



Village Evaluation System in Kem Kem using the Weighted Product Method

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Abstract

Village staff performance appraisal is an important part of knowing how well an organization is running, including in the village government. In Kem-Kem Village, the staff performance appraisal process has been done manually and subjectively. This can lead to unfairness and lack of transparency in decision-making. To overcome these problems, the purpose of this research is to create a computerized system to evaluate staff performance using the Weighted Product (WP) method. The WP method was chosen because it can process data based on several criteria. This is done by considering the importance of each criterion proportionally to other criteria. This system was developed using PHP programming language and MySQL database. The assessment criteria include responsibility, discipline, cooperation, initiative, and attendance. The results of applying the WP method show that it can produce objective and consistent staff performance ratings based on overall staff preferences. The system also helps the village government conduct regular and thorough performance checks. The system also makes it easier for Kem-Kem Village staff to be accountable for their work and encourages them to do their best.

Keywords: Decision Support System, Appraisal, Staff Performance, Website, Weighted Product

1. Introduction

The development of technology today is caused by globalization and the ever-changing internet, the rapid growth of information technology allows people to exchange data, communicate, and improve performance with the help of the internet. To process and transmit data, many industries, including governments, rely on computers and the internet. Now, humans are starting to develop systems that help determine the best solution to a problem. A decision support system (DSS) consists of alternatives, criteria, and weights that are used to determine the best solution. According to Veithzal Rivai, performance appraisal is a formal and structured system used to measure, assess and influence work-related traits, behaviors, and results, including absenteeism [1].

The main problem we face in staff performance is still using manual methods for data processing. This causes the appraisal process to be slow, error-prone, and less efficient. In addition, unstructured data often results in performance appraisals that are inaccurate, unfair, and can ultimately hinder village management decision-making. The goal is to determine how productive staff are and whether they have the ability to perform or become more effective in the future, so that both staff and the organization benefit [2]. When using *Microsoft Excel*, there are several obstacles in its use, one of which is that the formula used is not standardized and *Microsoft Excel* is not centralized in one database. To assist the performance appraisal process, a system is needed that is able to assist in making performance appraisal decisions on staff, a decision support system is used to facilitate this process, one of which is by applying the *Weighted Product* method, this method is one of the techniques in decision making that allows the decision-making process to be carried out more quickly and accurately, based on predetermined criteria [3].

The advantage of the *Weighted Product* method is its ability to determine the best solution based on specific criteria. This method can handle different criteria by giving appropriate weights, so the results are more objective. In addition, *Weighted Product* is flexible because it can accommodate both positive and negative criteria with preference scores for each alternative. Starting from the above problems, the author designed the Kem- Kem Village Staff Performance Assessment System using the *Weighted Product* Method. The *Weighted Product* (WP) method can calculate the accumulation in a weighted manner based on the value (rating) of the performance of each candidate. This is done by normalizing the weight for each criterion, which results in a total weight value [4].

This method is widely used by the world of education, including to analyze the causes of low student interest in learning English [5]. The designed assessment system is expected to store, analyze, manage and present performance assessment data. This system is designed for

five main features, namely input staff data, criteria, criteria weights, assessments, results, along with several other features that will be designed on this system admin, and a list of raw materials. The results of the research can help the Village Head to see and assess how productive a staff is in serving the village community with a more attractive display. The author hopes this research can help answer and facilitate the need to assess staff performance to further develop in the future. Based on the above background, the authors are interested in conducting research and taking the title "Village evaluation system in kem kem using the Weighted product method".

2. Research methods

2.1. Problem analysis

To analyze the problems contained in the current system, you can use a *fishbone* diagram which can be seen in the following figure:

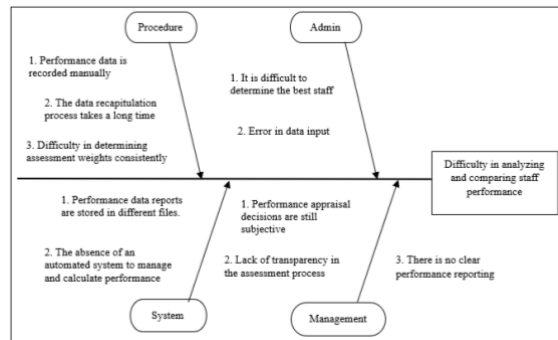


Fig. 1: Fishbone Diagram Performance Appraisal

As shown in Fig.1 above, the Procedure on Performance Appraisal reports data inputted in *Microsoft Excel* and the collection of data obtained takes a long time. Admins on performance appraisals often have data errors that cause information mismatches. The current system on performance appraisal is that data reports are stored in different *files* and calculate performance scores manually. So that management in the assessment process shares the results manually.

2.2. Process analysis

Currently, Kem-Kem Village still uses manual methods in recording and processing staff performance data. Data is collected through *Microsoft Excel* and stored in archives. This causes several problems, such as the difficulty of determining an objective performance assessment, the absence of structured criteria weighting, and limitations in systematically analyzing and comparing staff performance. This results in inaccurate decision-making and has the potential to cause injustice in staff performance evaluation.

2.3. Analysis of methods used

1. Normalize the criteria weights using the following equation

$$W_j = \frac{w_j}{\sum_{j=1}^n w_j} \quad (1)$$

Definition : formula for calculating the weight of the weight product method.

2. To develop a performance appraisal system for Kem-Kem Village, the Weighted Product Method will be used. Based on the concept of the Weighted Product Method, the following is how to work in designing a staff performance appraisal web.

1. Requirements Gathering

This initial stage involved working with the Head of Kem-Kem Village to identify data requirements including: homepage, staff data, criteria, criteria weights, ratings, and results. The data was analyzed to formulate the needs of the staff performance appraisal system.

2. Design

Design a user interface using Figma based on the analysis results. The designed interface includes home page, staff data, criteria, criteria weights, assessment, and results.

3. Implementation

The system design is converted into program code using PHP, HTML, CSS, JavaScript, and Bootstrap, with a MySQL database. This stage is the process of building a website based on the previous design

4. Testing

testing to ensure the system runs well, according to its function, and is error-free.

5. Maintenance

This stage ensures that the system remains stable after implementation. If new errors are found, they are fixed without building the system from scratch.

2.4. Analysis of the proposed system

Analysis of the proposed system is modeled using *Use Case Diagrams* and *Activity Diagrams*.

1. Use case diagram

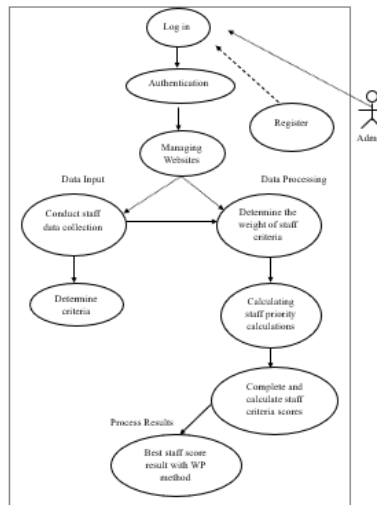


Fig. 2: Use Case Diagram

2. Activity Diagram

This login *activity diagram* allows the admin to access the system pages of the decision support system. This keeps the system safe from people who are not entitled to access the data contained in it. The admin login *activity diagram* is shown below.

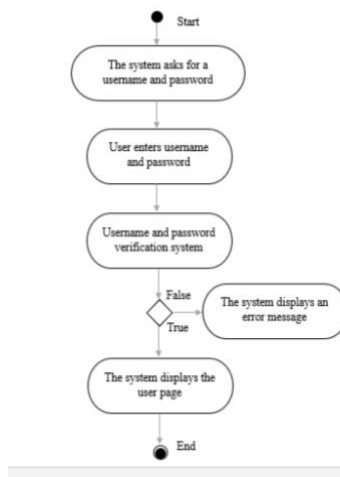


Fig. 3: Login *activity diagram*

Furthermore, the activity diagram of processing staff data is depicted to find out the flow of adding, changing, and deleting staff data. Activity diagram image for the following staff data processing use case.

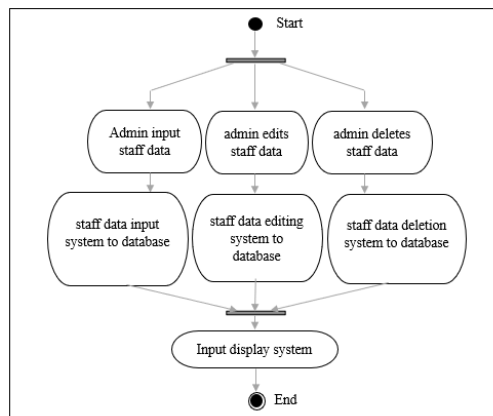


Fig. 4: Activity Diagram of Staff Data

Processing criteria data is used to now how to add, change, and delete the following criteria data.

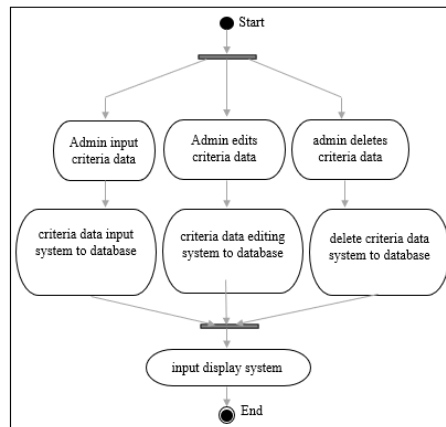


Fig. 5: Activity diagram of criteria data

2.5 System Modeling

The process contained in the system can be detailed as shown in Figure *Entity Relationship Diagram* illustrates the relationship or relationship between entities in the Kem-Kem Village Staff Performance Appraisal System program using the *Weighted Product (WP)* method is as follows.

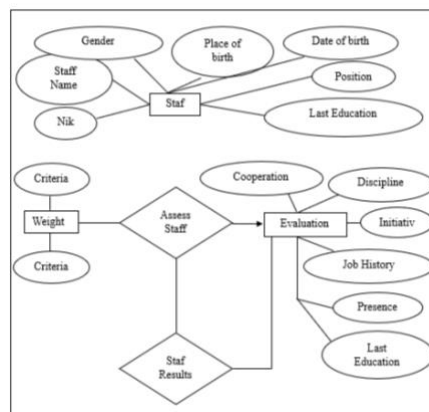


Fig. 6: Erd spk staff assessment

3. Result and discussion

3.1. Website display result

The following is a display and website of the performance assessment system for Kem-Kem village staff using the weighted product method for assessing student learning outcomes only displays the admin section.

- a. When running the admin part of the Kem-Kem Village Staff Performance Assessment System website using the Weighted Product Method. For Student Learning Outcomes Assessment, a login screen will appear as shown below.

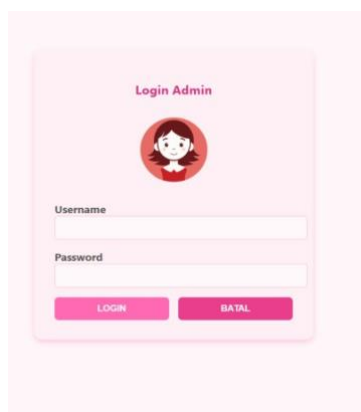


Fig. 7: Results of the login page display

b. Dashboard page display

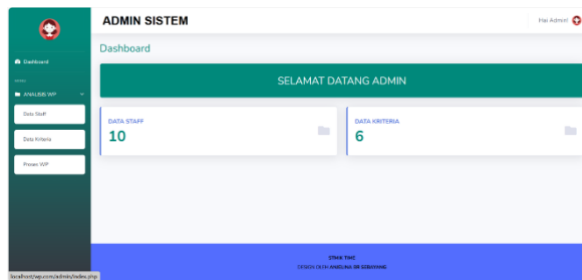


Fig. 8: Results of the dashboard page display

c. Alternative data input page



Fig. 9: Results of the Alternative Data Input page display

d. Display of Alternative Data Edit Page



Fig. 10: Results of the Edit Alternative Data Page Display

e. Criteria Data page display result



Fig. 11: Criteria Data page display results

f. WP Process Result Page Display

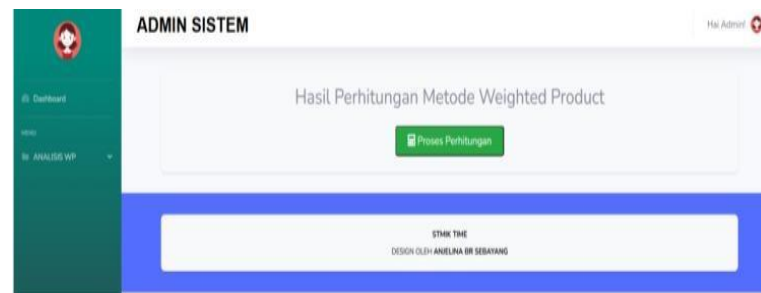


Fig. 12: WP Process Result Page.

g. Alternative Normalization Table Page Display.

Ranking	NIP	Nama Admistrasi	Nilai Performance (N)	Persentase
1	120800002710001	Yulia Ginting	0.1123	22.46%
2	120800002710002	Aris Pradipta Di Siantar	0.1098	21.96%
3	120800002710003	Pradisa Di Siantar	0.1067	21.34%
4	120800002710004	Wahyu Di Siantar	0.1037	20.74%
5	120800002710005	Indah Sulandari	0.0993	19.86%
6	120800002710006	Rita Raniya Siantar	0.0963	19.26%
7	120800002710007	Indi Siantar	0.0908	18.16%
8	120800002710008	Rani Siantar	0.0868	17.36%
9	120800002710009	Rani Siantar	0.0868	17.36%
10	120800002710010	Rani Siantar	0.0817	16.34%

Fig. 13: Alternative normalization table page display

4. Conclusion

Based on the discussion that has been stated in the previous chapters, the author can conclude the following:

1. The staff performance appraisal system has been successfully designed and developed with a user-friendly interface that can be accessed by both the Village Head and staff. The system supports a more transparent and accountable appraisal process.
2. The *Weighted Product* (WP) method has been successfully implemented as the basis for decision making in the system. This method is able to provide objective and measurable assessment calculations based on the weight of each criterion, making it easier to assign staff performance ratings fairly.

5. Suggestions

In order for the proposed system to be used and run as expected, there are several suggestions that can be taken into consideration, namely Future system development is expected to include the addition of features such as notifications, visualization of assessment results in the form of graphs, and performance history to improve system functions and user convenience, Training is also needed for users, including the Village Head and staff, so that they can operate the system optimally and ensure the accuracy and validity of the assessment data.

References

- [1] A. Performance Appraisal Definition of Performance Appraisal, "Chapter Ii Theoretical Basis."
- [2] "SPK Employee Performance Assessment Weight Product Method at the Regional Financial and Asset Management Agency (Case Study: Ogan Ilir Regency)," *SKRIPSI_SI_2021_ERIKA_ANGGRAINI*, 2021.
- [3] R. Gunawan, N. Nur Alamsyah, and P. Study of Informatics Engineering STMIK Rosma, "Volume 6; Number 1," *January*, pp. 205-215, 2023, [Online]. Available: <https://ojs.trigunadharma.ac.id/index.php/jsk/index>
- [4] M. Adnan Farizhi and A. Diana, "Decision Support System for Selection of the Best Employee for Promotion with WP (Weight Product) Method," *Pros. Semin. Nas. Teknoka*, vol. 5, pp. 9-18, Dec. 2020, doi: 10.22236/teknoka.v5i.322.
- [5] S. Adiola, Y. Hendro Syahputra, P. Student Study, S. Triguna Dharma, and P. Supervisor Study, "Decision Support System Determining the Performance Assessment of Village Heads in Babussalam District, Southeast Aceh Regency Using the Weighted Sum Model (WSM) Method," *J. CyberTech*, vol. x. No.x Online. Available: <https://ojs.trigunadharma.ac.id/>