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DECISION SUPPORT SYSTEM GROUP OF LEARNING EVALUATION AT SMA NEGERI LHOKSEUMAWE

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Abstract

Teachers as educators who have the main task of educating the nation's children to become the next generation who are intelligent and knowledgeable. Teachers can develop students' potential and motivate students to excel. The quality of teachers is influenced by the level of teacher performance in providing knowledge to students and the way of providing clear and appropriate material when teaching. Students must also be involved in the process of assessing the quality of the performance of teachers who have been teaching. Based on these problems, input from students about teacher performance is generally done manually by filling out a satisfaction questionnaire on the teaching and learning process. As a result, we require an assessment system and a model for the quality of learning, particularly in the core school subjects. The evaluation in teacher assessment uses the AHP (Analytical Hierarchy Process) method and group borda. The AHP model process is used to evaluate and improve the quality of student learning so that it can provide objective results. The stages of research using research and development include the first stage, namely the preliminary study stage, theoretical study, and planning stage. The variables measured included attendance, accuracy, ease of capturing material, and the ability to manage classes and formulate problems. The second stage is to test and revise the AHP and Borda models. The third stage is the feasibility test of the decision model with AHP and Borda. The result of the group model is to get the ranking value of each variable, and this value will be entered into the AHP model and the Borda group model. The Borda results are given by the school principal, vice principal, and policy makers. The results of the AHP Model value of K1 (Teaching Attendance Rate) with a priority weight value of 0.280, rank 2, K2 (Accuracy of Starting and Ending Study Hours) of 0.207, and ranking 4, K3 (Ease of Submission of Materials to Be Understood) of 0.295. 1, K4 (Ability to Manage Class Interaction) 0.217, ranking 3. The results of the board for selecting the best teacher: alternative A1 with a value of 0.24 ranking 3. Alternative A2 with a ranking value of 0.20; Alternative A3 with a value of 0.28 ranking 1. Alternative A4 with a value of 0.27 and a rating of 2. The results of this study are the assessment of students and each teacher from the AHP model. Furthermore, the results of the Borda group are in the form of rankings from policy makers. The results of the research are more objective because of the decision-making on the part of students and groups/policy-makers.

Keywords: Teacher Performance, Education Quality, AHP, Borda

1. INTRODUCTION

Performance competence in teaching and learning assessment is very important in the process of the quality of subject matter delivery. Evaluation of educational learning is one of the learning strategies

implemented in the lecture method, a combination of lectures, discussions, and questions and answers [1]. There is an evaluation in the teaching-learning process to see the quality of teachers in providing learning materials. For the purpose of improving the quality of teachers in providing deepening of the content of the material, In the evaluation, an assessment system is required so that students in schools can move in the direction of their interests [2]. To determine the performance of teachers, one approach can be taken with a decision support system model with the ANP model to improve teacher evaluation criteria, which are still low [3].

Education is not just a matter of learning, but education is a process of knowledge transfer, and personality formation [4][5]. Improving the quality of learning can be seen from the teaching and learning process as well as the final result of the student's score on the exam that is carried out. The important task of a teacher is to be able to teach and educate and to be an instructor who can build and apply data, knowledge, and technology in a better direction, full of creative ideas and changes in teaching. Therefore, the process of providing material in learning is a very important part, and the teacher plays an important role in this success. [6]. Determination in decision-making in seeing the process of superior students requires a model. Then there is the need for alternatives and process criteria in selecting the superior students. Selection of outstanding students can be done using a model using AHP and is used to determine outstanding students with ranking weights [7].

The existence of an assessment in determining the performance of each teacher allows students and principals to see the percentage of success in teaching. Evaluation in looking at teacher performance aims to find out how teachers teach and see teachers in providing material. This can assist principals in evaluating learning in schools. This evaluation encourages professional improvement with evaluation and competency processes. This evaluation process will make teachers better in terms of learning quality [8]. There is an evaluation process using a machine learning model and a decision model using the AHP model for the evaluation process. Being able to see that each teacher can provide performance material can help the school in determining the best alternative in choosing the teacher with the highest ranking [9] [10].

The decision-making system in determining the best teacher is more fully described in the process of evaluating teacher performance. So far, it is still using the manual and only in the form of calculations and ordinary data processing. It is still using the manual. Furthermore, teacher performance is only seen through manual attendance, and this is not appropriate in the process of selecting exemplary teachers. The next selection process will use a decision model with the AHP model and the results of system testing on criteria and sub-criteria on testing five educators or teachers who get the highest to lowest scores. for better selection results than manual selection [11].

Determination of the quality of teaching lecturers can be seen from the way of delivering material, timeliness, and discipline. The AHP model assists in determining the ranking of lecturers based on the quality of teaching. It uses a decision support system with the AHP model to produce a ranking that will assist in making decisions to choose the best lecturers in the teaching process. [12]. The main problem so far is that students do not provide input to teachers in order to improve the quality of learning. If there is input from students about teacher performance, it is generally done manually by filling out a satisfaction form. Based on these problems, it is necessary to apply the Group Decision Support System model to improve teacher performance. The evaluation process used with the AHP and Borda models can be used in decision making. The final result of this research can analyze teacher assessment data entered by students. The results of this study are expected to be one form of solution to the problem of the quality of learning The model applied can be a reference as an evaluation of competency-based education that can be realized.

The research objectives of the group decision support system for learning evaluation in state high schools include: (1) to facilitate principals, representatives, and supervisors in making decisions as seen from information technology-based teacher assessments with the AHP and Borda Decision models; (2) with the AHP model, the assessment can be seen based on the criteria values entered by students without any subjective assessment; (3) facilitate educational institutions in supervising, controlling, and observing teacher learning performance assessments in schools; and (4) can give positive results to

schools in order to improve the quality of school education whose student assessment results are processed using the AHP and Borda models.

2. METHOD

2.1 Improving Teaching Learning Performance

Regulation of the Minister of National Education of the Republic of Indonesia Number 2 of 2010 concerning learning that is oriented to the target of mastery of the material in equipping students to be able to solve problems. Evaluation of learning management learning evaluation activities are carried out in the teaching and learning process and the need for classification of activity management in the decision-making system can be used to determine the best teacher and suitability in providing assessments. [13] [14]. The decision support assessment process has a teacher performance evaluation process using a more detailed model than the manual process. The results obtained are in the form of basic calculations and data processing still using manuals and then seeing the teacher's performance using manual attendance. This is neither appropriate nor directed in the process of selecting an outstanding teacher.

The selection process for outstanding teachers uses a decision model, namely the AHP model and test results in the form of criteria and sub-criteria. There is a test with five educators or teachers who get the highest to lowest scores. for better selection results than manual selection [15]. Furthermore, in the teacher evaluation process, there are several obstacles in the evaluation process, such as the lack of variable values included in the teacher evaluation process, the absence of a model, the low level of program effectiveness, and the low number of participants in the assessment process [16][17].

2.2 Teacher Performance Evaluation and Assessment Indicators

Evaluation in quality learning means that teacher performance includes a good process and learning outcomes from the assessment. Performance can be in the form of criteria and alternatives in interrelated variables and is used as a measure of the level of achievement of the teacher's task success. Teaching performance indicators are listed in Permendiknas Number 16 of 2007. Evaluation of teacher performance requires the development of performance evaluations and can be used as a reference in teacher evaluation assessments [18].

Assessment in the process of teacher competence is a combination of a field of science, technology, and social problems as well as the existence of individual abilities in teaching. The existence of ideas in teaching is an information technology process in the teaching and learning process in which there are creative and effective ideas in the learning process [19], [20].

Performance or performance can be seen from the work that can be achieved by a teacher in accordance with the tasks that have been given. Assessment indicators Assessment of teacher performance includes teaching plans and materials, learning procedures, and skills in teaching students. The assessment in improving the quality of teachers includes the material presented at the time of teaching to students, the existence of supporting elements in the preparation of the content of the material, and the existence of an evaluation process for teacher assessment [21].

2.3 Model Decision AHP and Group Borda

AHP (Analytic Hierarchy Process) is a paired matrix assessment or not a paired matrix? The paired matrix is as follows:

1 : equal
3 : Slightly
5 : Strongly
7 : very Strong
9 : extreme

The problems that have been worked on will see structured and directed results [22]. Next, look at the assessment of the comparison matrix for criteria and alternatives that have similarities [23].

$$D = \begin{array}{c} \\ A1 \\ A2 \\ A3 \\ \vdots \\ Am \end{array} \begin{array}{c} \begin{array}{ccccc} C1 & C2 & C3 & \cdots & Cn \end{array} \\ \begin{bmatrix} x11 & x12 & x13 & \cdots & x1n \\ x21 & x22 & x23 & \cdots & x2n \\ x31 & x32 & x33 & \cdots & x3n \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ xm1 & xm2 & xm3 & \cdots & xmn \end{bmatrix} \end{array}$$

$$W = \begin{bmatrix} w1 & w2 & w3 & \ldots & wn \end{bmatrix}$$

Figure 1. Difference Matrix

Then conduct an assessment of each learning performance that is still objective, using the AHP method in the weighted summation of the rating ratings on each alternative on all attributes [24]. Next, look at the value of the consistency process, namely the value of Consistency Index (CI) and Consistency Ratio (CR) [25] such as the following:

$$CI = \frac{\lambda_{max} - n}{n-1}$$

$$CR = \frac{CI}{RI}$$

2.4 Model Group Decision Support System

Group decision support system, which can be carried out together with decision makers with the help of computers and a system that is divided and more focused [26]. Apart from the aspects of the data studied, differences in research also appear in the method chosen by the author in the Group Decision Support System research using the Borda method in voting [27]. Furthermore, the Group Decision Support System uses hare while decision makers use promethee [28].

2.5 Research Steps

The stages of the research on the group decision support system for learning evaluation in SMA Negeri Lhokseumawe are as follows:

1. Analyze the problem, namely in learning performance and see teacher data according to the field
2. Observation of the object being researched in schools relating to the evaluation of improving the quality of teacher learning
3. Using the AHP and Borda methods to determine teacher evaluations, collect research data and related designs on student learning performance.
4. System design based on problem analysis and learning evaluation of the Group Decision Support System at SMA Negeri Lhokseumawe implementation

The final stage of the research is to draw conclusions based on the results obtained from the previous stages, as well as provide suggestions to teachers and students. The research design for the group decision support system for learning evaluation in SMA Negeri 1 lhokseumawe is as follows:

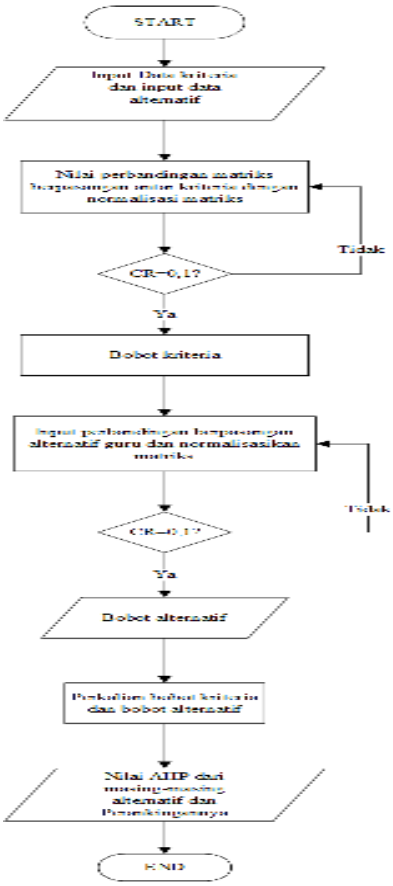

Figure 2. AHP Model

The research design for the group decision support system for learning evaluation in SMA Negeri Lhokseumawe is as follows:

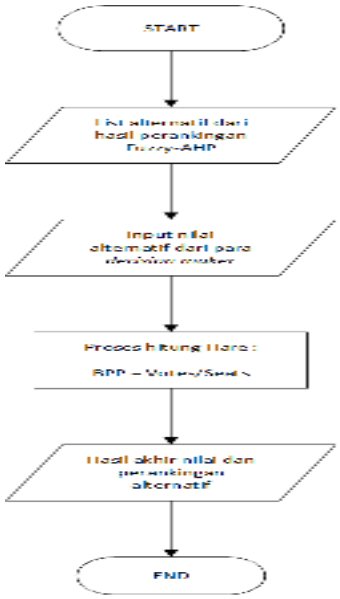

Figure 3. Borda Group

3. RESULTS AND DISCUSSION

3.1 System Implementation

A. Weighting Input Criteria (Student)

The stages after determining the criteria with the pairwise comparison matrix between the criteria filled in by the respondents are as follows:

Table 1. Overall Data

Voter	A1	A2	A3	A4
No_001	sufficiently	Good	Good	Good
No_002	Good	Good	Good	Sufficiently
No_003	Good	Good	Good	Good
No_004	Sufficiently	Good	Good	Good
No_005	Good	Good	Good	Good
No_006	Not enough	Good	Good	Good
No_007	Good	Good	Good	Good
No_008	Good	Sufficiently	Good	Good
No_009	Sufficiently	Sufficiently	Sufficiently	Good
…				
No_19	Good	Sufficiently	Good	Good
No_20	Good	Sufficiently	Good	Good

B. Voter Data (Student)

Alternative comparison data based on the average weight of the sub-criteria group decision support learning evaluation system in SMA Negeri Lhokseumawe are as follows:

Table 2. Voter Data

Voter	A1 VS A2	A1 VS A3	A1 VS A4	A2 VS A3	A2 VS A4	A3 VS A4
No_001	0,33	0,33	0,33	1,00	1,00	1,00
No_002	1,00	1,00	3,00	1,00	3,00	3,00
No_003	1,00	1,00	1,00	1,00	1,00	1,00
No_004	0,33	0,33	0,33	1,00	1,00	1,00
No_005	1,00	1,00	1,00	1,00	1,00	1,00
No_006	0,25	0,25	0,25	1,00	1,00	1,00
No_007	1,00	1,00	1,00	1,00	1,00	1,00
No_008	3,00	1,00	1,00	0,33	0,33	1,00
No_009	1,00	1,00	0,33	1,00	0,33	0,33
..	…	…	…	…	…	…
..	…	…	…	…	…	…
Student 19	3,00	1,00	1,00	0,33	0,33	1,00
Student 20	3,00	1,00	1,00	0,33	0,33	1,00
Geomean	1,32	0,78	0,70	0,57	0,51	0,89

C. Comparison Matrix

The value of the comparison matrix of the group decision support system evaluation criteria for learning in SMA Negeri Lhokseumawe is as follows:

Table 3. Comparison Matrix

	A1	A2	A3	A4
A1	1,00	0,64	0,78	0,70
A2	1,56	1,00	0,57	0,51
A3	1,28	1,74	1,00	0,89
A4	1,43	1,95	1,12	1,00
Count	5,28	5,33	3,47	3,11

D. Normalized Matrix

The Normalized Matrix Criteria for the group decision support system for evaluation of learning in SMA Negeri Lhokseumawe are as follows:

Table 4. Normalized Matrix

	A1	A2	A3	A4	score	Prioritas
A1	0,190	0,120	0,224	0,224	0,76	0,19
A2	0,295	0,188	0,165	0,165	0,81	0,20
A3	0,243	0,327	0,288	0,288	1,15	0,29
A4	0,272	0,365	0,322	0,322	1,28	0,32

E. CM Matrix

As for the CM Matrix the criteria for the group decision support system for evaluating of learning in SMA Negeri Lhokseumawe are as follows:

Table 5. CM Matrix

	A1	A2	A3	A4	Score	Prioritas	CM
A1	0,190	0,120	0,224	0,224	0,76	0,19	4,03756
A2	0,295	0,188	0,165	0,165	0,81	0,20	4,067525
A3	0,243	0,327	0,288	0,288	1,15	0,29	4,089896
A4	0,272	0,365	0,322	0,322	1,28	0,32	4,089896

3.2 Alternative Value

The alternative group decision support system for learning evaluation in SMA Negeri Lhokseumawe is as follows:

Kode	C1	C2	C3	C4
Bobot	0.2971	0.2125	0.3077	0.1826
A001	0.1152	0.1238	0.1029	0.1104
A002	0.125	0.0995	0.0771	0.1104
A003	0.1469	0.1454	0.1355	0.1176
A004	0.1469	0.1454	0.1015	0.142
A005	0.1355	0.1454	0.093	0.142
A006	0.1153	0.1109	0.1405	0.1104
A007	0.0904	0.0995	0.1476	0.1252
A008	0.1249	0.1304	0.2016	0.142

Figure 4. Alternative Value

The results of the ranking of the learning evaluation group decision support system in SMA Negeri Lhokseumawe are as follows:

Perangkingan

Ranking	Kode	Total
1	A008	0.1529
2	A003	0.1377
3	A004	0.1317
4	A005	0.1257
5	A006	0.1212
6	A007	0.1164
7	A001	0.1123
8	A002	0.1022

Jadi pilihan terbaik adalah DARA ,S.Pd dengan nilai 0.15

Figure 5. Ranking

3.3 Borda Model

The results of the final score of the learning evaluation group decision support system at SMA Negeri Lhokseumawe are as follows:

Table 6. Borda Model

Voter	Guru			
	Teacher 1	Teacher 2	Teacher 3	Teacher 4
Dm1	1	3	2	4
Dm2	2	1	4	3
Dm3	1	2	4	3
Dm4	2	1	3	4
Dm5	1	2	3	4

Table 7. Borda Ranking Result

	Ranking				
	1	2	3	4	Count
Teacher 1	3	2	0	0	23
Teacher 2	2	2	1	0	21
Teacher 3	0	1	2	2	4
Teacher 4	0	0	2	3	0

4. CONCLUSION

The results of the research for the criteria with the highest priority based on the respondents are: the ease of delivering material to be understood, namely 0.338; then the ease of managing class interaction with a priority of 0.237; then the level of teaching attendance with a priority of 0.223; and last is the accuracy of starting and ending learning hours with a priority of 0.192. The results of the ranking of teachers who get the highest weight in the AHP calculation based on the assessment of SMA Negeri Lhokseumawe students, namely A3 or A3 teachers, with a value of 0.30, the second position is occupied by A4 with a value of 0.24, Teacher A1 with a value of 0.23, and in last place, Teacher A2 with a value of 0.22. The results of the implementation of the Borda Group model where the ordering of teachers is based on the policy makers of each decision maker is a school based on a different The decision maker with the highest ranking is A1.

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