

Employee Selection Decision Support System Using the AHP Method

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ARTICLE INFO	ABSTRACT
Article history: Received Jun 28, 2020 Revised Jul 02, 2020 Accepted Jul 21, 2020	The recruitment process for Kanisius Printing Publisher Yogyakarta is the process of getting the best prospective employees from all applicants. In the process, applicants must go through several stages of selection, namely administrative tests, written tests, interview tests and medical tests. However, all processes are still done manually. This resulted in the recruitment process takes a long time in determining qualified applicants and in accordance with company criteria. In this research, a software decision-making support system for recruitment of employees is created which functions to help the company make the right decisions in a relatively faster time using the Analytical Hierarchy Process (AHP) method. The AHP method is a superior method for selecting competitive activities or many alternatives based on certain criteria. The main function of this software is to help the company, in this case the HRD section, to get prospective employees who match the criteria needed by the company. This software is implemented using the PHP MySQL programming language.
Keywords: Analytical Hierarchy Process; PHP; MySQL; Employee.	

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1. INTRODUCTION

In the computer era, the role of computers is very important in helping humans to do their jobs because computers can store and process large amounts of data with high accuracy. The use of computers is also used in various fields including in the field of employment.

As a developing country, of course, Indonesia needs a potential workforce and fulfills the criteria for the field of work to support the development and progress of the Indonesian state. Therefore, as a company in Indonesia, Kanisius Printing Publisher is required to be more competitive in recruiting employees so that the company can continue to compete and meet consumer needs.

The several stages in recruiting employees carried out by Kanisius Printing Publisher Yogyakarta are as follows: administrative selection, written test, interview test, and medical test. However, in making the decision to accept an employee, it is still done manually, so that if there are large numbers of applicants, the employee recruitment process will take a long time. Seeing from the problems above, the role of the computer will be very helpful in dealing with these problems. Therefore

2. METHOD

The research methods used are:

1. Field Study

Based on observations at Kanisius Printing Publisher, Yogyakarta, the process of accepting new employees is still done manually. Applicants come to Kanisius to submit their application letter and required documents. If they pass the administrative selection, the applicant is entitled to take a written test which is held at Kanisius Yogyakarta Publisher. After the applicant's score is obtained, HRD will assess the test results one by one. If the score meets the requirements, applicants are invited to come back to Kanisius Publishing - Printing Yogyakarta to take an interview test.

2. System Development

a. Initial investigation

The first step taken was an observation to Kanisius Yogyakarta Publisher on the related parties, namely Mr. Ar. Danang Afriady Kurnianto as Head of the HR Planning and Development Division (HRD) to seek information about the current employee recruitment system and what steps a prospective employee should take.

b. Problem analysis

The problem faced with regard to the employee selection process that is carried out manually is the length of the process required by HRD to get candidates qualified employees and in accordance with the criteria company needed.

c. Needs analysis

After analyzing the problem, the next steps are: data collection and system analysis tailored to user needs (in this case HRD). At this stage also collected data requirements that must be met by applicants and data values that have been determined by the company (attached).

d. Decision analysis

At this stage it was decided that the system to be developed was a web-based SPPK. Registration of applicants is done online and the written test assessment is calculated computerized.

e. System design

In this stage, the design of the database, user interface, and technology is made.

f. System implementation.

g. At this stage, programming is done (coding) using the PHP programming language with the Macromedia Dreamweaver8 application, the localhost server WampServer, and the database is stored in phpMyAdmin WampServer. For the calculation

3. System test

After the system has been built using the methods mentioned above, the system is ready to be tested. The trial was carried out by taking a case of employee acceptance that had been calculated manually and then tested by a computerized process.

3. RESULTS AND DISCUSSIONS

The system has been tested with a new employee acceptance case. In this trial case, a vacancy was opened as an Editor and there were 5 (five) applicants who registered. Prior to testing the system, the AHP calculation has been done manually (in CHAPTER III pages 37-48). Then the calculations are carried out using a system that is also guided by the AHP method and the results are in accordance with the results of manual calculations that have been carried out. In this system there are criteria and also requirements made by the user, namely the Kanisius Yogyakarta Publishing-Printing HRD (attached). In determining the value of the appeal, it is also guided by the conditions contained in the Data on Qualification Requirements for Candidates for Employees of Kanisius Printing Publisher (attached).

1. Define comparison (level 1)

After the problem hierarchy is created, the next step is to compile a paired matrix on each criterion based on the comparison values associated with the requirements for determining employee recruitment decisions.

Table 1.
Editor position criteria

Criteria	Editor
Logic	B
Accuracy	B
Personality	B
Character	A

Table 2.
Matrix comparison between criteria

	Logic	Accuracy	personality	Character
logic	1	1	1	0.5
precision	1	1	1	0.5
personality	1	1	1	0.5
character	2	2	2	1

- a. Synthesizing Considerations by calculating the number of elements in each column

Table 3.
number calculation

	Logic	precision	personality	Character
Logic	1	1	1	0.5
Precision	1	1	1	0.5
Personality	1	1	1	0.5
Character	2	2	2	1
number of columns	5	5	5	2.5

- b. Divide each entry in each column by the number in that column. Add up each row to get the value for the number of rows 1. Divide each row by 1 by the number of criteria to get the Priority Vector value.

Table 4.
Distribution of entries by column

	Logic	Accuracy	Personality	Character	Number of Rows 1	VP
Logic	0.2	0.2	0.2	0.2	0.8	0.2
districts	0.2	0.2	0.2	0.2	0.8	0.2
Personality	0.2	0.2	0.2	0.2	0.8	0.2
Character	0.4	0.4	0.4	0.4	1.6	0.4

- c. Multiply the first input with the priority vector value and add each row to produce the number of rows

Table 5.
Addition of Each Row

	Logic	Accuracy	Personality	Character	Number of Rows 1
Logic	0.2	0.2	0.2	0.2	0.8
Districts	0.2	0.2	0.2	0.2	0.8
Personality	0.2	0.2	0.2	0.2	0.8
Character	0.4	0.4	0.4	0.4	1.6

2. Define comparison (level 2)

Table 6.
Applicants' written test scores in the editor's position

Name	Logic	Accuracy	Personality	Character
Rani	122/b	75/w	A	B
Doni	135 / a	68 / c	A	B
Farah	128 / b	81 /a	A	A
Marwan	123 / b	78 /b	B	C
Kimmy	132 / a	70 / b	B	B

Do the calculations as above to find the priority value among applicants by looking at each of the criteria.

a. Logic

Determine alternative priorities based on Logic. Then count the number of values in each column.

Table 7.
Comparison of logical criteria

Logic	Rani	Doni	Farah	Marwan	Kimmy
Rani	1	0.5	1	1	0.5
Doni	2	1	2	2	1
Farah	1	0.5	1	1	1
Marwan	1	0.5	1	1	0.5
Kimmy	2	1	1	2	1
Number of Columns	7	3.5	6	7	4

Divide each entry in each column by the number in that column

Table 8.
Division of entries by column

Logic	Rani	Doni	Farah	Marwan	Kimmy
Rani	0.14285	0.14285	0.166666	0.14285	0.125
Doni	0.28571	0.28571	0.33333	0.28571	0.25
Farah	0.14285	0.14285	0.166666	0.14285	0.25
Marwan	0.14285	0.14285	0.166666	0.14285	0.125
Kimmy	0.28571	0.28571	0.166666	0.28571	0.25

Do the sum of the values of each row and calculate the average of the rows with the number of elements

Table 9.
Addition of each line

Logic	Number of rows 1	VP
Rani	0.720238	0.144048
Doni	1.440476	0.288095
Farah	0.845238	0.169048
Marwan	0.720238	0.144048
Kimmy	1.27381	0.254762

To perform the process of consistency, multiply the first column with relative priority and add up each row.

Table 10.
Multiplication of matrices with relative priority

Logic	Rani	Doni	Farah	Marwan	Kimmy	Number of rows 2
Rani	0,14404762	0,144047619	0,169047619	0,1440476	0,127381	0.728571429
Doni	0.28809524	0.288095238	0.338095238	0.2880952	0.2547619	1.457142857
Farah	0,14404762	0,144047619	0,169047619	0,1440476	0.2547619	0.855952381
Marwan	0,14404762	0,144047619	0,169047619	0,1440476	0,127381	0.728571429
Kimmy	0.28809524	0.288095238	0,169047619	0.2880952	0.2547619	1.288095238

b. Accuracy

Setting priorities alternative based on precision. Synthesizing judgment by calculating the number of each column.

Table 11.
Comparison of Accuracy criteria

Accuracy	Rani	Doni	Farah	Marwan	Kimmy
Rani	1	2	0.5	1	1
Doni	0.5	1	0.333333333	0.5	0.5
Farah	2	3	1	2	2
Marwan	1	2	0.5	1	1
Kimmy	1	2	0.5	1	1
Number of columns	5.5	10	2.833333333	5.5	5.5

Divide each entry in each column by the number in that column.

Table 12.
Comparison of Accuracy criteria

Accuracy	Rani	Doni	Farah	Marwan	Kimmy
Rani	0.18181818	0.2	0.176470588	0.1818182	0.1818182
Doni	0.09090909	0.1	0.117647059	0.0909091	0.0909091
Farah	0.36363636	0.3	0.352941176	0.3636364	0.3636364
Marwan	0.18181818	0.2	0.176470588	0.1818182	0.1818182
Kimmy	0.18181818	0.2	0.176470588	0.1818182	0.1818182

Do the sum of the values of each row and calculate the average of the rows with the number of elements.

Table 13.
The sum of each row and priority vector

Accuracy	Number of rows 1	Vp
Rani	0.921925	0.184385
Doni	0.490374	0.098075
Farah	1.74385	0.34877
Marwan	0.921925	0.184385
Kimmy	0.921925	0.184385

To perform the consistency process, multiply the first column of the matrix with relative priority and then the number of each row.

Table 14.
Multiplication of matrices with relative priority

Accuracy	Rani	Doni	Farah	Marwan	Kimmy	Number of rows 2
Rani	0.18438503	0.196149733	0.174385027	0.184385	0.184385	0.92368984
Doni	0.09219251	0.098074866	0.116256684	0.0921925	0.0921925	0.490909091

Accuracy	Rani	Doni	Farah	Marwan	Kimmy	Number of rows 2
Farah	0.36877005	0.294224599	0.348770053	0.3687701	0.3687701	1.749304813
Marwan	0.18438503	0.196149733	0.174385027	0.184385	0.184385	0.92368984
Kimmy	0.18438503	0.196149733	0.174385027	0.184385	0.184385	0.92368984

4. CONCLUSION

Based on the results of research, analysis and design of the Decision Making Support System (SPPK) for employee recruitment, it can be concluded that the Decision Support System (SPPK) for employee recruitment at Kanisius Yogyakarta Publisher with the Analytical Hierarchy Process (AHP) method can function well for assist the recruitment process. This SPPK can function properly, it is proven that the computer calculation process is in accordance with the manual method. From the test results on HRD, it shows that SPPK can help the recruitment process, easy to use, but the user interface is less attractive

References

- Ernest, H. Forman & Mary Ann Selly (2001). Decision By Objectives How to Covince Others That You are Right. Singapore: World Scientific Publishing.
- Efrain, Turban (2005). Design Support Systems and Intellegent System. New Jersey: Prentice Hall Inc.
- Little, J.D.C. (1970). Models and Managers : The Concept of a Decision Calculus, Management Science, vol.16, no.8.
- Polina, AM. (2004). Bahan Kuliah Basis Data 1. FST USD. Yogyakarta: Andi Offset.
- Saaty, T.L. (1990). The Analytic Hierarchy Process. New York: McGrow Hill. Saaty, T.L. (1994). Fundamentals of Decision Making and Priority Theory with The Analytic Hierarchy Process. USA: RWS Publications.
- Simarmata,Janner. (2006). Menggunakan PHP dan MySQL. Yogyakarta: Andi Offset.
- Sudirman, I & Widjajani (1996). Sistem Informasi Manajemen. Lemlit UNPAD Press Bandung.
- Suryadi, Kadarsah & Ramdhani Ali (2002). Sistem Pendukung Keputusan. Bandung: Remaja Rosda karya.
- Whitten, Jefrey L., Bentley, Lonnie D., Dittman, Kevin C. (2004). Metode Disain & Analisis Sistem edisi 6. Yogyakarta: Andi Offset.