

Analysis of Teacher Performance Evaluation Using the AHP Method in the School Academic Information System

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ABSTRACT

Teacher performance evaluation is an important factor in improving the quality of education in schools. However, the manual assessment process often leads to subjectivity and ineffective decision-making. This study aims to analyze teacher performance evaluation using the Analytic Hierarchy Process method in the school academic information system so that the assessment process can be carried out more objectively, quickly, and structured. The AHP method is used to determine assessment priorities based on several criteria such as discipline, competence, responsibility, attendance, and quality of learning. Research data was obtained through observation, interviews, and literature studies, then processed into the academic information system to produce more accurate decisions. The results show that the application of the AHP method can help schools in conducting teacher performance evaluations more effectively and transparently and simplify the process of processing assessment data to support decision-making.

Keyword : Teacher Performance Evaluation, Analytic Hierarchy Process, Academic Information System, Decision Support System, Teacher Assessment

1. Introduction

The development of information technology in the education sector has made a significant contribution to optimizing data management and decision-making within schools. One key manifestation is the implementation of an academic information system (AIS), which functions to integrate student and teacher data management, lesson schedules, and assessment processes. Furthermore, an AIS has the potential to be utilized to support teacher performance evaluation, enabling more effective and objective assessments.

Teacher performance evaluation plays a crucial role in improving the quality of learning in schools. However, the still-dominant manual assessment approach often leads to subjectivity and requires lengthy data processing times. These assessments are generally based on key criteria such as discipline, attendance, responsibility, competence, and learning quality, necessitating a method capable of producing precise and structured assessments.

The Analytic Hierarchy Process (AHP) method is an effective multi-criteria decision-making approach for establishing priorities based on a hierarchy of criteria. This method produces accurate

and systematic assessment outputs in the evaluation process. Therefore, this study aims to analyze the application of AHP in teacher performance evaluation within a school's academic information system, to facilitate more effective and efficient decision-making for schools.

2. Research Methods

This research applies a quantitative approach through the development of a decision support system based on the Analytic Hierarchy Process (AHP) method. The focus of the research is the analysis of teacher performance evaluation in the school's academic information system using standardized assessment criteria. The initial stage of the research involved data collection through observation, interviews, and literature review. Observations aimed to document the ongoing teacher performance evaluation process at the school, while interviews involved school stakeholders to obtain data on teacher assessment criteria. The literature review was conducted by reviewing scientific journals, books, and previous research relevant to the AHP method and decision support systems.

The criteria used for teacher performance evaluation include discipline, attendance, pedagogical competence, responsibility, and learning quality. The AHP method is used to establish relative priorities between criteria through a pairwise comparison mechanism. The AHP procedure includes the following steps: (1) constructing a hierarchical structure, (2) constructing a comparison matrix, (3) normalizing the matrix, (4) calculating priority weights, and (5) consistency testing using the consistency ratio (CR) to verify assessment reliability.

The AHP computational results are then integrated into the school's academic information system to support digital teacher performance evaluation. This system processes assessment data based on weighted criteria, resulting in a final score and teacher performance ranking. Implementation of this system is expected to increase the objectivity, effectiveness, and efficiency of the evaluation process, while also strengthening strategic decision-making within the school environment.

2.1 Data collection technique

The data collection techniques in this study were designed to gather essential information to support the analysis of teacher performance evaluation in the school academic information system. The data collection process was carried out through three main approaches: observation, interviews, and literature review. Direct observations were conducted on the ongoing teacher performance assessment process at the school, with the aim of identifying problems that arise in the evaluation mechanism. In-depth interviews were conducted with school stakeholders, including the principal and academic staff, to gain insight into the teacher assessment criteria and the functional requirements of the system to be developed. Meanwhile, a literature review was conducted by reviewing primary literature such as books, scientific journals, and previous research relevant to decision support systems and the Analytic Hierarchy Process (AHP) method, as the theoretical basis for writing the research. The collected data were then systematically analyzed and used as input in the AHP method calculations, to produce an objective and structured teacher performance evaluation.

2.2 Metode Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) method was applied in this study to support decision-making in teacher performance evaluation based on various assessment criteria. The AHP was selected based on its ability to establish relative priorities between criteria in a structured and systematic manner. The assessment process involves pairwise comparisons between criteria to generate priority weights, which are then used to determine the final score for the teacher performance evaluation.

The AHP procedure begins with the formation of a hierarchical structure encompassing the primary objective, criteria, and assessment alternatives. The purpose of this study was to identify the best teacher performance, with criteria including discipline, attendance, pedagogical competence,

responsibility, and learning quality. After constructing the hierarchy, the next step was to construct a pairwise comparison matrix between criteria based on their relative importance.

The next step involved normalizing the matrix to obtain priority weights for each criterion. Consistency was then verified by calculating the consistency ratio (CR). Assessment data was considered consistent if the CR value was <0.1 , making it suitable for further computation. The final AHP output served as the basis for teacher performance scores and rankings in the school's academic information system.

2.3. System Design

The system design in this research was conducted to build an academic information system capable of supporting a computerized teacher performance evaluation process. The system was designed to assist schools in managing teacher assessment data, performing calculations using the Analytic Hierarchy Process method, and generating evaluation reports more quickly and accurately.

The designed system comprises several key processes: teacher data management, assessment criteria management, grade input, AHP weighting calculation, and evaluation result determination. Administrators or schools can enter teacher data and grades based on predetermined criteria. The system then automatically performs the AHP calculation to determine the final grade and teacher performance ranking.

The system design utilized a system flow model that illustrates the relationship between users and the system in the teacher performance evaluation process. The system was also designed with a simple and user-friendly interface to facilitate user processing of assessment data. The final output of the system is teacher performance evaluation information that can be used as a basis for decision-making within the school environment.

2.4 System Testing

System testing was conducted to verify whether the developed academic information system met user needs and was capable of producing accurate teacher performance evaluations. Testing covered all system features, from teacher data input, criteria management, Analytic Hierarchy Process (AHP) method computation, to the presentation of evaluation results and teacher performance ratings.

The testing approach employed was functional testing (black box testing), which evaluates each function based on its input and output. The goal was to ensure the smooth operation of all features without any processing errors. Furthermore, validation of the AHP calculation results was conducted to ensure compliance with manual computations.

Test results confirmed that the system operated optimally, thereby accelerating, improving the effectiveness, and accuracy of the teacher performance evaluation process. The system also successfully minimized errors in processing assessment data, thereby supporting school decision-making regarding teacher performance evaluation.

2.5 Data Analysis Techniques

Data analysis in this study involved processing teacher performance assessment results using the Analytic Hierarchy Process (AHP) method. Data from observations, interviews, and related documents were analyzed to determine the relative priorities between assessment criteria. The analysis process was conducted sequentially, including the development of a decision hierarchy, pairwise comparisons between criteria, matrix normalization, and calculation of priority weights.

After determining the criteria weights, the next step was to calculate the final score for each alternative (teacher) based on these weights, to produce an objective and systematic performance ranking. Furthermore, consistency verification was performed through the calculation of the

consistency ratio (CR) to ensure the reliability of the comparisons between criteria, ensuring the data was valid for decision-making.

The output of the data analysis was presented in the form of a teacher performance evaluation report in the school's academic information system. This report serves as a basis for school decision-making to improve the quality of assessments and the performance of educators.

3. Results and Discussions

Research on the school academic information system indicates that the integration of the Analytic Hierarchy Process (AHP) method significantly improves the effectiveness and objectivity of teacher performance evaluations. The developed system processes assessment data based on key criteria: discipline, attendance, pedagogical competence, responsibility, and learning quality, with priority weights determined through AHP calculations to support the evaluation process.

The computation process begins with pairwise comparisons between criteria to determine their relative importance. After matrix normalization and priority weight calculations, it was found that pedagogical competence and learning quality received the highest priority compared to other criteria. This confirms that teaching ability and material delivery are dominant factors in teacher performance evaluations in schools.

The developed academic information system also generates an automatic display of evaluation results and teacher rankings based on the final AHP scores. This system enables faster assessments by schools while minimizing the risk of data processing errors. Furthermore, the system enhances evaluation transparency through structured and measurable calculations.

System testing confirmed the smooth operation of all features according to user needs, with optimal capabilities for managing teacher assessment data and producing accurate evaluation information. Thus, the application of AHP to school academic information systems offers an effective solution for decision making related to teacher performance evaluation.

3.1 Results

The research findings confirm that the developed academic information system successfully implemented teacher performance evaluations based on the Analytic Hierarchy Process (AHP) method in a structured and automated manner. This system integrates teacher data management, assessment criteria, and independently computes priority weights using the AHP algorithm. The evaluation criteria applied include discipline, attendance, pedagogical competence, responsibility, and learning quality.

The AHP computation results in priority weights for each criterion. Pedagogical competence received the highest priority as the primary indicator of teacher performance quality, followed by learning quality, responsibility, discipline, and attendance. These weights are used by the system to calculate final scores and performance rankings for each teacher.

System testing also demonstrated optimal performance of all features, meeting user expectations. The system provides teacher evaluation results instantly, facilitating the school's assessment process. This system implementation improves speed, accuracy, and reduces the potential for errors in processing teacher assessment data.

3.2 Discussions

Based on research findings, the implementation of the Analytic Hierarchy Process (AHP) method in the school academic information system has had a significant positive impact on the teacher performance evaluation process. AHP facilitates decision-making by establishing priority weights among assessment criteria, resulting in more objective and systematic evaluations. The application

of multiple criteria also ensures that the results align with the actual dynamics of the school environment.

The developed system accelerates the processing of teacher assessment data compared to previous manual approaches, which tend to be time-consuming and prone to computational errors. By automating the process, the system enables the generation of faster and more precise evaluation results.

Furthermore, the integration of AHP into the academic information system increases the transparency of teacher performance evaluations through a documented and accountable calculation process. As a result, schools can use evaluation results as a basis for strategic decisions, including awarding awards, periodic assessments, and developing the quality of teaching staff.

4. Conclusion

Based on the research findings, it can be concluded that the integration of the Analytic Hierarchy Process (AHP) method into the school's academic information system successfully increased the objectivity, effectiveness, and structure of the teacher performance evaluation process. The system developed processes assessment data based on key criteria - discipline, attendance, pedagogical competence, responsibility, and learning quality - thus automatically generating teacher evaluation scores and rankings. The implementation of AHP also facilitates accelerated decision-making by schools and reduces the risk of data processing errors. The existence of this system increases the transparency of teacher performance evaluation and has the potential to support improvements in the quality of education in schools.

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