Decision Support System in Determining the Best Employees of the Bengkulu Province Social Service Using the SAW Method

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Abstract *-In an effort to improve the performance and professionalism of employees, the Social Service of Bengkulu Province annually conducts an evaluation or assessment to determine the best employees as a form of appreciation for the performance of these employees. However, in its implementation, this process experiences obstacles in terms of objectivity and efficiency in conducting assessments, because it still uses a manual process. Therefore, to overcome these problems, this research develops a Decision Support System (SPK) using Simple Additive Weighting (SAW) method to increase objectivity and efficiency in assessing the best employees. This system was developed using PHP programming language and using MySQL database. Based on the results of data testing as many as 5 alternative employees, the results obtained were one employee with the highest score on behalf of Zulkifli with a value of 0.931 and declared the best employee.*
Keywords: Decision Support System, SAW Method, Employee Performance.

I. INTRODUCTION

Every organization, whether government or private, conducts employee assessments and selections. This activity is a crucial process that can boost work motivation and improve overall employee performance. One such activity is carried out by the Bengkulu Provincial Social Service government organization. At the Bengkulu Provincial Social Service, the determination of the best employee is carried out as a form of appreciation for employees who have demonstrated dedication and superior achievements. The Social Service, as an institution that plays a vital role in public service, needs to ensure that its employees perform optimally. This process aims to recognize and reward employees who contribute optimally to achieving work targets, maintaining ethics, and serving the public well. This award is expected to increase work morale and encourage a positive work culture within the agency. However, in practice, the process of assessing the best employee often faces various problems. These obstacles include subjectivity in the assessment, the manual process, and the difficulty in comparing employee performance fairly. Without an objective evaluation system, this selection process can lead to dissatisfaction among employees due to perceived inconsistencies in the results. Furthermore, manually analyzing data can increase the difficulty in accurately selecting the best employee candidates. To address these issues, a system is needed that can conduct a more objective assessment process while eliminating manual calculations, one of which is a Decision Support System. A Decision Support System (DSS) can assist the management of the Social Services Agency in determining the best employees more objectively and efficiently. One method that can be applied in this system is the Simple Additive Weighting (SAW) method. Simple Additive Weighting (SAW) is a weight-centered addition method. This method is used to find the value and performance of each alternative for each predetermined criterion (Devi, 2020). With a SAW-based DSS, it is hoped that more systematic calculations can be carried out and subjectivity in the assessment process can be reduced. The SAW method has advantages in terms of ease of implementation and clarity in the calculation process. This method is also capable of managing complex data while still providing results that are easy for users to understand. Therefore, implementing the SAW method in the best employee determination system can be an effective and accurate solution for the Bengkulu Provincial Social Services Agency. With this decision support system, it is hoped that the process of selecting the best employees in the Bengkulu Provincial Social Services Agency can be carried out transparently, accurately, and efficiently. This not only supports the achievement of agency goals, but also encourages improvements in the quality and professionalism of employees in their work.

II. LITERATURE REVIEW

1. Best Employee

An employee is any person who works by selling their labor (physical and mental) to a

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company and receives compensation in accordance with the agreement. Employees are human labor, both physical and spiritual (mental and mental), which is always needed and therefore becomes one of the main assets in collaborative efforts to achieve certain goals of a company or related parties, for example, organizations. Furthermore, employees are people who work in a certain body, both in government institutions and in business entities. Meanwhile, according to the Indonesian dictionary, an employee is a person who works in an institution (office, company) and receives a salary or wage (Tri, 2021).

The best and most qualified employees are a company's capital, enabling it to grow rapidly. Employee performance has a significant impact on company profits (Ilham, 2023). The best employees are individuals who demonstrate exceptional performance, are highly dedicated, and contribute significantly to the success of their workplace. They not only meet but often exceed established targets, and take the initiative to provide creative solutions to work challenges. The best employees are also known for their professional attitudes, such as discipline, integrity, and a strong work ethic. In working together, they are able to build harmonious relationships with colleagues, create a positive work environment, and provide excellent service to customers. In addition, they continuously develop their skills and competencies to deliver better results. With their attitudes and contributions, the best employees inspire other colleagues and help drive the success of the team and the company as a whole.

2 Systems

A system can be defined as a network of interconnected elements designed to achieve a specific goal. A system is a network of interrelated work processes that come together to achieve a goal and carry out an activity. A system is defined as a combination of several elements, components, or variables that are integrated with each other to form a unified whole, thereby achieving a goal and objective. From the above statements regarding the definition of a system, it can be concluded that a system is a collection of interconnected elements, components, or variables that are designed to achieve a specific goal (Maydianto, 2021).

3 Decision Support Systems

Decision Support System (DSS) as a computer-based system consisting of three interacting components, a language system, a knowledge system (a repository of problem domain knowledge that exists in the Decision Support System or as data or as procedures), and a problem processing system (the relationship between the other two components, consisting of one or more general problem manipulation capabilities required for decision making) (Sumarno, 2020).

III. RESEARCH METHODOLOGY

1. **Research methods**

The research method that will be used to build the system in this research is the RAD (*Rapid Application Development*) method . te r b a g i in Four f a se that is as follows :

Figure 1 RAD Method

1. **Planning Stage**
   In this stage, the author will plan the requirements needed to create the best employee decision support system, starting with preparing the hardware and software and the data requirements that will be processed by the system.
2. **e s a Stage in System**
   At this stage, the author will create a system design starting from creating a system flow consisting of a context diagram, *data flow diagram, entity relationship diagram,* system database and creating a system interface that will later be created or built.
3. **Stage Construction**
   In this stage, the author and programmer who created the system will create the program or system that has been designed. This stage is the implementation of the design phase. To be understandable by the computer, the system will be created using a programming language through a coding process. The programming language used in this research is PHP with a MySQL database.
4. **System Testing Phase**

At this stage, the author will test the system that has been built, starting from testing the correct system flow, *input, edit, delete* and *output processes* from the system as well as the decision process using the SAW method to find out whether the system is running well without any errors in the system construction stage.

IV. RESULTS AND DISCUSSION

A. **Results and Discussion**

The Decision Support System (DSS) in this study was created to assist in the decision-making process in determining the best employees within the Bengkulu Province Social Service. This system uses the Simple Additive Weighting (SAW) method to help make the

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decision-making process more objective, transparent, efficient, and professional, compared to the manual method previously used.

System The decision-support system for determining the best employees for the Bengkulu Provincial Social Service was developed using the PHP programming language and a MySQL database, utilizing XAMPP as a local server. This system is managed solely by an admin, who then inputs data into the system.

B. **System Implementation**

The system implementation displays the interface design results and calculation results. This system is designed for easy user access and accurate calculations. In its implementation, the system is equipped with an administrator login page, employee data and criteria processing, calculations, and results presentation. The system interface... decision support in determining the best employees of the Bengkulu Province Social Service using the *Simple Additive Weighting* (SAW) method, including:

1. Login Page

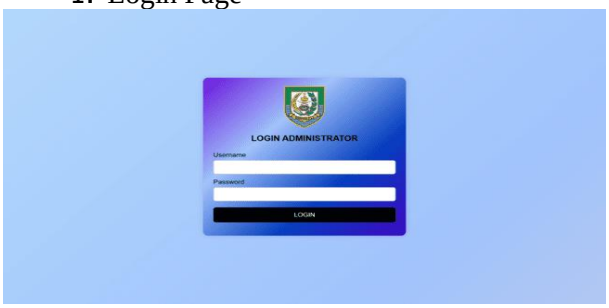

Figure 2. Login Page

The image above shows the system login page, the first page an admin will access. The login page serves as the primary access point for users with administrator privileges. On this page, the system verifies the username and password input against the database before granting access to the main page. Each page is equipped with a session, which ensures system access through the login page first, ensuring system security.

2. Home/Main Page

Figure 3. Main Page

The system's home page serves as the primary display, providing access to various system features. At the top of the page, there's a navigation header containing several main menus, including home, employees, assessment, the SAW method process, the admin menu, and the logout menu. In the center of the page, there's a banner that emphasizes the system's primary purpose: assisting in the decision-making process for identifying the best employees. Below the banner, there's a welcome message briefly explaining the system's function: to simplify the decision-making process, making it more objective and efficient.

3. Employee Page

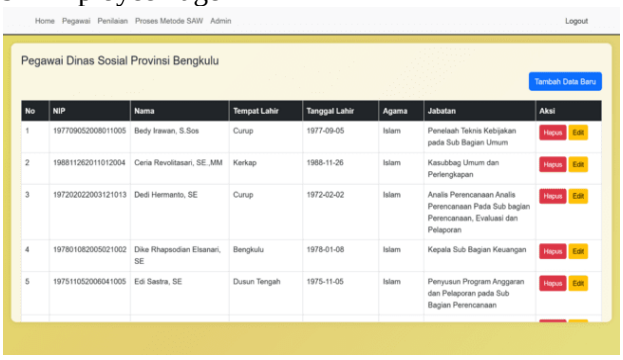

Figure 4. Employee Page

The employee page is the employee data management page in the best employee decision support system of the Bengkulu Provincial Social Service. This page is used to view, add, edit, delete employee data that will be assessed in the system. In the main section of this page, there is an employee data table that contains employee information, including Employee Identification Number (NIP), name, place of birth, date of birth, religion, and position, there is also an action column that will later appear two options on each row: edit and delete. At the top of the table there is an add new data button, which allows an admin to add new employees to the system. This system is designed to provide ease in managing employee data.

4. Add Employee Page

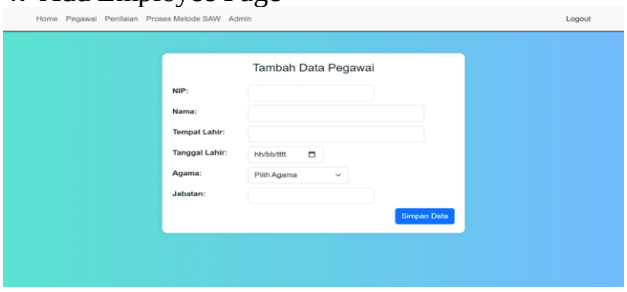

Figure 5. Add Employee page

This image is a design of the employee data input page. On this page there are several data inputs consisting of NIP to add employee identification number, Employee Name to add employee name data, Place of Birth to add employee birthplace data, Date of Birth to add employee birth date data, Religion to add employee religion data, and Position to add employee answer data. At the bottom of the data input page there is a save data button, which functions to run the command to save data into the database.

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5. Assessment Page

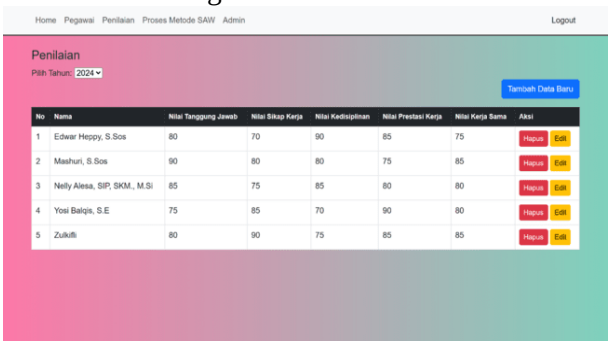

Figure 6. Assessment Page

The image above is an assessment page used to display each employee's value data based on criteria. At the top left of the page there is a year input used to display data based on the year. At the top right there is an add new data button, which functions to direct the admin to the add assessment data form page. Meanwhile, in the middle of the page there is a table that displays each employee's assessment data in the form of, number (No), Name, Responsibility Value, Work Attitude Value, Discipline Value, Work Achievement Value, Work Achievement Value, and Action containing a delete button used to delete data and an edit button used to direct to the selected data edit form page.

6. Assessment Data Input Page

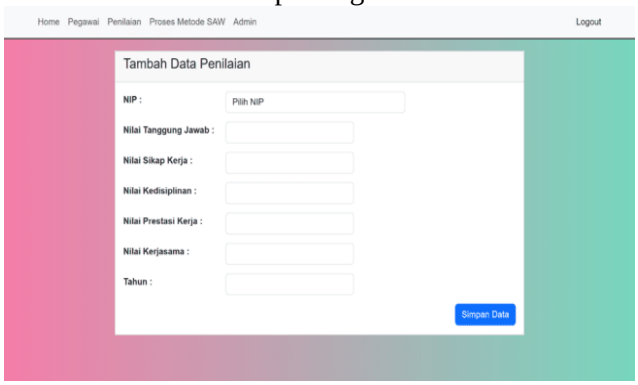

Figure 7. Assessment Data Input Page

The image above is an assessment data input page that allows the admin to add employee assessment data. On this page there is a form for inputting assessment data, in the form of NIP input, in the NIP input column it will display the NIP of each employee, then there is a Responsibility Value to input the value of the Responsibility Value criteria, Work Attitude Value to input the value of the Work Attitude Value criteria, Discipline Value to input the value of the Discipline Value criteria, Work Achievement Value to input the value of the Work Achievement Value criteria, Cooperation Value to input the value of the Cooperation Value criteria, and year input to input the year in which this value is used in the calculation. At the bottom there is a Save Data button to process saving data into the database.

7. SAW Method Process Page

Figure 8. SAW Method Process Page

The image above shows the processing page for employee assessment data using the SAW method. This page contains five tables: employee data, criteria weights, normalized values, normalized values, and final values. In the upper right corner, there's a report button that prints the calculation results.

The employee data table displays information based on the year entered on the previous assessment page. This table displays employee name, responsibility score, work attitude score, discipline score, work performance score, and cooperation score in status form.

The criteria weighting table displays the weighting of each criterion used in the calculation of the final score. This table displays the weighting of the criteria for responsibility, work attitude, discipline, work performance, and cooperation.

The Normalized Value Table is a table from the initial process of the SAW method. The table consists of the number, name, normalized value of responsibility criteria, normalized value of work attitude criteria, normalized value of discipline criteria, normalized value of work performance criteria, and normalized value of cooperation criteria.

The Normalized Value Table displays the results of processing the two SAW methods. This table contains information on the initial calculations from the normalization table, which will then be displayed in a normalized table for each criterion.

The Final Value Table displays the final calculation results, from calculating and adding the values in the normalized table to the values in the criteria weight table. These results will serve as the basis for decision-making.

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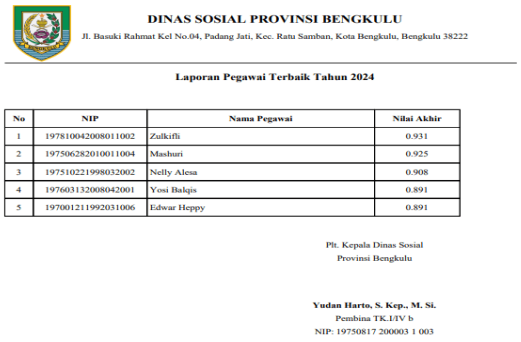
8. Report Page



DINAS SOSIAL PROVINSI BENGKULU

Jl. Basuki Rahmat Kel No.04, Padang Jati, Kec. Ratu Samban, Kota Bengkulu, Bengkulu 38222

Laporan Pegawai Terbaik Tahun 2024

No	NIP	Nama Pegawai	Nilai Akhir
1	197810042008011002	Zulkifli	0.931
2	197506282010011004	Mashuri	0.925
3	197510221998032002	Nelly Alesa	0.908
4	197603132008042001	Yosi Balqis	0.891
5	197001211992031006	Edwar Heppy	0.891

Plt. Kepala Dinas Sosial
Provinsi Bengkulu

Yudan Harto, S. Kep., M. Si.
Pembina TK.I/IV b
NIP: 19750817 200003 1 003

Figure 9. Report Page

The Report page displays the output of the calculation results. This page is designed to sort the highest values from the calculation results to make it easier to identify the best employees. This page features a header with the agency logo, agency name, and agency address. The report header contains the text "Best Employee Report," which corresponds to the year previously entered. The table contains information such as employee number, NIP, employee name, and final grade. The bottom right corner contains a section for the signature of the Head of the Bengkulu Provincial Social Service.

9. Admin Page

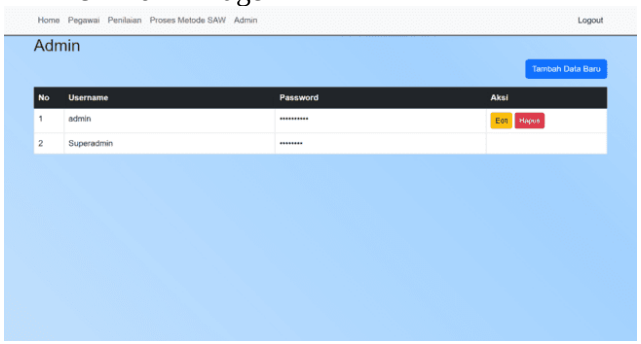


Figure 10. Admin Page

This page contains a table of admin data, including a "No," "Admin Name," which displays the admin name, a "Username," and an "Action" button, which includes "delete" and "edit." There's also an "Add New Data" button, which takes you to the new admin data entry page.

10. Add Admin Page

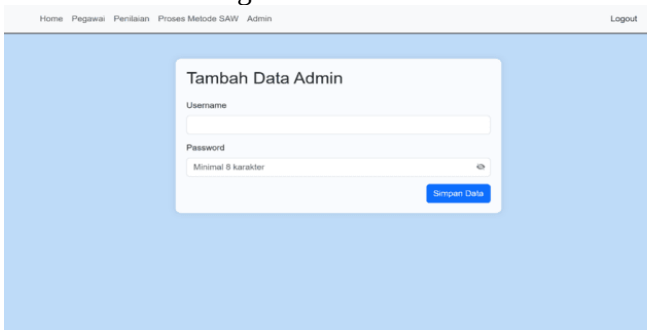


Figure 11. Add Admin page

This image shows a layout of the new admin data input page. The page contains data input fields, including Admin Name, Username , *and* Password . There's also a Save button to process the data for storage in the database .

a. **System Test Results**

System testing was conducted using the black box method, which involved testing the data *input* process , the displayed data *output* process , the data *editing process, and the* data *deletion* process within the system . The results of the testing are shown in Table 1.

Table.1 System Test Results

No	Tested Features	Testing	Expected results	Test Results
1	Login Page	Enter username & password	Users can log in to the system if the data is valid	Succeed
2	Employee Page	Add employee data	Employee data is stored in a database	Succeed
3	Employee Page	Edit employee data	Employee data has been successfully updated	Succeed
4	Employee Page	Delete existing employee data in the system.	Employee data deleted from the system	Succeed
5	Assessment Page	Input assessment data	Assessment data is stored correctly	Succeed
6	Assessment Page	Input year	The data displayed corresponds to the year inputted.	Succeed
7	SAW Process Page	Calculation using the SAW method	SAW calculation results according to the algorithm	Succeed
8	Report Page	Displays the best employee report, per year according to the year entered on the assessment page.	The report can be printed and is in accordance with the processed data and according to the year.	Succeed

Based on Testing results using the Black Box method showed that the system's functionality was functioning as expected. The system was also capable of displaying calculation results using the SAW method.

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V. CLOSING

A. Conclusion

Based on the results of the discussion, it can be concluded that :

1. The Decision Support System (DSS) developed can help the process of evaluating the best employees at the Bengkulu Province Social Service to be more objective and efficient compared to the manual method previously used.
2. The Simple Additive Weighting (SAW) method applied is able to provide accurate results, with structured calculations and is more objective in determining the best employees based on predetermined criteria.
3. From the tests that have been carried out, the results obtained are as expected, where all available features can run according to their functions, and can display calculation results that are accurate and in accordance with the Simple Additive Weighting (SAW) method calculations.
4. The data testing revealed that Zulkifli received the highest score, with a score of 0.931, and was declared the best employee. Mashuri came in second with a score of 0.925, Nelly Alesa came in third with a score of 0.908, Edwar Happy came in fourth, and Yosi Balqis came in fifth with the same score of 0.891.

B. Suggestion

So that this research can be further developed and be more widely useful, there are several suggestions that can be given as follows:

1. The system currently runs on a local server. For greater flexibility, the system can be developed as a web-based system for access from multiple locations.
2. The system can be integrated with the personnel system or other systems that exist at the Bengkulu Province Social Service.
3. Periodically evaluate the system to ensure the system remains relevant and effective in assisting the decision-making process.

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