

The Development of a Decision Support System for Selecting Outstanding Teachers

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Abstract—The Selection of Outstanding Teachers is an agenda of Department of Education Youth and Sports (Disdikpora) intended to encourage motivation, dedication, loyalty and professionalism of teachers, the expected positive impact on performance improvement. In general elections outstanding teachers have been running smoothly according to specified criteria. However, its implementation is still not optimal felt so necessary to improve, especially in the aspects of assessment. In the assessment of the current selection are inconsistent because one of the criteria assessments (portfolio) has different valuation ranges. Therefore, it is needed a decision support system that is able to provide consistency with the application of the normalization judgment and able to show the rank results of the selection. Decision support system methods used in this research are Simple Additive Weight (SAW) and the Analytic Hierarchy Process (AHP). Both methods support the assessment criteria and weighting. The criteria used for the assessment refer to the Outstanding Teacher Selection Handbook 2012 and based on the results of data analysis assessment Outstanding Teacher Selection of Junior High School, Senior High School and Vocational High School in 2012. The method for developing the system that is used in this research is waterfall method. The system is capable of displaying two alternative ranks of outstanding selection of teachers based on the SAW and AHP methods. This system is useful to provide a reference for the field of Technical Executives of Activities/ PPTK (Pejabat Pelaksana Teknis Kegiatan) Disdikpora particularly which are relevant in decision-making to determine the selection of outstanding teachers. Based on the results of testing the system's functionality, 96.7% stated functionality of the system running well, whereas the results of the testing interface, 38.96% for Strongly Agree, and 48.05% Agree.

Keywords-Simple Additive Weight; Analytic Hierarchy Process; Decision Support System; Youth and Sports Education Agency; Selection of Outstanding Teacher; Waterfall Method.

I. INTRODUCTION

Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, and evaluating students in early childhood education, formal education, basic education, and secondary education [1]. Teachers not only have educative technical abilities, but also must have a reliable personality so that they become the role model for students, families and society. In line with the development policies that put the development of human resources (HR) as a national development priority, the position and role of teachers are increasingly strategic in preparing qualified human resources in the face of the global era [2].

The selection of outstanding teachers is intended, to encourage motivation, dedication, loyalty and professionalism of teachers, which are expected to have a positive effect on the performance and work performance of this global era, both academically and non-academically such as creativity in the field of work or achievements in sports, as well as new discoveries that can support the advancement of education [3]. Outstanding teachers are teachers as stated in Law No. 14 of 2005 concerning Article 8 about Teachers and Lecturers that "Teachers must have academic qualifications, competencies, educator certificates, physically, and mentally healthy, and have the ability to realize national education goals". Moreover, in Article 10 it is said that "Teacher competence as referred to in Article 8 includes pedagogical competence, personality competence, social competence, and professional competence obtained through professional education" [4].

This final project takes a case study at Sleman District Youth and Sports Education Office with the theme and research title "The Development of Decision Support System for The Selection of Outstanding Teachers" which applies decision-making methods, Simple Additive Weight (SAW) and Analytic Hierarchy Process (AHP). This system will be built using the Java programming language and MySQL database.

II. THEORY

A. Simple Additive Weight (SAW)

The SAW method is often also known as weighted addition. The basic concept of the SAW method is to find a weighted sum from the performance rating on each alternative on all attributes. SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all available alternative ratings [5].

B. Analytic Hierarchy Process (AHP)

Analytic Hierarchy Process (AHP) is a model that is flexible and can provide opportunities for individuals or groups to build ideas. AHP helps in defining problems by making their respective assumptions and obtaining the desired solution [6].

C. Multi Attribute Decision Making (MADM)

Multiple Attribute Decision Making (MADM) is a method of decision making to determine the best alternative from a number of alternatives based on certain criteria. MADM is used to solve problems in discrete space. Therefore, MADM is

usually used to make an assessment or a selection of a limited number of alternatives [5].

III. METHODOLOGY

A. Study of Literature

The Ministry of Education and Culture, through the Directorate General of Secondary Education, gives serious attention to empowering teachers, especially outstanding teachers. This is in accordance with the mandate of the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers. The selection of outstanding teachers is the implementation of the mandate. Therefore, the literature study of this research is the Law of the Republic of Indonesia Number 14 of 2005 and the Selection Guidance of Good Teachers.

B. Data Collection

At this stage it aims to obtain data from the Office of Youth and Sports Education of Sleman Regency by consulting PPTK. The data used in this study were obtained by:

- Documentation study, namely data collection through archives of the results of the evaluation of outstanding teacher selection in 2012.
- Interview with The Department of Youth and Sports Education Office in Sleman Regency especially with staff from PPTK.

C. Data Analysis

At this stage the researcher studies and processes data to find an idea in the study. The researcher analyzed the comparison between the results of the assessment of the selection of outstanding teachers and the assessment format in the teacher's manual for achievement.

D. System Development

The development of this system uses Waterfall method of System Development Life Cycle (SDLC) method, which have the following process:

- System Planning

Identify the needs of system functionality, actors for systems, planning and system design.

- System Analysis

Stage for process modeling with the Unified Modeling Language (UML)

- System Design

The stage for designing the database and user interface.

- System implementation

The stage to build the system, in this case the system is built with Java and the MySQL database.

- System testing

System testing for evaluation and improvement.



- System maintenance

To maintain the system and keep it stable.

IV. SYSTEM DESIGN

This Decision Support System for Selecting Outstanding Teachers is implemented in a desktop based system. The system is built by Java programming language, and uses MySQL database.

1) Login Form

Figure 1 shows a form which is used to enter the system.



Figure 1. Login Form

2) Home Page

Figure 2 is the main page of the system.

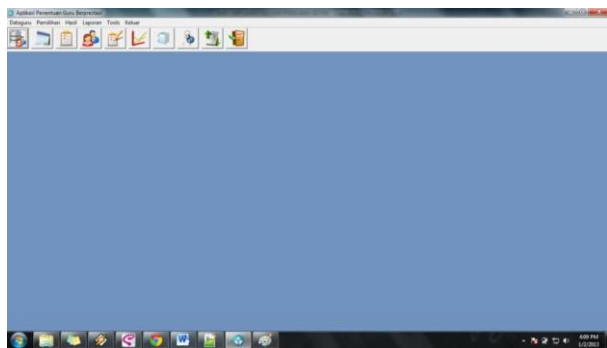


Figure 2. Home Page

3) Teachers Data Form

Figure 3 is a form that can be used to process teacher's data.

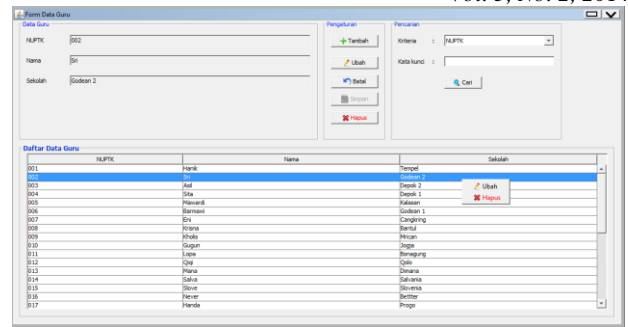


Figure 3. Teachers Data Form

4) Period Form

The form in Figure 4 serves to process the period for a selection. Performed before processing criteria and participant data.

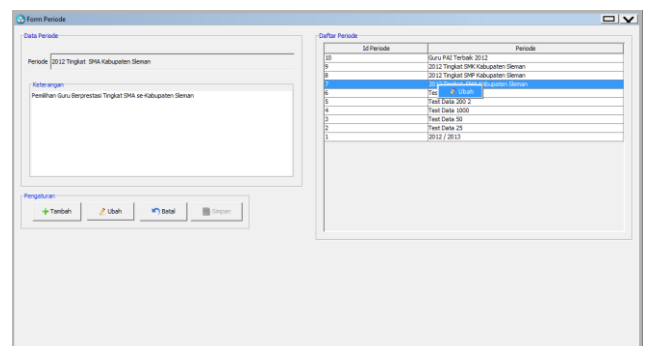


Figure 4. Period Form

5) Criteria Form

Criteria form is used to process the data of criteria in each selected period. It is shown in Figure 5.

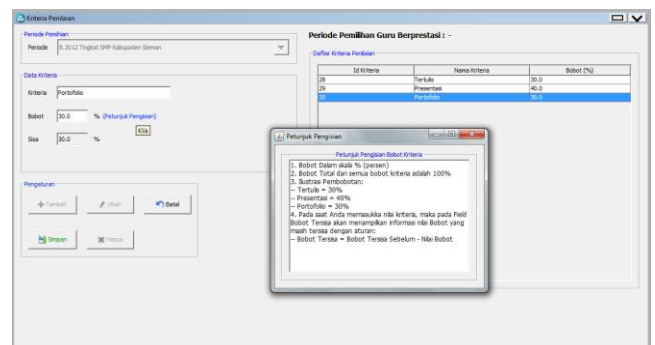


Figure 5. Criteria Form

6) Participant Form

Admin must first select the period before processing participants' data. This process uses form on Figure 6.



Figure 6. Participant Form

7) Assessment Form

This form in Figure 7 is used to enter participants scores based on each criterion.

Figure 7. Assessment Form

8) Result Form

This form in Figure 8 implements the SAW and AHP methods for ranking. If the SAW ranking result table is different with the AHP ranking table, the system will give a different font color; red for SAW ranking, and blue for AHP ranking result.

Figure 8. Result Form

9) Detail Graph Form

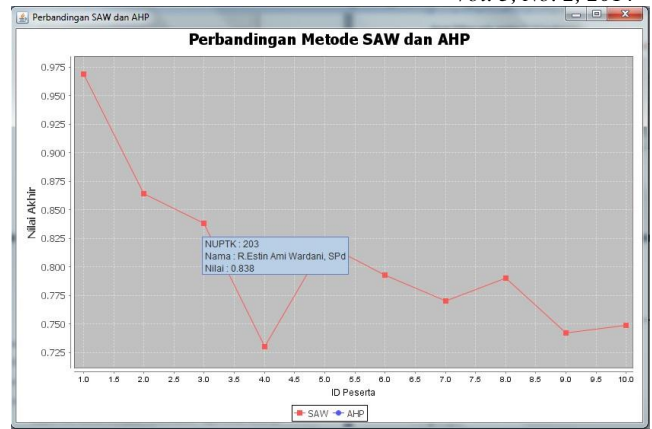


Figure 9. Detail Graph Form

Figure 9 shows a detailed graph form.

10) Report Form

Figure 10. Report Form

Figure 10 shows a report form.



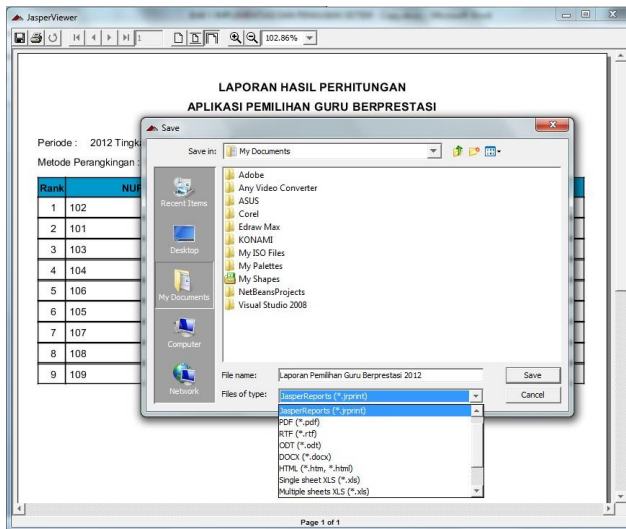


Figure 11. Report Form 2

This form in Figure 11 processes activities after the previous process in Figure 10.

11) Change Password Form

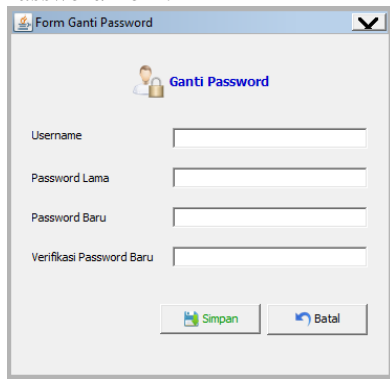


Figure 12. Change Password Form

If a user wants to change its password, the for in Figure 12 can be used.

12) Backup-Restore Form

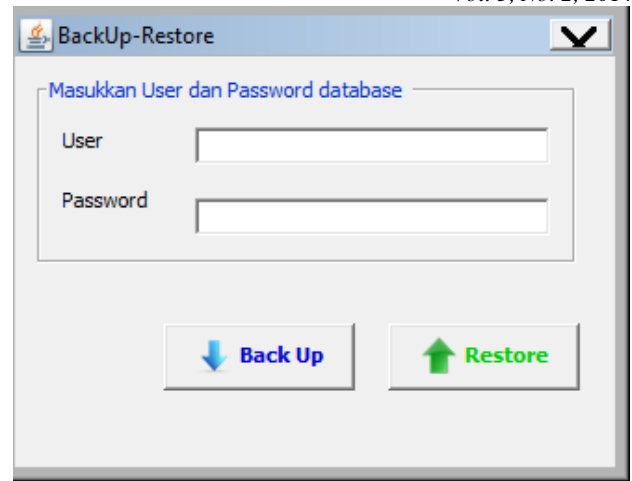


Figure 13. Backup-Restore Form

Figure 13 shows the form for backing up the system.

V. RESULT AND DISCUSSION

A. Test Result

We have conducted a test for this system which involved 11 respondents consisting of staffs from the Sleman District Youth and Sports Education Office, whose education levels come from various levels. Tests are carried out on system functionality and system interfaces. The test results on system functionality can be seen in Table I.

TABLE I. SYSTEM FUNCTIONAL TEST RESULTS

No	Statements	Y	N
1	If the username and password are incorrect or the username is not registered, then it cannot log in to the system	11	0
2	The system is able to provide convenience in managing and ranking data for the admin.	11	0
3	The system can display teacher's data information	9	2
4	The system can display selection of period data information	11	0
5	The system can display information on the assessment criteria's data	11	0
6	The system can display information on participant's data	9	2
7	The system can display assessment data information	22	0
8	The system can display information on ranking data	11	0
9	The system can display a comparison chart	11	0
10	Users can change passwords via the password setting's form	11	0
11	The user after logging out, can no longer operate the system	11	0
Total		128	4
Percentage		96.97	3.03



B. Discussion

Based on the results of the implementation of the SAW and AHP methods on the system, ranking has been produced without any inconsistency in assessment. This is evidenced by the comparison of the results of the assessment of each criterion that is not significant when compared with before using a system that applies the SAW and AHP methods. For example, the results of the assessment of Dra. Hewi Murdaningsih. M.Pd.Si before and after system usage as in Table 2.

TABLE II. COMPARISON RESULTS BEFORE AND AFTER

Criteria		Written	Percentage	Portfolio
PBG 2012 result	Value	20.67	33.2	981.9
	(%) Total	2%	3.21%	94.80%
SAW	After processing	0.271	0.398	0.3
	(%) Total	27.97%	41.07%	30.96%
AHP	After processing	0.03	0.041	0.061
	(%) Total	22.73%	31.06%	46.21%

Based on the results of testing the system functionality and system interfaces, it was concluded that most respondents or testers stated the functionality of the system is good. Data from the system functionality test results show that 96.97% states that the functionality of the system is functioning properly (Y) and 3.03% states that the functionality of the system is not functioning properly (N). The percentage of testers who state system functionality does not function properly due to the lack of teacher data information expected by the examiner. Therefore, it is necessary to add teacher data information displayed in this system.

The test results based on the system interface concluded that most testers agreed with the system interface that had been made. Data from system interface testing results show that 38.96% Strongly Agree (SS), 48.05% Agree (S), 12.99% Disagree (KS), and 0% Disagree (TS).

Based on the explanation above, it can be concluded that the decision support system for the selection of good/ high achieving teachers is feasible, but there is still a need for further system development in order to obtain more optimal results.

VI. CONCLUSION

Based on the research that has been done by researchers during data collection, design to the implementation of the Achievement Teacher Selection Decision Support System, then some conclusions can be drawn as follows:

- This research has succeeded in developing an Achieved Teacher Election Decision Support System that can facilitate the assessment process of achieving teacher selection, as indicated by the percentage of system functionality testing of 96.97% answering "yes" and 3.03% answering "no". The system interface test results show that 38.96% for Strongly Agree, 48.05% Agree, 12.99% Less Agree, and 0% Disagree.
- This research has succeeded in developing the Achievement Teacher Decision Support System that applies the SAW and AHP methods to rank teachers with achievement.

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