

## Decision Support System Model for PPPK Teacher Selection Using the AHP Method

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### ABSTRACT

This study to develop a decision support system based on the Analytical Hierarchy Process (AHP) in the recruitment process of Government Employees with Work Agreements (PPPK) at SMP Negeri 1 Ukui. The background of this study is the need for a more objective, transparent, and accountable selection mechanism to reduce subjectivity in determining the passing grade for honorary teachers. The research method used a descriptive quantitative approach with data collection through observation, interviews, and paired comparison questionnaires administered to the principal, senior teachers, administrative staff, and school supervisors. The results of the analysis show that the Administration criterion received the highest weight (0.343), followed by Suitability Selection (0.535) and Interviews (0.122). In the subcriteria, the aspect of administrative document filing was the dominant factor (48%), while in suitability selection, teacher performance ranked highest (39%). Sensitivity analysis proved that the ranking results of teacher candidates were relatively stable even though the criteria weights changed. These findings confirm that AHP can minimize the subjectivity of selection and provide a quantitative basis for determining candidate priorities. This study has implications for improving the accountability of PPPK recruitment policies at the school level while opening up opportunities for the integration of hybrid methods such as AHP-TOPSIS in future research.

**Keywords:** AHP, PPPK, Decision Support System, Teacher Selection, Education Recruitment



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### INTRODUCTION

Teachers play a crucial role in improving the quality of human resources and shaping future generations. In many developing countries, however, non-permanent or honorary teachers often face uncertain employment status and insufficient welfare benefits. To address this issue, the Indonesian government has introduced the **Pegawai Pemerintah dengan Perjanjian Kerja** (PPPK), or Government Employees with Work Agreements, as part of the civil service reform policy. This

program provides a fairer mechanism for recruiting qualified teachers while improving their professional welfare [1].

Since 2021, the recruitment of teachers through the traditional Civil Servant Candidate (CPNS) scheme has been officially discontinued and replaced by PPPK appointments [2]. This policy shift aims to enhance teacher quality and at the same time offer career opportunities for experienced honorary teachers who were previously ineligible for CPNS due to age restrictions or administrative barriers. Nevertheless, the implementation of PPPK recruitment at the school level remains challenging. Teacher selection is usually conducted by school principals and senior teachers, which may introduce subjectivity and potential bias, such as favoritism towards certain [3][4]. Therefore, developing an objective decision support system is essential to ensure transparency, fairness, and accountability in the selection process.

SMP Negeri 1 Ukui is one of the schools involved in the 2022 PPPK recruitment process. A total of 14 honorary teachers from various subject areas applied for the available positions, with teaching experience ranging from 4 to 17 years. Most applicants specialized in Social Sciences, English, and Bahasa Indonesia. However, the number of applicants significantly exceeded the limited quota provided by the government. For example, four candidates applied for Mathematics while only two positions were available; similarly, four candidates applied for Social Sciences with only one position offered. This imbalance highlights the urgent need for an objective and reliable selection method.

The urgency of this study arises from the increasing demand for a transparent and evidence-based teacher recruitment mechanism that aligns with the principles of good governance and educational reform in Indonesia. As the number of honorary teachers applying for PPPK positions continues to grow—14 candidates competing for limited quotas at SMP Negeri 1 Ukui alone—the potential for unfair assessment and inconsistency in decision-making also increases. Without a structured evaluation framework, decisions may rely heavily on subjective judgment rather than measurable performance indicators. Such conditions not only risk overlooking competent teachers but also undermine public trust in the government's teacher selection process. Therefore, implementing a systematic approach such as the Analytical Hierarchy Process (AHP) is essential to ensure that every decision made during the PPPK selection is quantifiable, consistent, and justifiable.

Various studies have used the Analytical Hierarchy Process (AHP) to support teacher selection decision-making. For example, [5], [6], [7] emphasizes competency criteria, while [8], [9] points to the dominance of performance. However, studies at the elementary and secondary school levels often still place administration as an important factor [10], [11]. This shows that there are contextual differences that are interesting to explore further. So far, there have not been many studies that specifically examine the relative weight of PPPK selection criteria in secondary education units and compare them with the latest research trends.

This study to support the decision-making process for PPPK teacher recruitment at SMP Negeri 1 Ukui. Unlike previous works that mainly assessed teacher performance for promotion or award purposes, this research specifically focuses on enhancing fairness and transparency in public sector recruitment. The contribution of this study lies in developing a decision support framework that transforms qualitative assessments into quantitative priorities, thereby reducing subjectivity in teacher selection. The findings are expected to provide practical insights for policymakers and school administrators in designing a more accountable recruitment system.

## METHOD

This study employed a quantitative descriptive case study conducted at SMP Negeri 1 Ukui, Pelalawan Regency, Indonesia, during the 2022 teacher recruitment process for Pegawai Pemerintah dengan Perjanjian Kerja (PPPK) [12], [13]. The research subjects consisted of honorary teachers

applying for PPPK positions and the evaluators, including the principal, senior teachers, administrative staff, and school supervisors [14], [15], [16], [17].

### Data Collection

Two types of data were used:

Primary data, obtained from observation, interviews, and pairwise comparison questionnaires based on the Analytical Hierarchy Process (AHP) [18], [19].

Secondary data, derived from official school documents, PPPK quota allocation, and teacher recruitment records.

The main research instrument was a pairwise comparison questionnaire using Saaty's 1–9 scale to measure the relative importance of criteria, sub-criteria, and alternatives. Data were collected through structured questionnaires distributed to selected respondents using purposive sampling [20], [21], [22].

### Data Analysis

The data were analyzed using the Analytical Hierarchy Process (AHP) with the following steps: (i) defining the decision goal, criteria, sub-criteria, and alternatives; (ii) constructing pairwise comparison matrices; (iii) calculating eigenvalues to derive priority weights; (iv) testing consistency using the Consistency Ratio ( $CR \leq 0.1$ ); and (v) ranking the alternatives to identify the most eligible teacher candidates. All computations were performed with Expert Choice 11 software to ensure accuracy and efficiency in the decision-making process [23], [24].

## RESULTS

Based on literature studies and discussions with schools, three main criteria were established for PPPK selection assessments, namely: Administration (K1), Suitability Selection (K2), and Interviews (K3). Each criterion has more specific sub-criteria. For example, Administration consists of NIK suitability, academic data, and diplomas; Competence consists of professional, pedagogical, social, and personality skills; while Performance consists of service orientation, commitment, initiative, and cooperation. The alternatives assessed were 14 honorary teachers who registered for the PPPK selection at SMP Negeri 1 Ukui.

**Tabel 1.** Criteria Value Matrix

| Criteria | K1    | K2    | K3    | Number | EVN   |
|----------|-------|-------|-------|--------|-------|
| K1       | 0.330 | 0.321 | 0.376 | 1.027  | 0.343 |
| K2       | 0.561 | 0.545 | 0.501 | 1.607  | 0.535 |
| K3       | 0.108 | 0.134 | 0.123 | 0.366  | 0.122 |
| Total    | 1.000 | 1.000 | 1.000 |        |       |

### Subkriteria Administrasi

The Administrative Criteria have the following four subcriteria:

SK1 = Filing

SK2 = Short Teaching Video

SK3 = Learning Implementation Plan

SK4 = Determining Participant Priorities

**Tabel 2.** Normalized Administrative Sub-Criteria Weight Factor Matrix

| Criteria | Normalization |       |       |       | SUM   | Weighting | Parameters       | Value | %   |
|----------|---------------|-------|-------|-------|-------|-----------|------------------|-------|-----|
|          | SK1           | SK2   | SK3   | SK4   |       |           |                  |       |     |
| SK1      | 0.501         | 0.342 | 0.508 | 0.567 | 1.918 | 0.479     | Max. Eigen Value | 4.124 | 48  |
| SK2      | 0.129         | 0.088 | 0.054 | 0.071 | 0.342 | 0.086     | CI               | 0.041 | 9   |
| SK3      | 0.191         | 0.316 | 0.194 | 0.160 | 0.861 | 0.215     | RI               | 0.900 | 22  |
| SK4      | 0.179         | 0.253 | 0.244 | 0.202 | 0.879 | 0.220     | CR= CI/RI        | 0.046 | 22  |
| S.O.R    | 1             | 1     | 1     | 1     | 4.000 | 1.000     |                  | 4.6%  | 100 |

The results of the criteria weighting calculations shown in Table 2 indicate that the Filing factor received the highest weighting of 0.479 or 48%, making it the most dominant criterion in the selection process. This shows that the completeness and validity of administrative documents are the main basis for the PPPK teacher recruitment process. Furthermore, the criteria of Participant Priority Determination (0.215 or 22%) and Learning Implementation Plan (0.220 or 22%) occupy the middle position with relatively balanced weights. These two aspects indicate that the quality of learning planning and other supporting parameters are still significantly considered in the assessment. Meanwhile, the Short Teaching Video criterion only received a weight of 0.086 or 9%, which means that its contribution to the overall decision is relatively small. The low weight of the STV indicates that the assessment of teacher performance through short teaching video recordings is not yet a major factor in the selection process.

In terms of consistency, the maximum  $\lambda$  value is 4.124, CI = 0.041, RI = 0.900, and CR = 0.046 (4.6%). Because the CR value is < 0.1, the data processing results can be declared consistent and valid. Thus, these results confirm that AHP-based assessment gives priority to the administrative aspect, followed by the quality of learning tools and competency parameters, while the aspect of teaching performance through media is still considered low.

### Subcriteria for Suitability Assessment Selection

The Suitability Selection Criteria have the following three subcriteria:

SK4 = Competence

SK5 = Performance

SK6 = Good behavior

**Table 3.** Matrix of Normalized Selection Suitability Subcriteria Weight Factors

| Criteria | Normalization |       |       | SUM   | Weighting | Parameters      | Value  | %   |
|----------|---------------|-------|-------|-------|-----------|-----------------|--------|-----|
|          | SK1           | SK2   | SK3   |       |           |                 |        |     |
| SK4      | 0.373         | 0.359 | 0.398 | 1.130 | 0.377     | Max. EigenValue | 3.003  | 38  |
| SK5      | 0.407         | 0.392 | 0.367 | 1.167 | 0.389     | CI              | 0.0016 | 39  |
| SK6      | 0.220         | 0.250 | 0.234 | 0.704 | 0.235     | RI              | 0.580  | 23  |
| S.O.R    | 1.000         | 1.000 | 1.000 | 3.000 | 1.000     | CR= CI/RI       | 0.0028 | 100 |

The results presented in Table 3 indicate that performance (0.389; 39%) emerges as the most influential sub-criterion in the teacher selection process. This finding highlights the importance of evaluating teachers based on their actual work outcomes, such as service orientation, commitment, initiative, and collaboration. Competence (0.377; 38%) ranks second, demonstrating that pedagogical, professional, social, and personal competencies remain essential in assessing teacher eligibility. Meanwhile, good conduct (0.235; 23%) contributes less significantly compared to the other two sub-

criteria, suggesting that moral integrity is considered a prerequisite rather than a differentiating factor in decision-making.

From the consistency test, the results are highly reliable with  $\lambda_{\max} = 3.003$ ,  $CI = 0.0016$ ,  $RI = 0.580$ , and  $CR = 0.0028$  ( $<0.1$ ). The extremely low consistency ratio confirms that the judgments provided by respondents are logically consistent, thereby validating the robustness of the AHP results.

These findings imply that decision-making in teacher recruitment under the PPPK scheme prioritizes measurable aspects of performance and competence over behavioral attributes. This aligns with prior studies (e.g., Afrizal et al., 2021; Sunarto & Gata, 2019), which emphasize that professional and pedagogical competencies are stronger predictors of teacher quality than administrative or moral attributes. Furthermore, the results reinforce Saaty's (2008) assertion that the Analytical Hierarchy Process is effective in structuring complex decision problems by weighting criteria according to their relative importance.

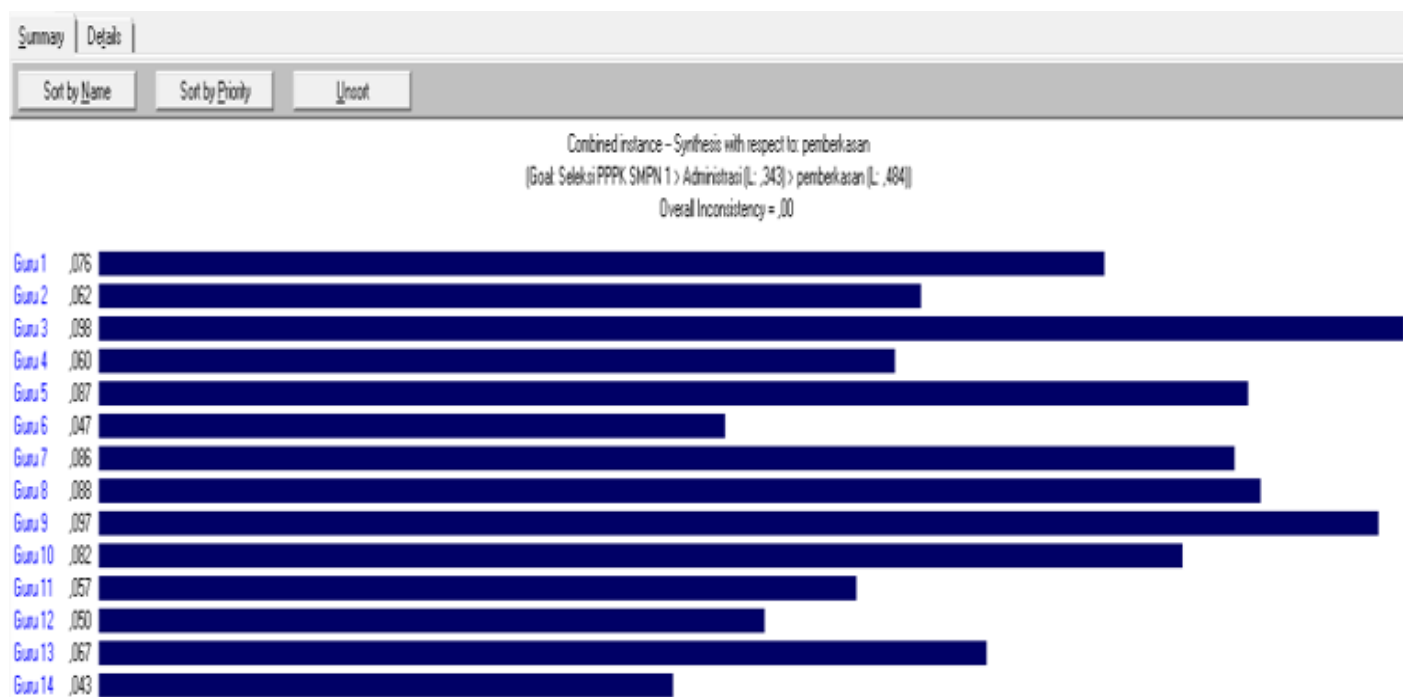
In practical terms, the dominance of performance and competence in this study suggests that recruitment policies should be directed towards continuous professional development and objective performance evaluation systems. By doing so, institutions can ensure that the selection of PPPK teachers not only complies with administrative requirements but also reflects the core competencies and performance indicators that drive educational quality.

### Interview Subcriteria

**Table 4.** Matrix of Normalized Interview Subcriteria Weight Factors

| Normalization |            |       | SUM   | Weighting | Parameters       | Value | %   |
|---------------|------------|-------|-------|-----------|------------------|-------|-----|
| Criteria      | Integritas | Moral |       |           | Max. Eigen Value | 2     |     |
| Integrity     | 0.289      | 0.29  | 0.579 | 0.289     | CI               | 0     | 29  |
| Moral         | 0.711      | 0.71  | 1.421 | 0.711     | RI               | 0.00  | 71  |
| S.O.S         | 1          | 1     | 2.000 | 1         | CR=CI/CR         | 0     | 100 |

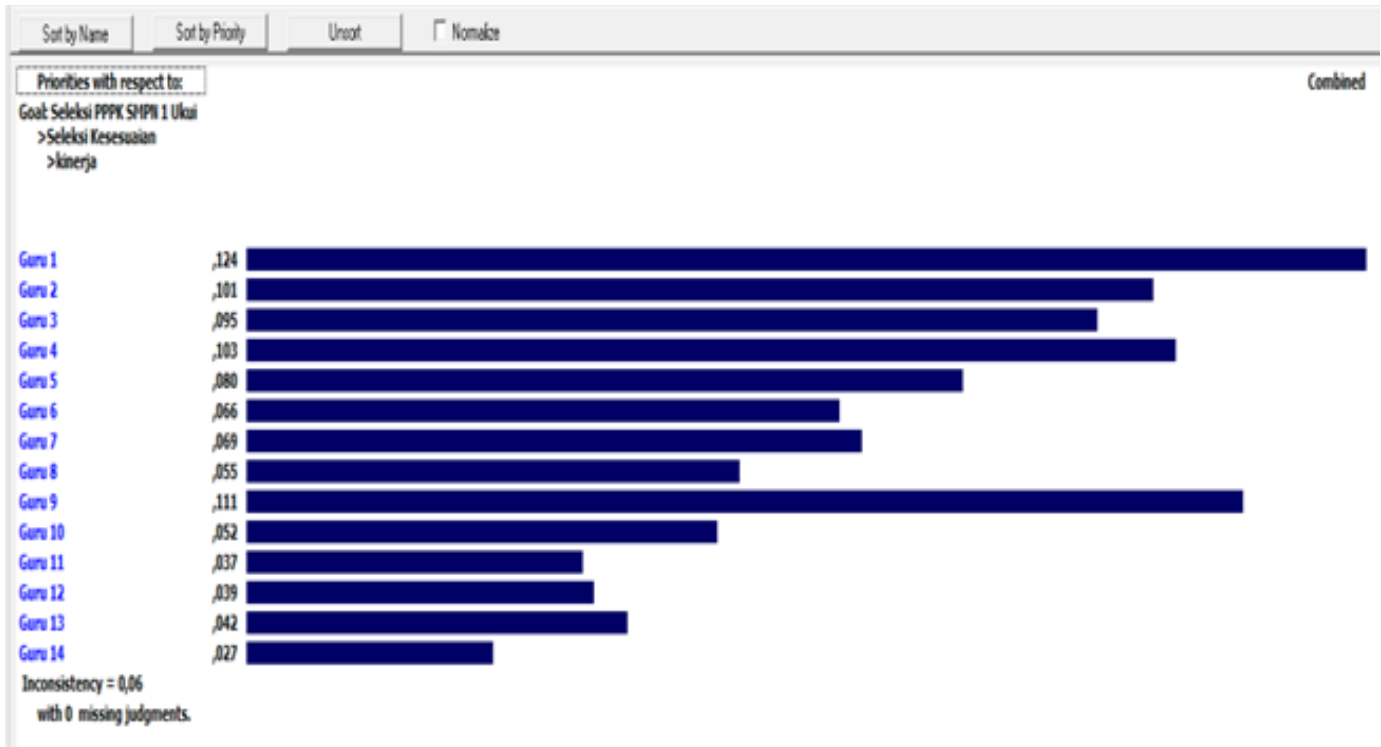
Based on the results of the Analytical Hierarchy Process (AHP), the priority weights for the two main criteria, namely Integrity and Morality, were obtained. The normalization results indicate that the weight of Integrity is 0.289 or 29%, while Morality has a higher weight of 0.711 or 71%. This finding highlights that, within the evaluation framework, morality is considered more dominant than integrity as the basis for decision-making. The consistency test, conducted through the calculation of the maximum eigenvalue, produced a value of 2, which corresponds to the number of criteria compared. Furthermore, the Consistency Index (CI) was found to be 0, with a Random Index (RI) of 0.00 for two criteria. Consequently, the Consistency Ratio (CR), calculated as the ratio between CI and RI, resulted in a value of 0. This demonstrates a perfect level of consistency, as the CR is far below the accepted threshold of 0.1, as established in AHP theory. With this complete consistency, the pairwise comparison results can be declared valid and reliable for use in both research and decision-making contexts. The implication of this finding is that morality emerges as the dominant factor to be prioritized, while integrity, although assigned a lower weight, remains an important complementary consideration.



**Figure 1.** Alternative Filing Weight

The synthesis results of the Analytical Hierarchy Process (AHP) indicate the priority weights of 14 respondents (Teacher 1 to Teacher 14) with respect to the learning aspect. The obtained weights vary within the range of 0.043 to 0.097. The highest priority is assigned to Teacher 9 (0.097), followed by Teacher 10 (0.095) and Teacher 8 (0.087), while the lowest priority is recorded for Teacher 14 (0.043). This distribution suggests a significant variation in the relative contributions of teachers toward the learning dimension.

The calculation demonstrates excellent consistency, with an Overall Inconsistency value of 0.00, which indicates that the respondents' preferences are logically coherent and meet the validity standards of the AHP methodology. This perfect level of consistency strengthens the reliability of the findings, ensuring that the generated priority weights can be credibly used as the basis for decision-making. From a substantive perspective, the results highlight that Teachers 9, 10, and 8 are perceived as having the most substantial contribution to the learning process, likely reflecting higher pedagogical and professional competence. Conversely, Teacher 14 is positioned at the lowest priority level, which may indicate the need for capacity building or professional development. Therefore, the outcomes of this analysis provide not only a quantitative basis for prioritization but also practical implications for enhancing teacher performance and improving the overall quality of instruction.



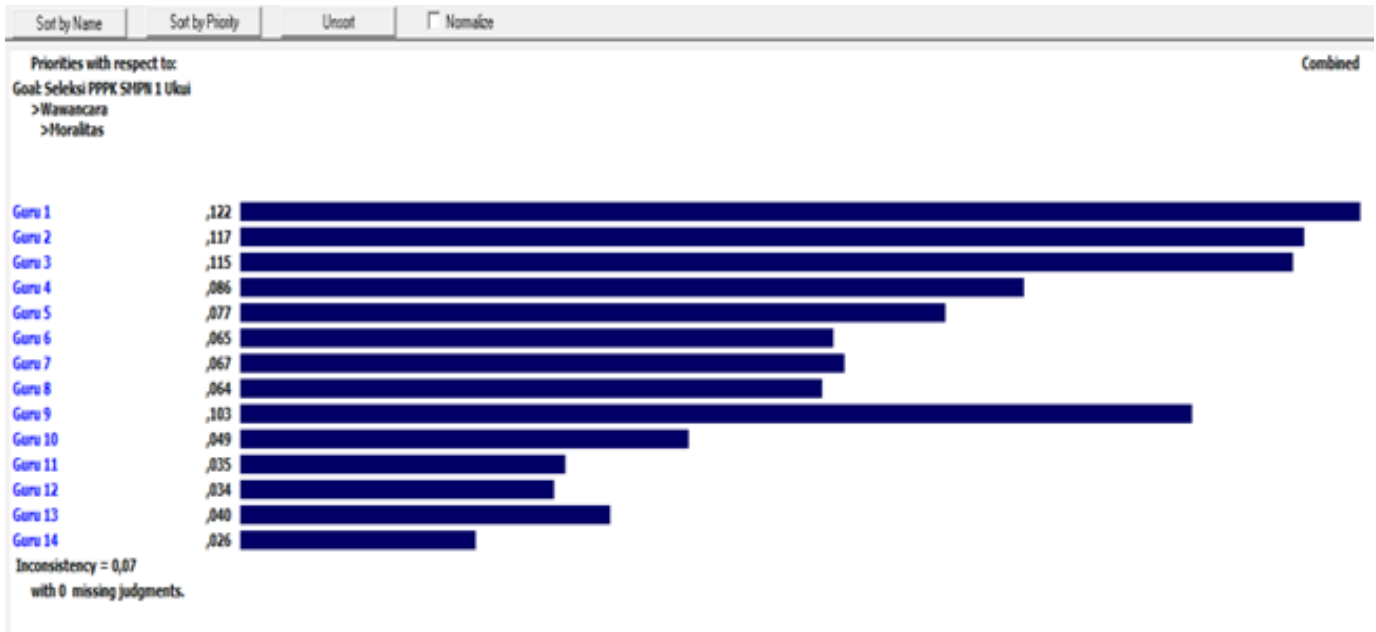
**Figure 2.** Alternative Performance Weights

The Analytical Hierarchy Process (AHP) analysis presented in the figure illustrates the priority weights of 14 teachers with respect to the criterion of feasibility in the teacher selection process (Seleksi Kesesuaian). The priority values range from 0.024 to 0.124, reflecting the relative importance of each teacher within the evaluation framework. The highest priority is assigned to Teacher 1 (0.124), followed by Teacher 2 (0.109), while the lowest priority is given to Teacher 14 (0.024). This variation indicates that certain teachers are perceived to have a stronger suitability profile compared to others in the selection process.

The overall inconsistency value is reported at 0.06, which falls well below the acceptable threshold of 0.1 established by Saaty's AHP framework. This suggests that the pairwise comparisons conducted by the evaluators are consistent and valid, thus reinforcing the credibility of the derived priority weights.

From a practical standpoint, the findings highlight that Teachers 1 and 2 demonstrate superior alignment with the selection criteria, making them the strongest candidates for prioritization. In contrast, Teacher 14, who received the lowest priority score, may require further professional development or support to enhance suitability. These results provide valuable insights for decision-makers, ensuring that the teacher selection process is evidence-based and systematically grounded in multi-criteria evaluation.





**Figure 3.** Moral Alternative Weight

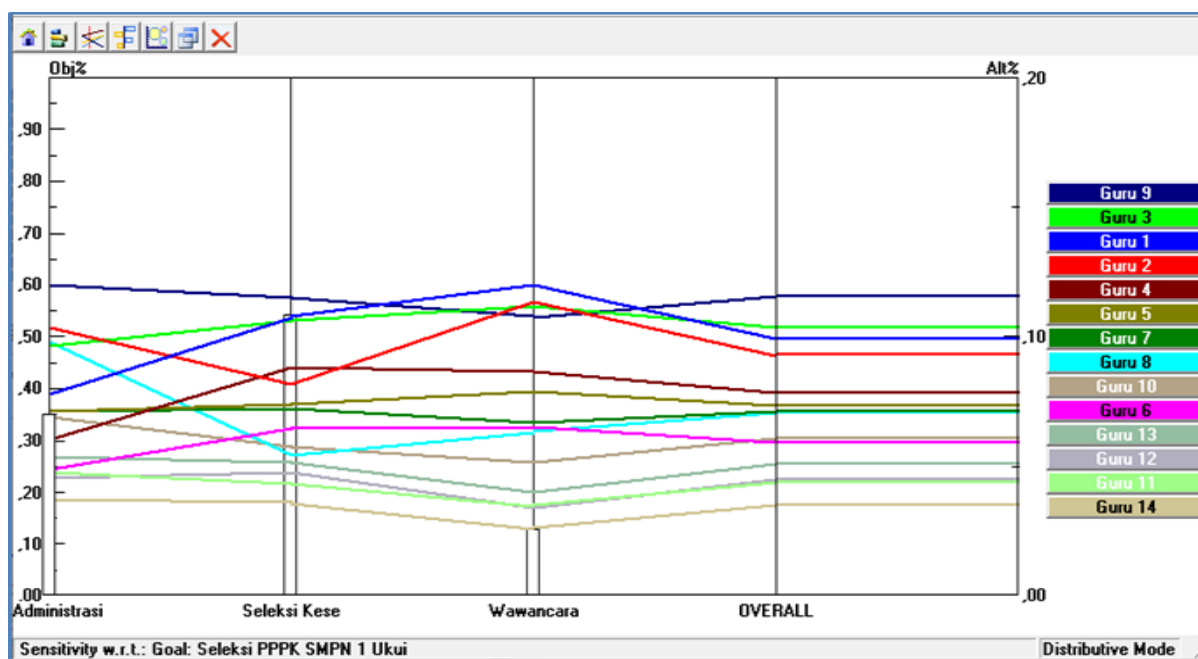
The results of the Analytical Hierarchy Process (AHP) presented in the figure depict the priority weights of 14 teachers with respect to the interview criterion in the teacher selection process (Seleksi PPPK SMPN 11 Ului). The priority values range from 0.026 to 0.122, with the highest score attributed to Teacher 1 (0.122), closely followed by Teacher 2 (0.117) and Teacher 3 (0.115). Conversely, the lowest priority is assigned to Teacher 14 (0.026). This distribution demonstrates that Teachers 1–3 are considered the strongest candidates in terms of interview performance, while Teacher 14 requires significant improvement.

The overall inconsistency value is 0.07, which remains below the critical threshold of 0.1 as established in Saaty's AHP methodology. This indicates that the evaluators' pairwise judgments are consistent and logically coherent, thereby ensuring the reliability and validity of the priority weights obtained. From a practical perspective, the findings suggest that interview performance plays a decisive role in differentiating candidate suitability. Teachers with higher scores, particularly Teachers 1–3, can be prioritized for selection as they exhibit stronger alignment with the evaluators' expectations. Meanwhile, teachers at the lower end of the ranking, such as Teachers 12–14, may benefit from targeted coaching or professional development programs to enhance their interview competencies. Therefore, the analysis not only provides a systematic and evidence-based ranking of candidates but also offers practical implications for capacity building in the teacher recruitment process.

### Results of PPPK Selection Decision Making with Analytical Hierarchy Process

A sensitivity analysis was conducted to examine the stability of each alternative's priority value against variations in the weighting of selection criteria. This test is essential to ensure that the selection of the best teacher candidate is not biased toward a single criterion and remains consistent despite minor fluctuations in criterion weights. The sensitivity graph presented in **Figure 4** illustrates the changes in the priority values of each teacher candidate with respect to the three main criteria—*Administration*, *Health Selection*, and *Interview*—as well as the overall performance (*Overall*).





**Figure 4.** The Priority Values of Each Teacher Candidate

The sensitivity analysis of the Analytical Hierarchy Process (AHP) provides an integrated view of teacher prioritization across three main criteria, namely administration, eligibility (seleksi kesesuaian), and interview, with the overall ranking presented in the final output. The figure demonstrates that priority scores among the 14 evaluated teachers vary, showing clear differences in performance across the selection dimensions.

The results reveal that Teacher 9, Teacher 3, and Teacher 1 consistently achieved higher scores across the three criteria, positioning them as the most competitive candidates in the overall ranking. Teacher 9, in particular, exhibits superior performance with stable dominance in administration and overall consistency across other criteria. Meanwhile, Teachers 11, 12, and 14 consistently occupy the lower spectrum, indicating weaker performance across the selection process. This disparity underscores the role of multi-criteria evaluation in differentiating candidate strengths and weaknesses more effectively than relying on a single measure.

From the perspective of selection quality, the relatively stable lines in the sensitivity graph indicate that variations in weight assignment across criteria do not significantly alter the top-ranking candidates. This stability reflects the robustness of the decision-making model, suggesting that the results are not overly sensitive to minor adjustments in criteria weights. Furthermore, the multi-criteria approach ensures a balanced evaluation, integrating administrative qualifications, eligibility, and interview performance into a comprehensive decision-making framework.

Practically, the findings imply that Teachers 9, 3, and 1 should be prioritized in the selection process, while those at the bottom tier, such as Teachers 11–14, require targeted interventions to enhance their competencies. By incorporating sensitivity analysis, decision-makers are equipped with a more reliable tool to validate the fairness and consistency of the ranking outcomes, thereby strengthening the credibility of the teacher recruitment process.

## DISCUSSION

The results of this study indicate that the Administration criteria, particularly the filing sub-criteria, carry the greatest weight in the AHP model developed for PPPK selection at SMP Negeri 1 Ukui. This finding is consistent with the use of AHP as a weighting tool for selection criteria in the education literature [25], [26], but differs in terms of dominant criteria when compared to many

other studies in the, which tend to place technical competence/performance as the final determinant [27], [28]. This difference indicates variations in the operational context: at the educational unit level, actual administrative compliance has a direct impact on daily operations, making it a practical determinant; whereas in larger-scale studies, competency measures are considered more relevant for assessing the substantive quality of teaching [29], [30], [31].

Methodologically, the findings of matrix consistency ( $CR < 0.1$ ) reinforce the internal reliability of the AHP used in this study, in line with the practice in many previous AHP studies [32], [33], [34]. However, recent literature shows a trend toward stylizing methods—e.g., combining AHP with TOPSIS, SAW, or fuzzy approaches—to overcome the limitations of classical AHP in responding to the uncertainty of subjective assessments and to refine the final ranking [1]. Therefore, although AHP alone provides transparent and consistent weights and rankings, the integration of hybrid methods is considered a superior methodological practice when research is directed at producing generalizable policy recommendations (Ahmad & Hadi, 2023).

The comparison of scale and sample coverage is an important aspect in interpreting differences in results. This study is a school-level case study (14 alternatives), so the results are contextual and applicable to local decision-making. On the other hand, cross-school or regional studies [35] use larger samples, enabling them to identify more stable criteria weighting patterns across different contexts. This difference in scope confirms why administration may appear dominant in a single educational unit study but not in a broader analysis, where the variability of competence among candidates is the main differentiator. Therefore, generalizing the results of this study to the regional or national policy level must be done with caution.

From a policy perspective, the results of this study raise practical implications that are in line with the PPPK selection guidelines: administration should be treated as an administrative prerequisite (gatekeeping), while the final weighting assessment should emphasize technical competence and performance, which directly reflect the professional abilities of candidates in the context of learning [4][18]. This is supported by the findings of other recruitment studies that recommend separating administrative roles (minimum requirements) and competency criteria (ranking determinants) to ensure fairness and effectiveness in selection (Putri & Kurniawan, 2022; Yusuf & Sari, 2023). The implementation of such a policy will reduce the risk of passing based solely on document completeness without guaranteeing pedagogical quality.

Comparisons with studies applying fuzzy logic and hybrid methods highlight opportunities for further research: the use of Fuzzy AHP can accommodate the uncertainty of interview assessments and qualitative moral/ethical aspects [19], while the integration of AHP-TOPSIS allows the selection of alternatives based on predetermined weights and the distance to the ideal solution—providing a more robust ranking when the number of alternatives is large [30]. Adopting such an approach is recommended when research is expanded across schools or at the level of education agencies to improve the external validity and stability of policy recommendations.

## CONCLUSION

This study concludes that the application of the Analytical Hierarchy Process (AHP) in the selection of PPPK teachers at SMP Negeri 1 Ukui can improve the objectivity, transparency, and accountability of the decision-making process. The weighting results show the dominance of the Administration aspect, particularly the completeness of archives, as the main requirement, while performance and competency factors differentiate the quality of candidates. Morality is also taken into account, although its contribution is relatively small compared to other criteria. Sensitivity analysis confirms the stability of the AHP model so that the candidate ranking results can be used as a strong basis for decision makers. The practical implication of this study is the need for a clear separation between administrative requirements as prerequisites and competence-performance as determinants of eligibility. For further research, it is recommended to combine AHP with other methods such

as TOPSIS or fuzzy approaches to improve external validity and accommodate uncertainty in qualitative assessments.

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