

Web-based application on employee performance assessment using exponential comparison method

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2017 IOP Conf. Ser.: Mater. Sci. Eng. 166 012019

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Web-based application on employee performance assessment using exponential comparison method

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Abstract: Employee performance assessment is also called a performance review, performance evaluation, or assessment of employees, is an effort to assess the achievements of staffing performance with the aim to increase productivity of employees and companies. This application helps in the assessment of employee performance using five criteria: Presence, Quality of Work, Quantity of Work, Discipline, and Teamwork. The system uses the Exponential Comparative Method and Weighting Eckenrode. Calculation results using graphs were provided to see the assessment of each employee. Programming language used in this system is written in Notepad++ and MySQL database. The testing result on the system can be concluded that this application is correspond with the design and running properly. The test conducted is structural test, functional test, and validation, sensitivity analysis, and SUMI testing.

1. Introduction

Employee Performance Assessment in modern organizations provides an important role for the management mechanism to be used in explaining the objectives and standards of performance and to motivate individual performance. Currently, the employee performance assessment of the company still using manual system by calculating the assessment of each employee one by one and discussing with the managers with insufficient data. This is considered as less effective and less efficient to determine the employee performance assessment. This situation can be resulted into unfavourable decisions.

Therefore it is needed to create a system that could help in fast data processing, exact, and accurate. To support in the calculation process this application uses Exponential Comparison Method (ECM). This method is one of the decision making method that quantifies the opinion of one person or more in a certain range. In principle, it is a scoring method for the existing choices. By using the exponential calculation, the difference value between criteria can be distinguished depend on the capability of the person in evaluating. The aim of this study is to develop a web-based application on employee performance assessment using exponential comparison method. The scope of this study including the employee data, calculation process, report of the assessment and rank.

2. Methodology

2.1 Model Base Application

The system used the Exponential Comparative Method for calculating performance assessment and Eckenrode weighting method. The criteria which have been determined from the interviews for



employee performance assessment include: login, the presence, quantity of work, quality of work, initiative, teamwork, integrity, discipline, work ethics, health and safety. The calculation used Exponential Comparative Method, by power all the criteria and look for the highest score results. The results of the analysis will be able to assist the company in determining who is worthy and appropriate to be the first rank and also used as a promotion in accordance provided by the company so that the selection of promotions is no longer selected in the kinship system but with reference to employee performance assessment application [5].

2.2 User Interface

User interface was designed simple so that can allow the user to use and provide the information required. The interface generated in this system is home page, login admin, Eckenrode criteria, weighted value, expert assessment, employee, MPE criteria, employee assessment, and employee assessment results. Applications used in this interface is phpMyAdmin and MySQL database [6]. The method used in this research is System Development Life Cycle (SDLC). It is a series of activities carried out by professionals and users of information systems, to develop and implementing information systems [2]. The stages of research can be seen in Figure 1.

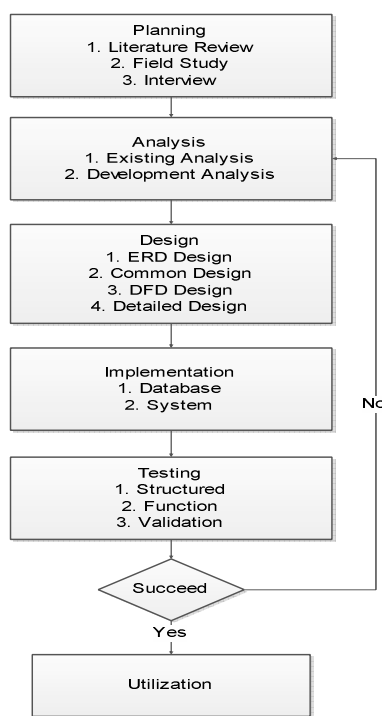


Figure 1. Stages of research

3. Results and Discussion

The determination of criteria was done by interviews with personals and manager that adjusted with the condition of the Company. The determination resulted in 5 criteria as explained in Table 1.

Table 1. Type of criteria

Criteria	Indicator
K1	Presence Employees presence on work day
K2	Quality of Work Work quality of low mistake
K3	Quantity of Work Target achievement
K4	Discipline Obedience
K5	Teamwork Willingness to work together in teams

From the results of the selection criteria by three experts summed every choices based on the order or the scale of assessment in which the order of 1 or first is the order of the highest importance degree and value for the multiplicative also getting bigger, then the total selection obtained for each criterion [1]. The next process was calculated by weigh the value on the order of 1 = 5, 2 = 4, ..., 5 = 1. The weighted grades can begin by any number with the proviso sequentially from the largest to the smallest, where if the weigh calculation process getting smaller, then the smaller its results. The total selection results can be seen in Table 2.

Table 2. Total Selection

No	Criteria	Order				
		1	2	3	4	5
1	K1	0	1	2	0	0
2	K2	2	1	0	0	0
3	K3	1	1	1	0	0
4	K4	0	0	0	3	0
5	K5	0	0	0	0	3
Value		5	4	3	2	1

Calculation of weighted criteria [4]:

$$We = \frac{\sum_j^n = 1 \lambda_{ej}}{\sum_k^e = 1 \lambda_{ej} \sum_j^n = 1 e_{ej}} \quad \text{where} \quad \sum_{e=1}^k We = 1 \quad \text{or total of weight} = 1$$

$$\begin{aligned}
 K1 &= \frac{[(0x5) + (1x4) + (2x3) + (0x2) + (0x1)]}{[(0x5) + (1x4) + (2x3) + (0x2) + (0x1) + (2x5) + (1x4) + (0x3) + (0x2) + (0x1) + (1x5) + (1x4) + (1x3) + (0x2) + (0x1) + (0x5) + (0x4) + (0x3) + (3x2) + (0x1) + (0x5) + (0x4) + (1x3) + (0x2) + (3x1)]} \\
 &= 0,22 \\
 K2 &= 0,31 \\
 K3 &= 0,27 \\
 K4 &= 0,13 \\
 K5 &= 0,07 \\
 We &= K1 + K2 + K3 + K4 + K5 \\
 &= 0,22 + 0,31 + 0,27 + 0,13 + 0,07 \\
 &= 1
 \end{aligned}$$

After the Eckenrode calculation process was done, then obtained the weight of each predefined criteria. The weight of each criteria as shown in Table 3.

Tabel 3. Weighting criteria

No	Criteria	Weight	Refinement weight
1	Presence	22%	0.22
2	Quality of work	31%	0.31
3	Quantity of work	27%	0.27
4	Discipline	13%	0.13
5	Teamwork	7%	0.07
Total		100%	1

Calculations sample using exponential comparison method manually can be seen in Tables 4 and 5. The calculation is: $\text{Alternative} = \text{Assessment}^{\wedge} \text{weight}$.

Determining the value for employees

Name : Saeful Bahri
 NIK : 262012

Table 4. Input Criteria

Criteria	Value
Presence	80
Quality of work	90
Quantity of work	75
Discipline	80
Teamwork	70

Value (Saeful Bahri)
 $= 80^{0.22} + 90^{0.31} + 75^{0.27} + 80^{0.13} + 70^{0.07}$
= 12.986

Table 5. Employee performance assessment result matrices

No	Name	Criteria					Value	Ranking
		C1	C2	C3	C4	C5		
1	Saeful Bahri	80	90	75	80	70	12.986	4
2	Sela Agus	90	80	85	90	75	13.053	3
3	Hadi Wiratmono	100	90	90	85	80	13.305	1
4	Bibing Sublisolih	90	85	80	85	80	13.066	2
Weight		0.22	0.31	0.27	0.13	0.07	1.0	

From the above calculation, obtained:

Saeful Bahri = 12.986
 Sela Agus = 13.053
 Hadi Wiratmono = 13.305
 Bibing Sublisolih = 13.066

It is known that the order of priority ranking employee assessment, namely:

1st Ranking Hadi Wiratmono = 13.305
 2nd Ranking Bibing Sublisolih = 13.066
 3rd Ranking Sela Agus = 13.053
 4th Ranking Saeful Bahri = 12.986

It can be concluded that the first rank of all the data that is Hadi Wiratmono with total value = 13.305.

Employee assessment results page displayed showing the results of calculation analysis using exponential comparison method, the display showed based on employee data input and the ranking process showed are also in graphic form. The display shown in Figures 2 and 3.

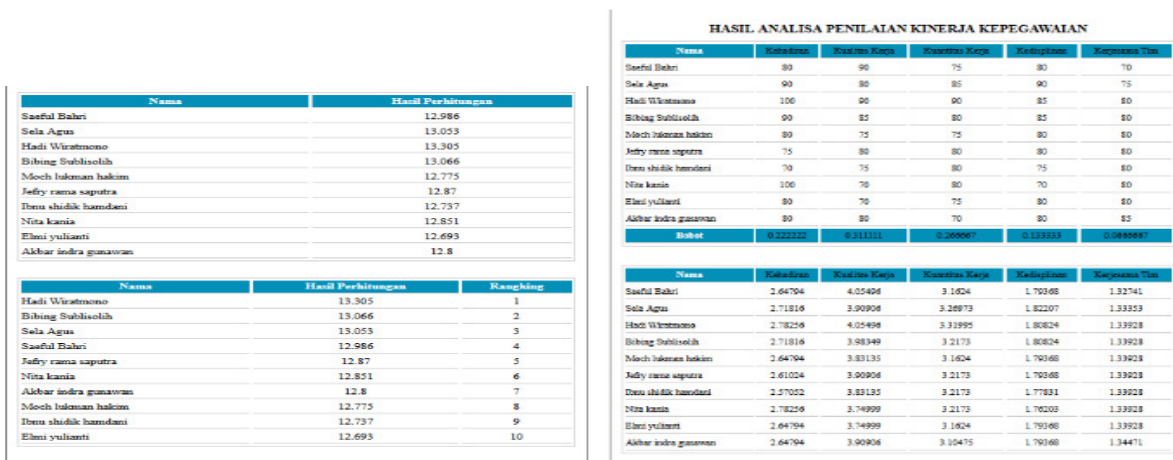


Figure 2. Display of employee assessment result

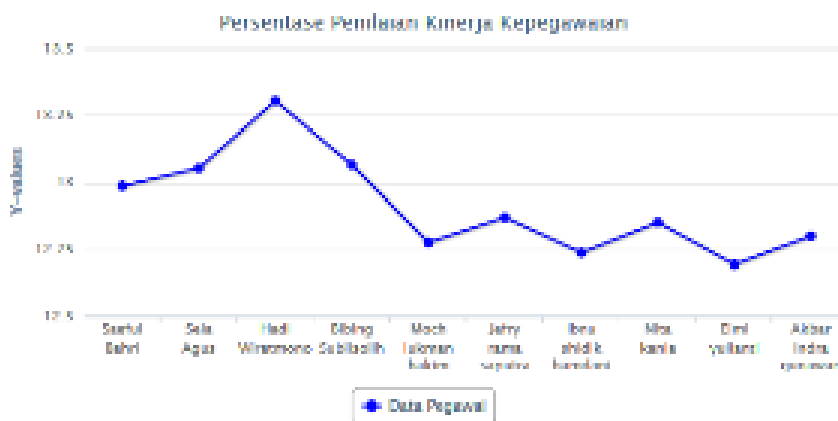


Figure 3. Employee assessment graph

4. Conclusion

Application of Employee Performance Assessment is an improvement of the previous system that still use manual systems in its data processing. The criteria which have been determined from the interviews for employee performance assessment include: the presence, quantity of work, quality of work teamwork, discipline. The calculations used to build applications of employee performance assessment by using methods and techniques weighting Eckenrode MPE. By power the value of the results of the system between all the criteria and look for the highest score.

The system development used the research stages of SDLC (System Development Life Cycle). The system was implemented using Adobe Dreamweaver CS6, Notepad++ and database using Xampp 1.6.7. This application cover of two stages of the calculation, the first process was calculated the Eckenrode weighting where the admin should input the Eckenrode criteria, the weight value, and input the selection order of criteria by experts. After the process was done then the calculation of weighted criteria Eckenrode will be entered automatically into the MPE criteria weights. The second MPE calculation process was the admin should input employee's data, criteria MPE, and employee assessment, then it can be resulted the calculation analysis of employees, ranking employees, and chart ranking employees. In this system, all the calculations was done dynamically by adding criteria, alternatives as well as edit or delete data.

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