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Decision Support System for Determining Student Representative Management Positions Using Case-Based Reasoning Method

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ABSTRACT

The regeneration of the Sanata Dharma University Student Representative Council (DPMU) management is carried out regularly at the end of each year. One of the stages that DPMU board candidates go through is an interview. The interview aims to assess candidates with the criteria that have been set as DPMU administrators. In the regeneration process, DPMU often finds it difficult to determine positions that match the criteria possessed by the candidate concerned. The problem that will arise when the admissions committee assigns positions to candidates who do not match the criteria they have is that the candidate's performance is not optimal. This decision support system was created to help provide recommendations to the DPMU in determining the position of the position. The system will be made using Case Based Reasoning method. Knowledge data and criteria data used are data owned by DPMU. Testing is done by comparing the results of system calculations with decisions made by the DPMU management manually. From the trial, it was concluded that the system using the Case Based Reasoning method was quite capable in determining the position of the DPMU but not yet satisfactory.

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1. INTRODUCTION

A country or agency must have an organization or management. Organization or management is needed to support the sustainability of the country or agency to progress and develop. The existence of an organization or management will be very helpful in coordinating a system that is created. One of the institutions that have an organization is a university. In the existing system in university institutions, organization is needed in various ways. The organizational levels within the university are in the ranks of the rector and students, as recorded in Government Regulation number 4 of 2014 concerning universities.

Based on the problem of regeneration, the author tries to make a decision-making system for selecting positions that will compare candidate criteria data with criteria data owned by the previous management. This system is expected to be able to help the old management to get new management candidates who meet the standards or are above the predetermined standards. The system will be created by applying the case based rationaling (CBR) method. The CBR method is a method that runs the decision-making process by comparing old cases with new cases. With this

regeneration case, the author tries to prove that whether the case based reasoning method is able to help provide office selection decisions.

There is no system or journal that discusses the placement of positions in an organization using the CBR method. In the journals, they discuss more about the diagnosis of a disease or case related to the medical world that applies the CBR method as a decision-making method (Octaviani, Fransisca, et al. 2010).

2. METHOD

The research methodologies that will be used include:

a. The planning stage of the system built using the case based reasoning method.
b. Collecting the data needed to build the system.
c. Literature study to study the organizational history of Sanata Dharma University.
d. Implementation is the process of making or applying a system design that has been made in an executable form.
e. Testing and analysis of the system will be carried out by the user and assessed using a questionnaire to analyze the work of the system.

3. RESULTS AND DISCUSSIONS

System testing is done by matching the results of system calculations with calculations carried out manually to test the suitability of the system with the actual situation. In addition to manual testing, the system was tested by distributing questionnaires to 20 users in the category of DPMU administrators and new users. Filling out the questionnaire is useful to determine the success and suitability of the system to the user in terms of the existing aspects, namely the objectives and benefits, functional aspects, and non-functional aspects.

1. Testing With Comparison Against Manual Calculations

   There is an experimental system that has been tried to perform calculations by comparing the similarity values between candidate data and existing knowledge. Comparison is done by trying to compare one candidate with the following criteria. The system will read the criteria with the id_criteria that have been previously determined and then TRUE is read as 1 and FALSE is read as 0.

Table 1.
Candidate Character

id_criteria	Criteria	Individual
k_1	Communicate	TRUE
k_2	Firm	FALSE
k_3	Relation	TRUE
k_4	Drafter	TRUE
k_5	Executor	TRUE
k_6	Self-confident	TRUE
k_7	Active Work	TRUE
k_8	Wise	TRUE
k_9	Critical	TRUE
k_10	Public Speaking	TRUE
k_11	Extrovert	FALSE
k_12	Language ability	FALSE
k_13	Be careful	FALSE
k_14	Viewpoint	TRUE

On this occasion, administrators are given the flexibility to choose candidates with positions that have the appropriate similarity values. The greater the similarity value, the closer the candidate's resemblance to the previous management is. The calculation carried out by the system is the calculation of the similarity value or similarity measure which is the result of the formula.

The explanation from the above formula is that when one candidate is compared with existing knowledge data, the number of the same attributes is calculated divided by the number of the same attributes and different attributes. In this condition the system will read that TRUE is 1 and FALSE is 0. It can be exemplified by a table.

Table 2.
Table Example comparison of candidate data and knowledge

id_criteria	CHAIRMAN	Individual	id_criteria
k_1	TRUE	TRUE	k_1
k_2	TRUE	FALSE	k_2
k_3	TRUE	TRUE	k_3
k_4	TRUE	TRUE	k_4
k_5	TRUE	TRUE	k_5
k_6	TRUE	TRUE	k_6
k_7	TRUE	TRUE	k_7
k_8	TRUE	TRUE	k_8
k_9	TRUE	TRUE	k_9
k_10	TRUE	TRUE	k_10
k_11	TRUE	FALSE	k_11
k_12	TRUE	FALSE	k_12
k_13	TRUE	FALSE	k_13
k_14	TRUE	TRUE	k_14
Results	*Common*	10	71.428
Mpq	*Different*	4	

Candidate data consisting of 14 criteria will be compared with existing knowledge. The system will compare with the choice of years of knowledge or certain positions available. On this occasion, the system has stored knowledge consisting of management from 2011 to 2014. Therefore, candidates can be compared with the existing knowledge. The following is the result of the candidate's manual calculation above compared to all knowledge.

Table 3.
Table of comparison of candidate data with 2011 knowledge

id_criteria	Candidate	Chairman	representative	Secretary	treasurer	KPU	Communication	Domestic	Personnel
k_1	1	1	1	1	1	1	1	1	1
k_2	0	1	1	1	0	1	1	1	1
k_3	1	1	1	1	1	1	1	1	1
k_4	1	1	1	1	0	0	1	1	0
k_5	1	1	1	1	1	1	1	1	1
k_6	1	1	1	1	1	1	1	1	1
k_7	1	1	1	1	1	1	1	1	1
k_8	1	1	1	1	0	1	1	1	1
k_9	1	1	1	0	0	1	1	1	1
k_10	1	1	1	0	0	1	1	1	1
k_11	0	1	1	1	0	1	1	1	1
k_12	0	1	0	1	1	0	1	1	1
k_13	0	1	0	1	1	0	1	1	1
k_14	1	1	0	0	0	1	1	1	0
Results		71.43	78.57	50.00	50.00	78.57	71.43	71.43	57.14

Table 4.
Table of comparison of candidate data with 2013 knowledge

id_criteria	Candidate	chairman	representative	Secretary	treasurer	KPU	Communication	Domestic	Personnel
k_1	1	0	1	0	0	1	1	1	1
k_2	0	0	0	1	1	1	0	0	1
k_3	1	1	1	1	1	1	0	1	1
k_4	1	1	1	0	0	1	1	1	1
k_5	1	0	1	1	1	1	0	0	1
k_6	1	1	1	1	1	1	1	1	1
k_7	1	0	1	1	1	1	0	1	1
k_8	1	0	0	1	1	0	0	1	1
k_9	1	0	1	0	0	1	1	1	0
k_10	1	1	1	0	0	1	1	1	1
k_11	0	1	0	1	1	1	0	1	0
k_12	0	1	1	1	1	0	1	1	1
k_13	0	1	0	1	1	0	1	1	1
k_14	1	1	1	1	1	1	1	0	1
Results		42.86	85.71	42.86	42.86	78.57	57.14	64.29	71.43

Table 6.
Table of comparison of candidate data with 2014 knowledge

id_criteria	Candidate	chairman	representative	Secretary	treasurer	KPU	Communication	Domestic	Personnel
k_1	1	0	0	1	0	1	1	1	1
k_2	0	0	0	0	1	0	1	1	0
k_3	1	0	1	0	1	1	1	1	1
k_4	1	1	0	0	0	1	1	1	0
k_5	1	0	1	1	1	1	1	1	1
k_6	1	1	1	0	0	1	1	1	1
k_7	1	1	0	1	1	1	1	1	0
k_8	1	1	0	1	0	0	0	1	1
k_9	1	0	0	0	1	1	1	1	0
k_10	1	0	0	1	0	1	1	1	1
k_11	0	0	0	1	1	0	1	0	0
k_12	0	0	0	1	0	1	1	1	1
k_13	0	1	0	1	1	1	0	0	1
k_14	1	0	0	1	1	1	0	1	1
Results		50.00	50.00	50.00	42.86	78.57	64.29	85.71	64.29

In the manual calculation above, it has been seen that the results of the system calculations are the same as the results of calculations carried out manually. In this condition, the standard similarity value used is 40, so the results that appear are values above the standard. Administrators can increase the default value to see the closest value.

4. CONCLUSION

Based on the results of the design and development of a decision support system for the selection of DPMU management positions using the Case Based Reasoning (CBR) method, it can be concluded as follows. Based on the comparison of the results of the decisions taken by the DPMU management and the results of system decisions on the management who served in 2016-2017, which is compared with the knowledge of the management for the years 2011-2012 to 2014-2015, an accuracy rate of 75% is obtained. From these results it can be concluded that the decision-making system using the Case Based Reasoning method is quite capable in determining the position of the DPMU but not yet satisfactory.

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