Analysis of Job Placement Based on Employee Competency Using Profile Matching

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***Abstract*— In organizations with many employees, the suitability of work placements will affect employee performance. Misplacement of work can lead to less than optimal organizational performance. Job placement in an organization is done chiefly subjectively. Based on these problems, research is needed to analyze the suitability of work placements effectively and efficiently. In this study, it is proposed to apply the Profile Matching method to produce the usefulness of work placements with employee competencies. The suitability of work placements is based on years of service, education level, work experience, and appropriateness in the field of science. This study resulted in recommendations for the suitability of good employee work placements.**

Keywords—job placement, employee competence, profile matching

I. INTRODUCTION

An organization in carrying out activities to achieve its goals always involves human resources, namely employees. Employees as an essential component of the organization [1]. One of the stages in determining the successful use of human resources is the placement of employees following the potential of human resources. Appropriate work placement affects employee performance and can realize organizational goals. The proper job placement is not only the desire of an organization but the desire of the employees. According to Mathis & Jackson in the journal [2], defining placement is placing a person's position into the proper job; how well an employee fits his career will affect the amount and quality of work. Misplacement of work can cause organizational performance to be less than optimal. Job placement in an organization is done chiefly subjectively.

Research by [3] utilizes profile matching to select employee positions. In this study, only five alternatives were used, and the criteria were not clearly stated—other research, the Profile Matching method for employee performance appraisal [4]. The study resulted in the value of employee performance but did not assess the suitability of the employee's work placement. Meanwhile, a Kartika et al. [5] survey used the profile matching method for promotion recommendations. The research resulted in one employee named who would be recommended to be given a promotion.

Furthermore, in a study conducted by [6] using the Profile Matching method for employee mutation recommendations. The focus of the research is on the assessment of employees who will be recommended for transfers. And in the subsequent study [7], the Profile Matching method is used for the best courier recommendation. The study did not conduct an assessment of the suitability of job placements. Meanwhile, in research [4], the profile matching method is used to assess employees' best performance.

The Profile Matching (PM) method has the advantage of solving profile conformity problems. In other cases, PM has been shown to be used to assess the suitability of diabetes medication with patient profiles [8], [9], employee performance assessment [4], job recommendations on job seeker applications [10], and suitability of profiles on social media sites [11]. However, in previous studies the PM method has not been used in determining the suitability of employees' positions. This gap is resolved in this study.

Suitability of work placements based on years of service, education level, work experience and suitability of the field of science. Based on this background, this study analyzed the suitability of work placements, which was more effective and efficient. This study not only ranks employees based on predetermined criteria but also assesses the suitability of employee profiles with a position. To produce an analysis of the appropriateness of job placement, the proper method is needed. In this study, the Profile Matching method is used because it can assess the compatibility between employee profiles and a position profile.

This research can assist organizations in placing employees following employee profiles and competencies. The proper work placement can help achieve the goals of an organization.

II. METHOD

A. Research Steps

In carrying out research, structured stages are needed to achieve research objectives properly. The steps of the study become a reference in carrying out research. The stages of the research can be seen in Figure 1.

In Figure 1, the study begins with formulating the problem and research objectives. The literature study stage is required. Based on the literature study and problem analysis carried out in the previous step, an application design or prototype of a decision support system is made. The output of this stage is in the form of an application design, including the creation of the method that will be used for the decision support system. Testing the prototype of the application that has been made is done by inputting the value from the existing assessment form, then the best deal is obtained. Based on the test results, an evaluation of the application that has been built is carried out, in the form of advantages and disadvantages of the

application. Conclusions are obtained from the evaluation results. The output of this stage is in the form of a research report containing the results of research that has been carried out. The last stage of this research is to publish research results in national journals, national seminars or international seminars. Publication of research results is an important thing to do as a researcher's contribution to the world of science

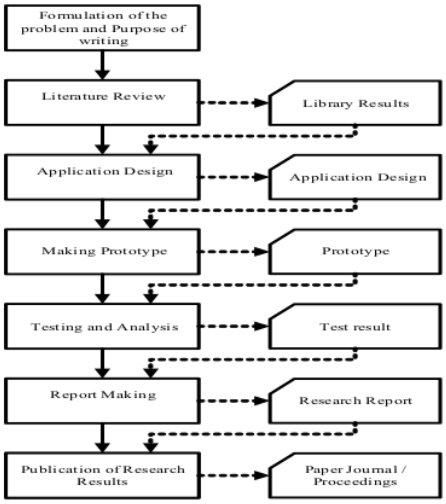

Fig. 1. Research Steps

B. *Data and Criteria*

This study uses a dataset from the Budi Luhur University HR. The data used are 35 employees from 600 employees with the criteria for the position of the head of the section and above.

TABLE I. CRITERIA

#	Criteria	Description
1	Working Period	Employee's Working Period at Budi Luhur University
2	Education Level	Last Education Level
3	Structural Experience	Experience serving as a structural officer at the level of the head of the division and above
4	Conformity in the field of education	Compatibility of educational history with the position being assessed
5	Academic work experience	Academic work experience prior to the current position
6	Non-academic work experience	Non-academic work experience before the current position
7	Academic rank	The employee's last academic rank
8	Teaching Experience	Teaching experience at Budi Luhur University

C. *Profile Matching*

Profile Matching method is a method of decision support system using GAP between alternative values and criteria [8]. There are several things known about GAP analysis, one of which is the table of GAP weight values. In addition, GAP analysis must also have a priority scale concept because in making weights with a range of 0 -5 based on the priority of each criterion [12].

The calculation process in the Profile Matching method begins with defining the minimum value for each assessment variable. The difference between each test data value against the minimum value of each variable is a gap which is then given a weight. The weight of each variable will be calculated on average based on the Core Factor (CF) and Secondary Factor (SF) variable groups. The composition of CF plus SF is 100%, depending on the interests of the user of this method. The last stage of this method is the process of accumulating CF and SF values based on the values of the data testing variables [9].

The weighting of the Profile Matching method is a definite value that is firm on a certain value because the existing values are members of the crisp set. In a firm set, the membership of an element in the set is stated explicitly, whether the object is a member of the set or not, by using a characteristic function.

Profile Matching, in general, is the process of comparing the actual data value of a profile to be assessed with the expected profile value so that the difference in competence (GAP) can be known. The smaller the resulting GAP, the greater the weight value. Stages in the profile matching method are shown in Figure 2.

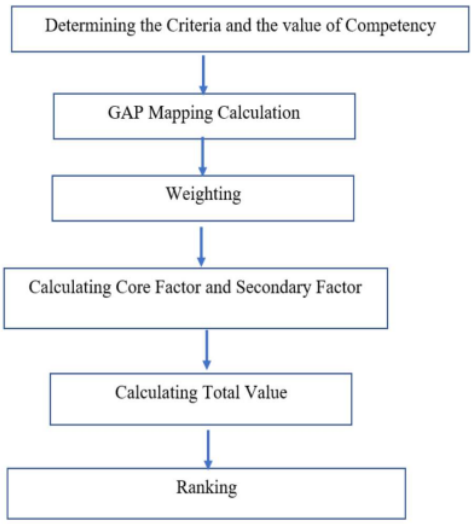

Fig. 2. Profile Matching Steps

TABLE II. GAP AND WEIGHT

Gap	Weight	Description
0	6	No GAP (Competence as suitable)
1	5,5	Excess individual competence 1 level
-1	5	Individual competence is less than 1 level/level
2	4,5	Individual competence excess 2 levels /
-2	4	Individual competence less than two levels
3	3,5	Individual competence excess 3 levels
-3	3	Individual competence of fewer than three levels
4	2,5	Individual competence excess four levels
-4	2	Individual competence of fewer than four levels

Based on Figure 2, the first step is to determine the criteria to be used, and the second is to calculate the GAP using the formula GAP = Value target - Value attribute; the third is to do the weighing. Table 1 is a table of GAP value weights [4], [13], [14].

The Core Factor (NCF) and Secondary Factor (NSF) Calculations can use the following formula (1) and (2) [14], [15].

$$NCF = \frac{\sum NC}{\sum IC} \quad (1)$$

$$NSF = \frac{\sum NS}{\sum IS} \quad (2)$$

where,

- NCF: Average Core factor value
- NC: Sum of a core factor value
- IC: Number of core factor item
- NSF: Average Secondary factor
- NS: Sum of a secondary factor value
- IS: The number of secondary factors.

From the results of the calculation of each criterion, the total value is calculated based on the percentage of the core factor and secondary factor. Calculation of the total value of each criterion uses Equation (3).

$$NI = W_{CF} * NCF + W_{SF} * NSF \quad (1)$$

where,

- NI: Total value
- W_{CF}: Weight of core factor
- W_{SF}: Weight of secondary factor

III. Result and Discussions

A. Criteria target value

Table 3 presents the codification of the criteria along with the target value of the analyzed positions.

TABLE III. Criteria Target Value

#	Code	Description	Target Value
1	C1	Working Period	4
2	C2	Education Level	5
3	C3	Structural Experience	4
4	C4	Conformity in the field of education	5
5	C5	Academic work experience	5
6	C6	Non-academic work experience	5
7	C7	Academic rank	3
8	C8	Teaching Experience	4

B. Gap Mapping

An example of alternative data used is 10. Table 4 is a list of employees that will be used for this research.

TABLE IV. Gap Calculations

#	Employee	C1	C2	C3	C4	C5	C6	C7	C8
1	EMP1	5	5	5	5	5	5	4	5
2	EMP2	5	5	5	5	5	5	3	5
3	EMP3	5	5	5	5	5	5	4	5
4	EMP4	5	5	5	5	5	5	3	5
5	EMP5	5	5	4	5	5	5	3	5
6	EMP6	4	5	2	5	5	5	3	4
7	EMP7	3	5	1	5	3	3	3	3
8	EMP8	5	4	1	5	3	3	3	4
9	EMP9	5	5	4	5	5	5	3	5
10	EMP10	3	4	1	5	3	3	2	3
11	EMP11	4	5	3	3	5	5	4	4
12	EMP12	3	5	1	3	3	3	3	3
13	EMP13	2	4	2	5	5	3	3	2
14	EMP14	5	5	5	5	5	5	5	5
15	EMP15	5	5	5	5	5	5	4	5
16	EMP16	4	5	1	5	5	3	4	4
17	EMP17	3	4	1	5	5	3	2	3
18	EMP18	2	4	1	5	5	3	2	2
19	EMP19	2	5	1	5	5	5	4	2
20	EMP20	1	5	1	5	5	3	3	1
21	EMP21	2	4	1	5	5	5	2	2
22	EMP22	2	4	1	5	5	3	2	2
23	EMP23	5	5	5	5	5	5	4	5
	Target Value	**4**	**5**	**4**	**5**	**5**	**5**	**3**	**4**
1	EMP1	1	0	1	0	0	0	1	1
2	EMP2	1	0	1	0	0	0	0	1
3	EMP3	1	0	1	0	0	0	1	1
4	EMP4	1	0	1	0	0	0	0	1
5	EMP5	1	0	0	0	0	0	0	1
6	EMP6	0	0	-2	0	0	0	0	0
7	EMP7	-1	0	-3	0	-2	-2	0	-1
8	EMP8	1	-1	-3	0	-2	-2	0	0
9	EMP9	1	0	0	0	0	0	0	1
10	EMP10	-1	-1	-3	0	-2	-2	-1	-1
11	EMP11	0	0	-1	-2	0	0	1	0
12	EMP12	-1	0	-3	-2	-2	-2	0	-1
13	EMP13	-2	-1	-2	0	0	-2	0	-2
14	EMP14	1	0	1	0	0	0	2	1
15	EMP15	1	0	1	0	0	0	1	1
16	EMP16	0	0	-3	0	0	-2	1	0
17	EMP17	-1	-1	-3	0	0	-2	-1	-1

#	Employee	C1	C2	C3	C4	C5	C6	C7	C8
18	EMP18	-2	-1	-3	0	0	-2	-1	-2
19	EMP19	-2	0	-3	0	0	0	1	-2
20	EMP20	-3	0	-3	0	0	-2	0	-3
21	EMP21	-2	-1	-3	0	0	0	-1	-2
22	EMP22	-2	-1	-3	0	0	-2	-1	-2
23	EMP23	1	0	1	0	0	0	1	1

In Table 4 for EMP1, C1 = 5, which means that the tenure of service gets a value of 5, while the target value for C1 based on the criteria Table (Table 3) is 4. GAP = attribute value-value target then GAP = 5-4 =1.

C. *Calculation of Weight, Core Factor (CF) and Secondary Factor (SF)*

Based on Table 1, the weight value of each value of the gap difference in Table 3 can be determined as presented in Table 5. Furthermore, for each criterion included in the Core Factor (CF) and Secondary Factor (SF) the average is calculated. The value of CF is calculated by Equation (1) and SF by Equation (2).

TABLE V. CORE FACTOR (CF) AND SECONDARY FACTOR (SF)

#	Employee	C1	C2	C3	C4	C5	C6	C7	C8	CF	SF
1	EMP1	5.5	6	5.5	6	6	6	5.5	5.5	5.7	5.8
2	EMP2	5.5	6	5.5	6	6	6	6	5.5	5.8	5.8
3	EMP3	5.5	6	5.5	6	6	6	5.5	5.5	5.7	5.8
4	EMP4	5.5	6	5.5	6	6	6	6	5.5	5.8	5.8
5	EMP5	5.5	6	6	6	6	6	6	5.5	5.8	6.0
6	EMP6	6	6	4	6	6	6	6	6	6	5.3
7	EMP7	5	6	3	6	4	4	6	5	5.2	4.3
8	EMP8	5.5	5	3	6	4	4	6	6	5.3	4.3
9	EMP9	5.5	6	6	6	6	6	6	5.5	5.8	6.0
10	EMP10	5	5	3.5	6	4	4	5	5	4.8	4.5
11	EMP11	6	6	5	4	6	6	6	5	5.8	5.0
12	EMP12	5	6	3	4	4	4	6	5	5.2	3.7
13	EMP13	4	5	4	6	6	4	6	4	5	4.7
14	EMP14	5.5	6	5.5	6	6	6	5.5	5.5	5.7	5.8
15	EMP15	5.5	6	5.5	6	6	6	5.5	5.5	5.7	5.8
16	EMP16	6	6	3	6	6	4	5.5	6	5.9	4.3
17	EMP17	5	5	3	6	6	4	5	5	5.2	4.3
18	EMP18	4	5	3	6	6	4	5	4	4.8	4.3
19	EMP19	4	6	3	6	6	6	5.5	4	5.1	5.0
20	EMP20	3	6	3	6	6	4	6	4	5	4.3
21	EMP21	4	5	3	6	6	6	5	4	4.8	5.0
22	EMP22	5.5	6	5.5	6	6	6	5.5	5.5	4.8	4.3
23	EMP23	5.5	6	5.5	6	6	6	6	5.5	5.7	5.8

D. *Calculation of Total Value and Ranking*

Based on the calculation results of the Core Factor (CF) and Secondary Factor (SF) values, then the total value calculation for each employee is carried out using Equation (3). The calculation results become the basis for ranking employees as presented in Table 6. Based on Table 6, the employees who are most suitable for the assessed positions are EMP5 and EMP9.

TABLE VI. TOTAL PROFILE MATCHING SCORE

#	Employee	Score	Rank
1	EMP1	5.8	3
2	EMP2	5.8	4
3	EMP3	5.8	5
4	EMP4	5.8	6
5	**EMP5**	**5.9**	**1**
6	EMP6	5.7	10
7	EMP7	4.9	
8	EMP8	4.9	
9	**EMP9**	**5.9**	**2**
10	EMP10	4.7	
11	EMP11	5.5	
12	EMP12	4.6	
13	EMP13	4.9	
14	EMP14	5.8	7
15	EMP15	5.8	8
16	EMP16	5.3	
17	EMP17	4.9	
18	EMP18	4.6	
19	EMP19	5.1	
20	EMP20	4.7	
21	EMP21	4.9	
22	EMP22	4.6	
23	EMP23	5.8	9

E. *Prototype*

In Figure 3, the main menu screen display is described, which consists of Master, data analysis, and Reports. Meanwhile, in Figure 4, it is described that after inputting the criteria values for each alternative, followed by inputting the Core Factor (CF) and Secondary Factor (SF) values, the total value is obtained, as shown in Figure 4.

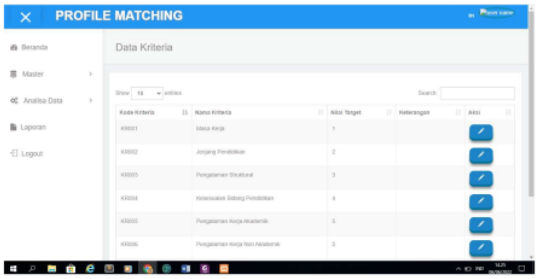

Fig. 3. Main screen display

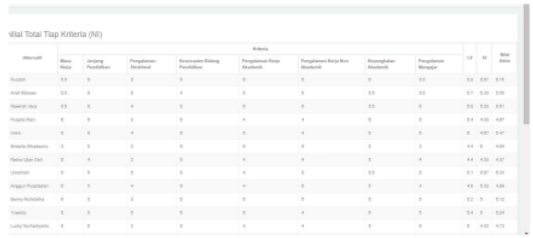

Fig. 4. Ranking results

IV. Conclusion

This study aims to build and design a system that can analyze the suitability of work placements at Budi Luhur University based on determined competencies and criteria. This study applies the Profile Matching method to see the match between the profile of the position or placement with the competencies possessed by employees. In this study, 8 (eight) criteria were used, namely years of service, education level, work experience in structural, suitability of the field of science with work, work experience in academics, work experience in non-academic, academic rank, and teaching experience. Based on tests involving 23 employee data, the Profile Matching method can present the value of the suitability of the employee profile with the profile or qualification of the position being assessed. In addition, a prototype was built using the PHP programming language and MySQL database. Thus, the Profile Matching method is proven to be able to be used to assess the suitability of work placements based on employee profiles.

Although it can provide recommendations for job compatibility with employee profiles, this research is still limited to employees who are at the structural level of the Dean, Head of the study program and Director. Therefore, in further research, a job suitability analysis for other levels can be developed. In addition, the Profile Matching method can be developed by optimizing using interpolation or fuzzy logic methods. In addition, prototypes can be developed so that they directly benefit Budi Luhur University.

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