaking. It gauges how effectively programs help students achieve fluency and academic command of the English language.

These weights suggest a well-balanced evaluation, with a slight preference for language proficiency and curriculum structure, which are foundational in language and literature education.

Table 1. The assessment values.

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
A ₁	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.9]
A ₂	[0,1.9]	[0,1.1]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]
A ₃	[0,1.8]	[0,1.1]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.8]
A ₄	[0,1.6]	[0,1.2]	[0,1.3]	[0,1.2]	[0,1.1]	[0,1.2]
A ₅	[0,1.5]	[0,1.1]	[0,1.6]	[0,1.8]	[0,1.9]	[0,1.8]
A ₆	[0,1.3]	[0,1.6]	[0,1.5]	[0,1.2]	[0,1.9]	[0,1.2]
A ₇	[0,1.9]	[0,1.5]	[0,1.6]	[0,1.1]	[0,1.3]	[0,1.3]
A ₈	[0,1.1]	[0,1.3]	[0,1.1]	[0,1.6]	[0,1.5]	[0,1.5]
A ₉	[0,1.2]	[0,1.9]	[0,1.9]	[0,1.9]	[0,1.6]	[0,1.6]
A ₁₀	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.9]	[0,1.8]
A ₁₁	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.9]	[0,1.8]
A ₁₂	[0,1.8]	[0,1.2]	[0,1.1]	[0,1.6]	[0,1.5]	[0,1.3]
A ₁₃	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.1]	[0,1.2]
A ₁₄	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.9]	[0,1.8]
A ₁₅	[0,1.9]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.1]	[0,1.1]
A ₁₆	[0,1.9]	[0,1.1]	[0,1.2]	[0,1.8]	[0,1.2]	[0,1.9]
A ₁₇	[0,1.1]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.3]	[0,1.8]
A ₁₈	[0,1.6]	[0,1.8]	[0,1.5]	[0,1.1]	[0,1.5]	[0,1.6]
	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
A ₁	[0,1.1]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.2]
A ₂	[0,1.2]	[0,1.8]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]
A ₃	[0,1.3]	[0,1.8]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.1]
A ₄	[0,1.5]	[0,1.2]	[0,1.3]	[0,1.9]	[0,1.1]	[0,1.9]
A ₅	[0,1.6]	[0,1.8]	[0,1.6]	[0,1.1]	[0,1.2]	[0,1.3]
A ₆	[0,1.3]	[0,1.9]	[0,1.1]	[0,1.2]	[0,1.3]	[0,1.5]
A ₇	[0,1.9]	[0,1.3]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]
A ₈	[0,1.1]	[0,1.5]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.5]
A ₉	[0,1.2]	[0,1.6]	[0,1.5]	[0,1.6]	[0,1.6]	[0,1.6]
A ₁₀	[0,1.8]	[0,1.6]	[0,1.6]	[0,1.3]	[0,1.2]	[0,1.8]
A ₁₁	[0,1.8]	[0,1.6]	[0,1.6]	[0,1.3]	[0,1.9]	[0,1.8]
A ₁₂	[0,1.1]	[0,1.1]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.2]
A ₁₃	[0,1.9]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.1]	[0,1.2]
A ₁₄	[0,1.8]	[0,1.6]	[0,1.6]	[0,1.3]	[0,1.2]	[0,1.8]
A ₁₅	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.3]	[0,1.2]
A ₁₆	[0,1.1]	[0,1.2]	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.1]
A ₁₇	[0,1.1]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.9]
A ₁₈	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.2]	[0,1.8]	[0,1.9]
	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆
A ₁	[0,1.9]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.6]	[0,1.2]
A ₂	[0,1.9]	[0,1.6]	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]
A ₃	[0,1.1]	[0,1.5]	[0,1.5]	[0,1.6]	[0,1.3]	[0,1.5]
A ₄	[0,1.6]	[0,1.3]	[0,1.6]	[0,1.2]	[0,1.2]	[0,1.3]
A ₅	[0,1.5]	[0,1.9]	[0,1.5]	[0,1.6]	[0,1.6]	[0,1.2]
A ₆	[0,1.3]	[0,1.6]	[0,1.3]	[0,1.5]	[0,1.5]	[0,1.6]
A ₇	[0,1.2]	[0,1.5]	[0,1.2]	[0,1.3]	[0,1.3]	[0,1.5]
A ₈	[0,1.8]	[0,1.3]	[0,1.8]	[0,1.9]	[0,1.9]	[0,1.3]
A ₉	[0,1.2]	[0,1.2]	[0,1.2]	[0,1.2]	[0,1.6]	[0,1.2]
A ₁₀	[0,1.1]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.2]	[0,1.8]
A ₁₁	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.2]	[0,1.8]
A ₁₂	[0,1.8]	[0,1.2]	[0,1.8]	[0,1.6]	[0,1.5]	[0,1.3]
A ₁₃	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.8]	[0,1.8]
A ₁₄	[0,1.1]	[0,1.6]	[0,1.5]	[0,1.3]	[0,1.2]	[0,1.8]

A_{15}	[0,1.2]	[0,1.3]	[0,1.5]	[0,1.6]	[0,1.1]	[0,1.2]
A_{16}	[0,1.2]	[0,1.8]	[0,1.2]	[0,1.8]	[0,1.1]	[0,1.3]
A_{17}	[0,1.8]	[0,1.9]	[0,1.3]	[0,1.5]	[0,1.9]	[0,1.5]
A_{18}	[0,1.6]	[0,1.8]	[0,1.5]	[0,1.3]	[0,1.8]	[0,1.6]

Eq. (8) is used to compute the normalized decision matrix as shown in Fig 1.

Eq. (9) is used to compute the weighted decision matrix as shown in Fig 2.

The mini and max numbers are computed for positive and cost criteria using eq. (10 and 11).

Eq. (12) is used to compute the relative numbers as shown in Fig 3.

Rank the alternatives as shown in Fig 4.

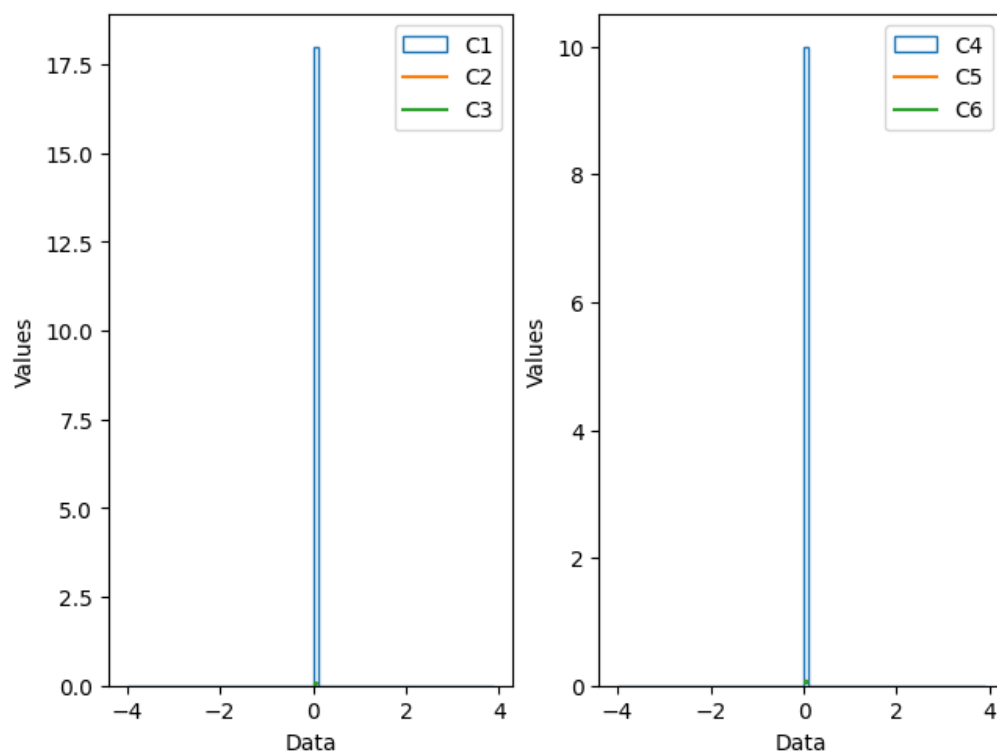


Fig 1. The normalized values.

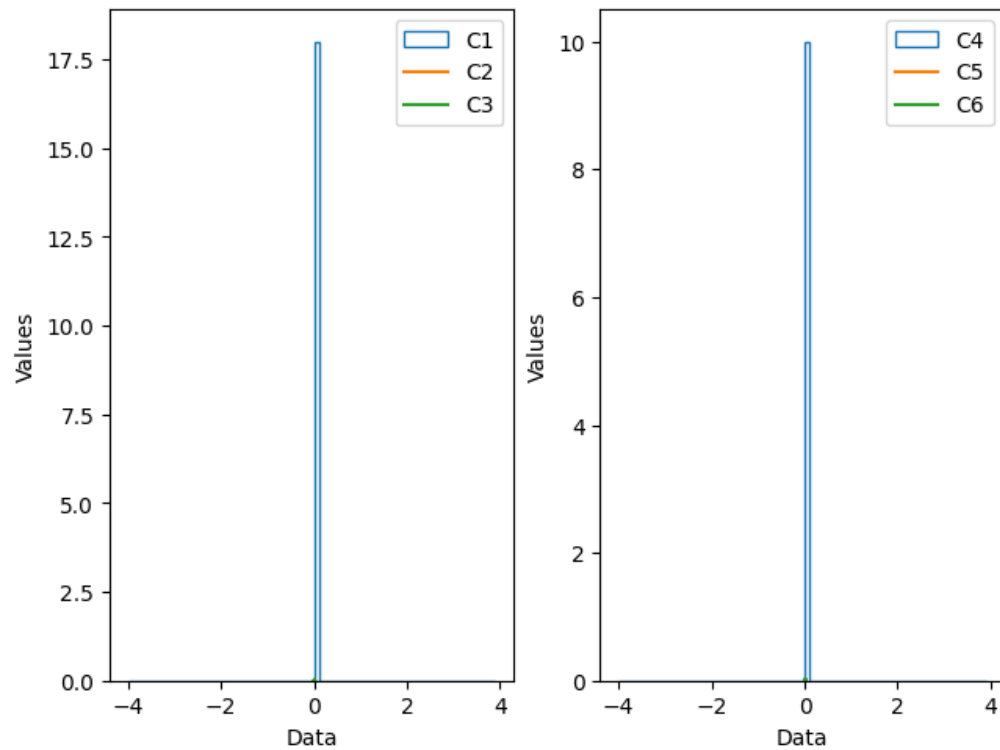


Fig 2. The weighted matrix.

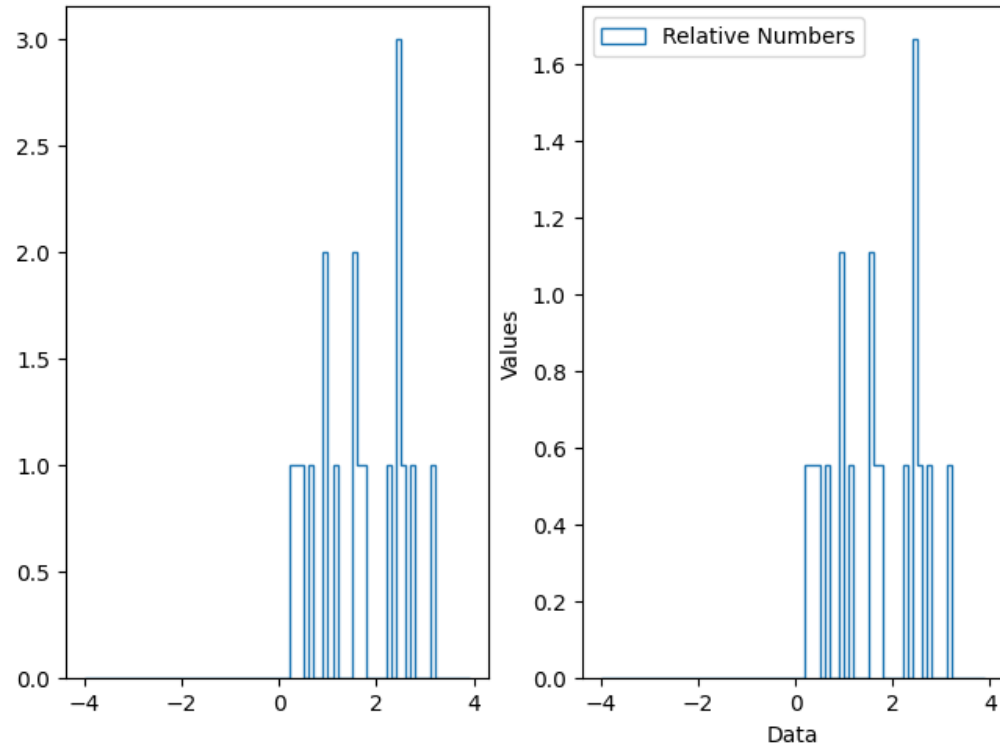


Fig 3. Relative numbers.

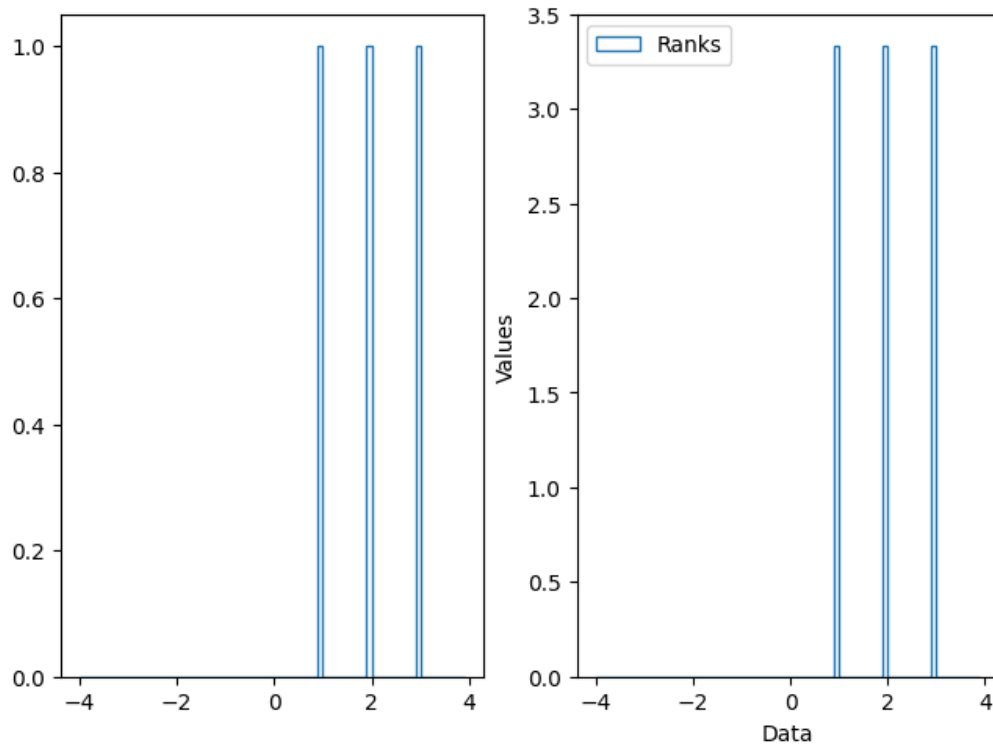


Fig 4. The ranks of alternatives.

4. Analysis

We show the sensitivity analysis between the ranks of alternatives. We change the criteria weights by six cases as shown in Fig 5. Then we apply the steps of the COPRAS method to show the ranks of alternatives. The relative numbers of six cases are shown in Fig 6. The ranks of alternatives are shown in Fig 7.

Criterion C1: Highly weighted in Case 1 (≈ 0.198): Minimal emphasis in other cases: This case likely focuses on the precision, clarity, and structural soundness of language or text.

Criterion C2: Highlighted in Case 2 (≈ 0.194)

Represents alignment with educational goals or the richness of thematic content.

Weight drops significantly in Case 2 for other criteria, indicating a targeted evaluation.

Criterion C3: Emphasis in Case 3 (≈ 0.192)

Assesses originality in language use, teaching methods, or literary interpretation.

Shows a marked drop in Case 3, spotlighting this aspect alone.

Criterion C4: Primary focus in Case 4 (≈ 0.194)

In this case, weight is placed on how well the alternative incorporates cultural literacy or relevance to context.

Criterion C5: Given the highest weight in Case 5 (≈ 0.198)

Indicates evaluation centered on student involvement and responsiveness in learning activities.

Criterion C6: Most emphasized in Case 6 (≈ 0.201): Focuses on the robustness of evaluation methods or success in achieving educational outcomes.

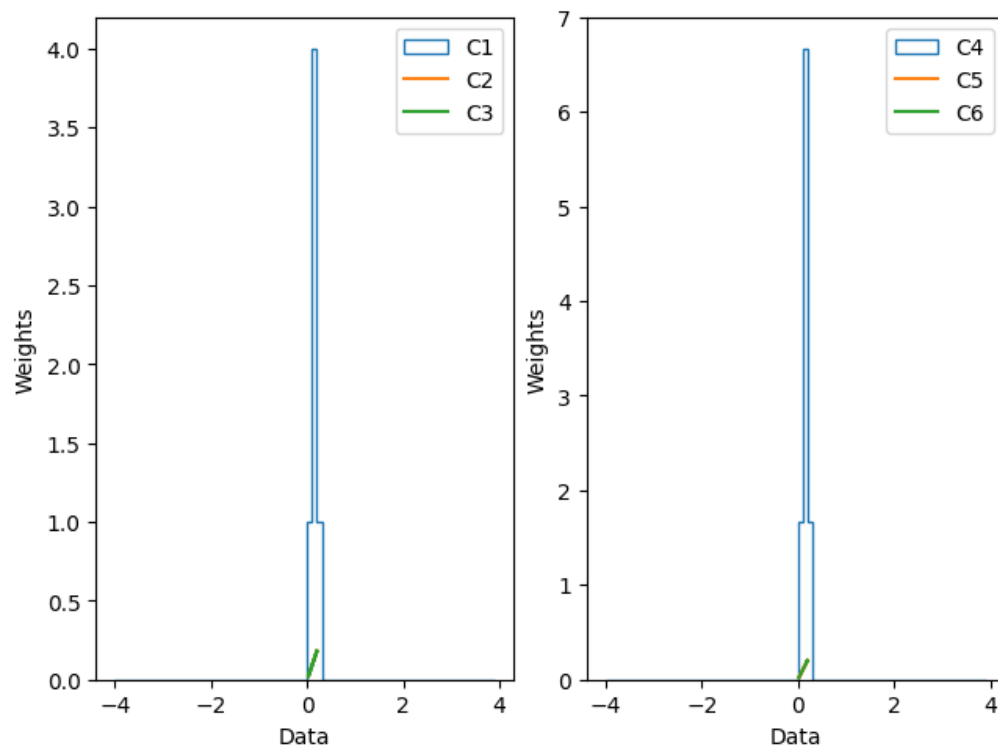


Fig 5. The six cases of criteria weights.

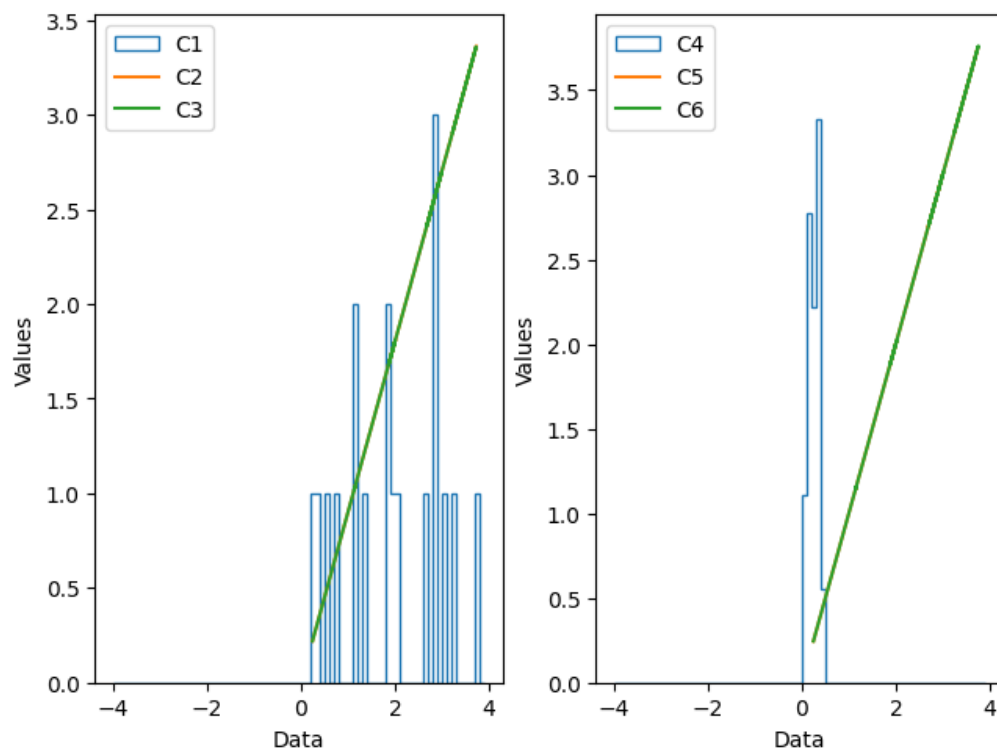


Fig 6. The six cases of relative numbers.

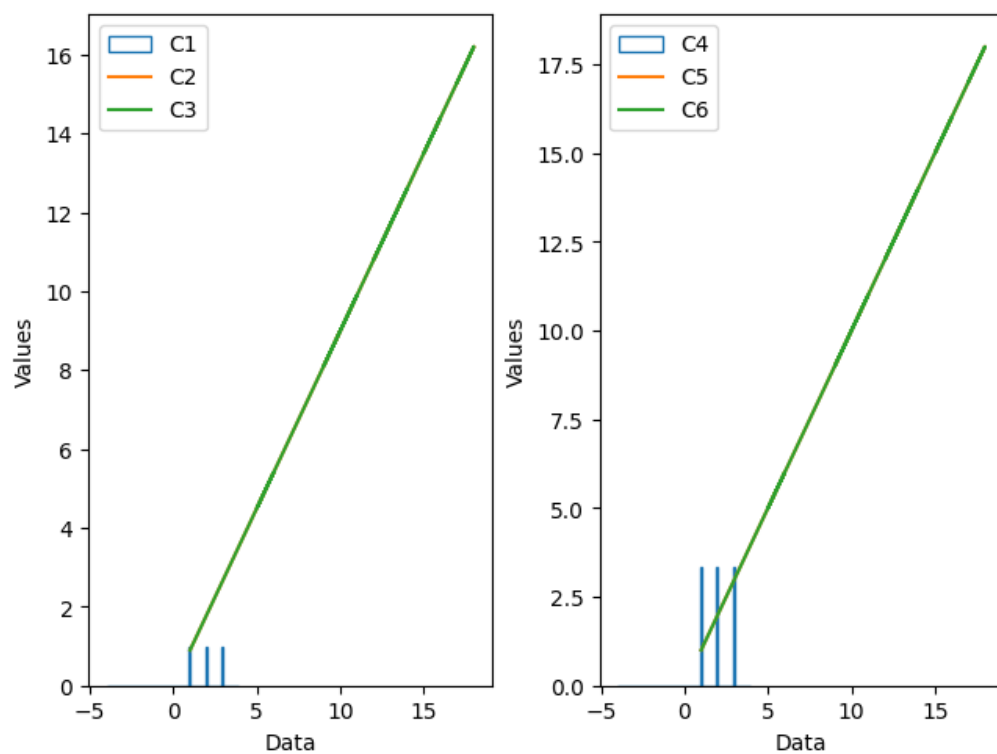


Fig 7. The six cases of ranks of alternatives.

A18 to A15 (Ranks 18–15): These are the top-performing alternatives across all cases: A18 (Rank 18) consistently stands out as the best among all alternatives, showing exceptional performance in all six cases.

A17 (Rank 17), A16 (Rank 16), and A15 (Rank 15) also maintain strong positions, suggesting high effectiveness in areas such as instructional strategy, student engagement, assessment methods, and integration of literature and language skills.

A14 to A12 (Ranks 14–12): These alternatives perform very well, just below the top tier: Likely demonstrate strong teaching approaches, innovative practices, and successful learning outcomes, though they may have slight room for improvement compared to the top 4.

A11 to A8 (Ranks 11–8): These are above-average performers: A11 (Ranks 8–11) and A8 (Rank 10) are steady, indicating reliability in meeting core educational objectives.

They likely reflect balanced programs with consistent delivery but may need targeted improvements to reach the top tier.

A7 to A5 (Ranks 7–5): These alternatives represent mid-level effectiveness: Programs here may have inconsistent performance, excelling in some evaluation criteria (e.g., content delivery) but underperforming in others (e.g., cultural integration or innovation).

A4 to A1 (Ranks 4–1): These alternatives show low effectiveness: A4 (Rank 16), A3 (Rank 15), A2 (Rank 18), and A1 (Rank 17) are the lowest ranked, consistently receiving the worst scores.

These may reflect outdated teaching methods, weak outcomes, poor student engagement, or insufficient integration of English literature and language components.

This rank distribution shows clear performance stratification, with A18–A15 leading as exemplary alternatives and A1–A4 lagging significantly. These insights are valuable for curriculum planning, strategy optimization, and targeted interventions in English language and literature instruction.

5. Conclusions

The evaluation model proposed in this study offers a comprehensive and adaptable approach to assessing English Language and Literature programs. By integrating six well-rounded criteria and evaluating a broad set of alternatives, the framework recognizes the diversity of educational approaches within the discipline. The findings highlight the importance of balancing curriculum innovation, pedagogical quality, and cultural inclusivity to improve academic outcomes. Future research could expand on this model by incorporating longitudinal student success data and alumni feedback to strengthen its application. We used the MCDM approach in this study. We used the COPRAS method to rank the alternatives. The average method is used to compute the criteria weights. Case study with six criteria and 18 alternatives is proposed. The sensitive

analysis is applied by changing the criteria weights by six cases. The results show the ranks of alternatives are stable under six different cases.

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