

## Decision Support System For Achieving Students With Profile Matching Method

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### Abstract

Determination of outstanding students at school is very important to provide suggestions for students at SMK Karya Serdang Lubuk Pakam. However, in determining student achievement, it is necessary to look at several criteria and accurate assessments, to provide maximum results. SMK Karya Serdang Lubuk Pakam in determining outstanding students has not used a system, so it needs a decision support system in determining outstanding students. The method used in determining outstanding students is the Profile Matching Method. The variables determined in this study are 1) Knowledge. 2) Personality. 3) Extracurricular This system is built by applying the web-based Profile Matching method and MySQL as the database. With the application of the Profile Matching method in determining outstanding students at SMK Karya Serdang Lubuk Pakam from the 20 predetermined candidates, the best student is Putri with a score of 2.16.

Keywords: Achievement, SPK, Profile Matching Method

### 1. Introduction

Achievement, in general, is the result of someone's achievement in doing his business. In the achievement appraisal, it should be done with very objective and computerized calculations, so that the assessment can be in detail. Where student assessments are very close together. This can lead to an error in judgment and not seeing such small differences. Broadly speaking, especially in school, sometimes the achievements obtained by students are not the same as their efforts. This is due to several aspects, one of which may be a human error by judgments in determining outstanding students. This matter is made clear sometimes so many teachers give an assessment based on the closeness to their students. Schools can be said to be successful and developing if the students in them have a large number and certainly proud achievements.

SMK Karya Serdang Lubuk Pakam which is located at Jl. Sudirman No.60 B, Petapahan, Kec. Lubuk Pakam, Deli Serdang Regency, North Sumatra 20516, is a school with highly outstanding students and has become one of the favorite schools in the Deli Serdang area. Assessment of outstanding students at SMK Karya Serdang Lubuk Pakam still uses manual calculations, so it does not produce an accurate assessment. Of the many duties and responsibilities of a teacher, one of them is the teaching schedule and making textbooks that are so dense, so sometimes the teacher doesn't pay attention to the grades that each student gets. Based on the cases that occurred in school, of course, some students felt disadvantaged and could even become discouraged in the teaching and learning process if each teacher gave grades to students based on an objective assessment. And that is a special concern in this study. So it needs a decision support system.

Decision Support Systems (DSS) are flexible, interactive, and adaptable computer-based information systems developed to support unstructured solutions to specific management problems.



Decision Support Systems use data, provide an easy user interface, and can incorporate decision-making thinking (Turban, Sharda & Delen, 2011). One method of solving problems in decision support systems is by using the Profile Matching method. This research will provide recommendations in the form of computerization so that the grades obtained by the students are all confined so that at the end of the semester there is no human error in giving the right value to students. And the decision support system method is the Profile Matching Method. In the process of profile matching, in general, it is a process of comparing student competencies so that differences in incompetence can be found (also called GAP).

Based on the explanation above, the researcher will research SMK Karya Serdang Lubuk Pakam with the topic "Decision Support System for Determining Outstanding Students with the Profile Matching Method".

## 2. Method

In application design, the method used is the same as application development which consists of seven parts, namely:

- a) Determination of the problem domain At this stage, the researcher collects the information and data needed for research and studies the information and data. Researchers found a problem, namely the absence of an application or system in determining outstanding students at SMK Karya Serdang. So that the school must use the manual for outstanding students every semester.
- b) Defining the problem The researcher defines the problem found. Researchers formulate how to build a decision support system for determining student achievement.
- c) Determination of hardware and software In the next stage the researcher determines the hardware and software used. The hardware used by researchers is a laptop. The software used by researchers is the windows operating system as a window or bridge that connects researchers with auxiliary applications, Visual Studio 2010 as a tool to build applications, MySQL as a database, Microsoft Word as a report writing.
- d) Making application prototypes Researchers make system prototypes by designing the database, application flow, and interface design.
- e) Testing and evaluating the model At this stage the user must test the model with an example problem, fix it if necessary, and analyze the family generated by the model to ensure whether the model can represent a reliable and valid problem. System testing 20 is designed with a black-box test that focuses on the information domain of the software by conducting a test case by partitioning the input domain of a program by providing in-depth testing coverage. Testing methods include software capabilities and application areas.
- f) Using the model If the application is ready to be built, the application can be used.
- g) Maintaining the application In the application maintenance stage, including maintenance or maintenance of hardware and software and if needed, further system development is needed.

## 3. Results and Discussion

### 3.1 Analysis of the data

After all the information and data have been found, the next step that will be carried out is the stage of implementing the matching profile method. Below is explained of the application of the profile matching method. As shown in the following table:

Table 1. Model Criteria

No	Aspect	Criteria	Point
1	Aspects of Knowledge	Report Card Value (NP)	5



2		Skills (KT)	3
3	Personality Aspects	Attitude (SK)	4
4		Behavior (PR)	5
5	Extracurricular Aspects	Extracurricular (EK)	5
6		Attendance (KH)	4

Mapping the Knowledge Aspect Gap is the difference between value and skill or it can be shown by the formula below:

$$\text{Gap} = \text{Student Profile} - \text{Student Achievement}$$

Table 2. Score Criteria in Each Aspect

No	Student's Name	Aspects of Knowledge		Personality Aspects		Extracurricular Aspects	
		NP	KT	SK	PR	EK	KH
1	Ananda	5	3	4	2	3	1
2	Lulu Humaera Emala D	5	2	4	2	3	2
3	Siti Fatimah	4	2	4	2	4	2
4	Siti Amniah	3	3	4	3	3	4
5	Maya	4	2	3	2	4	4
6	Elisabet	5	3	3	2	2	2
7	Nanda asmita	2	3	3	1	1	3
8	Fitra Ramadani	3	2	3	2	1	4
9	Siti arbayah	3	2	2	2	2	2
10	Nuri sitanggung	2	3	2	3	2	3
11	Rotua sipahutar	3	2	2	1	3	4
12	Rokaya Simanjuntak	4	3	2	3	4	4
13	Melly	5	2	1	2	5	2
14	Ayu utari	5	2	1	2	2	2
15	Ayu Ramadani	2	3	1	1	2	4
16	Anzelina	5	2	4	2	1	2
17	Ema Susanta	4	3	3	1	1	3
18	Enda Kapiyani	2	2	2	2	2	4
19	Elita	2	2	2	1	1	2
20	Putri	5	3	3	3	2	3

### 3.2. Weighting of Each Criterion

The results of the Knowledge Gap Mapping after being matched with the Weight Gap Value are as shown in table 3.

Table 3. Mapping results on each sub criterion

No	Student's Name	Aspects of Knowledge	Personality Aspects	Extracurricular Aspects
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		<i>NP</i>	<i>KT</i>	<i>SK</i>	<i>PR</i>	<i>EK</i>	<i>KH</i>
1	Ananda	5	5	5	4	3	1
2	Lulu Humaera Emala D	5	4	5	4	3	1
3	Siti Fatimah	4	4	5	4	4	1
4	Siti Amniah	3	5	5	5	3	5
5	Maya	4	4	4	4	4	5
6	Elisabet	5	5	4	4	2	1
7	Nanda asmita	2	5	4	1	1	4
8	Fitra Ramadani	3	4	4	4	1	5
9	Siti arbayah	3	4	3	4	2	1
10	Nuri sitanggang	2	5	3	5	2	4
11	Rotua sipahutar	3	4	3	1	3	5
12	Rokaya Simanjuntak	4	5	3	5	4	5
13	Melly	5	4	2	4	5	1
14	Ayu utari	5	4	2	4	2	1
15	Ayu Ramadani	2	5	2	1	2	5
16	Anzelina	5	4	5	4	1	1
17	Ema Susanta	4	5	4	1	1	4
18	Enda Kapiyani	2	4	3	4	2	5
19	Elita	2	4	3	1	1	1
20	Putri	5	5	4	5	2	4

### 3.3. Calculation and Classification of Core Factors and Secondary Factors

After determining the weight of the Gap value for the three aspects, namely Knowledge Aspects, Personality Aspects, and Extracurricular Aspects, in the same way, each aspect is grouped into 2 namely, Core Factor and Secondary Factor. Calculation of Core Factor (Knowledge) and Secondary Factor (Personality and Extracurricular)

#### 1. Aspects of Knowledge

Determination of the subject aspect of Core Factor Knowledge. Valid for all students.

Core Factor Formula:

$$NCP = \frac{\sum NCP1}{\sum iC}$$

##### a. Ananda

$$NCP = \frac{\sum 5 + 5}{\sum 2} = \frac{10}{2} = 5$$

#### 2. Personality Aspects

Determination of the subject of the Secondary Factor Personality aspects. Valid for all Students.

Core Factor Formula:

$$NCP = \frac{\sum NCP2}{\sum iC}$$

##### a. Ananda

$$NCP = \frac{\sum 5 + 4}{\sum 2} = \frac{9}{2} = 4,5$$

3. Extracurricular Aspects

Determination of the subject of the Secondary Factor Extracurricular aspects. Valid for all Students. Secondary Factor Formula:

$$NSF = \frac{\sum NCP3}{\sum iC}$$

a. Ananda

$$NSF = \frac{\sum 3 + 1}{\sum 2} = \frac{4}{2} = 2$$

Each student has carried out the same calculation for all aspects.

### 3.4. Total Value Calculation

From the calculation of each aspect, then the calculation of the Total Value is based on the percentage of the Core and Secondary Factors above.

$$(x)\%NCF (P1) + (x)\%NSF (P2,P3) = N(P1,P2,P3)$$

The calculation of the total value can be seen in the example of calculating Knowledge Aspects with a value of 60%, Personality and Extracurricular Aspects with a percent value of 40%.

1. Aspects of Knowledge

a). Ananda

$$NT = (60\% * 5) = 3$$

2. Personality Aspects

a). Ananda

$$NT = (40\% * 4,5) = 1,8$$

3. Extracurricular Aspects

a). Ananda

$$NT = (40\% * 2) = 0,8$$

### 3.5. Calculation of Rank Determination

The final result of the Gap Method is a ranking of students for determining student achievement. This calculation can be addressed by the formula below.

$$\text{Rank} = (\%)NP1 + (\%)NP2 + (\%)NP3$$

Previously we first determine the percent value of NP1 (50%), NP2 (30%), and NP3 (20%).

As shown in table 4. The final result of the Gap Process

Table 4. Final Results of the Gap Process

No	Student's name	P1 value	P2 value	P3 value	The final result	Rank
1	Putri	1,50	0,42	0,24	2,16	1
2	Ananda	1,50	0,42	0,20	2,12	2
3	Elisabet	1,50	0,36	0,20	2,06	3
4	Rokaya Simanjuntak	1,35	0,36	0,36	2,07	4
5	Lulu Humaera Emala D	1,35	0,42	0,24	2,01	5
6	Siti Amniah	1,20	0,48	0,32	2,00	6
7	Anzelina	1,35	0,42	0,16	1,93	7

No	Student's name	P1 value	P2 value	P3 value	The final result	Rank
8	Melly	1,35	0,24	0,32	1,91	8
9	Siti Fatimah	1,20	0,42	0,28	1,90	9
10	Maya	1,20	0,36	0,36	1,92	10
11	Ema Susanta	1,35	0,30	0,20	1,85	11
12	Ayu utari	1,35	0,24	0,20	1,79	12
13	Fitra Ramadani	1,05	0,36	0,24	1,65	13
14	Nuri sitanggang	1,05	0,36	0,24	1,65	14
15	Rotua sipahutar	1,05	0,24	0,32	1,61	15
16	Nanda asmita	1,05	0,30	0,20	1,55	16
17	Siti arbayah	1,05	0,30	0,20	1,55	17
18	Ayu Ramadani	1,05	0,18	0,28	1,51	18
19	Enda Kapiyani	0,90	0,30	0,28	1,48	19
20	Elita	0,90	0,24	0,16	1,30	20

### 3.6. Decision Support System Implementation

Figure 1. Login Form

The login form displays when the application is first to run. In the user and key dialog box, the admin must enter the user id and password. And if the admin does not enter the correct user id and password, then the admin cannot enter the application. In the login screen, to enter the next page, the admin can press the enter button. And then, the admin will go to the main menu page.



Figure 2. Main Menu Form

The main menu form appears if the login has been successful, and in the main menu form there are several sub-menus such as 1) Files in which there are 49 lecturer data forms, student data forms, Aspects, and Criteria; 2) Process with profile matching; 3) Reprint SK; 4) Users in which there is also a password change form and exit.

NIDN	Nama Dosen	Aspek Pengetahuan (APT)	Aspek Kepribadian (AKB)	Aspek Ekstrakurikuler (AEK)	Total	Rangking
20179846	Putri	1,5	0,42	0,24	2,16	1
20179842	Ananda	1,5	0,42	0,2	2,12	2
20179889	Rokaya Simanjuntak	1,35	0,36	0,36	2,07	3
20179930	Elisabet	1,5	0,36	0,2	2,06	4
20179830	Lulu Humaera Emala D	1,35	0,42	0,24	2,01	5
20179897	Siti Annisah	1,2	0,48	0,32	2	6
20179824	Anzelina	1,35	0,42	0,16	1,93	7
20179732	Maya	1,2	0,36	0,36	1,92	8
20179751	Melly	1,35	0,24	0,32	1,91	9
20179842	Siti Fatimah	1,2	0,42	0,28	1,9	10
20179900	Ema Suaanta	1,35	0,3	0,2	1,85	11
20179838	Ayu Utari	1,35	0,24	0,2	1,79	12
20179793	Fitra Ramadani	1,05	0,36	0,24	1,65	13
20179956	Nun Stanggang	1,05	0,36	0,24	1,65	14
20179768	Robue Sipahutar	1,05	0,24	0,32	1,61	15
20179737	Siti Arbayah	1,05	0,3	0,2	1,55	16
20179731	Nanda Asmita	1,05	0,3	0,2	1,55	17
20179867	Ayu Ramadani	1,05	0,18	0,28	1,51	18
20179809	Erida Kapiyani	0,9	0,3	0,28	1,48	19
20179982	Elita	0,9	0,24	0,16	1,3	20

Figure 3. Calculation of Determination of Outstanding Students (Perengkingan)

Calculation form for determining ranking to display the end of the calculation process using the profile matching method.

#### 4. Conclusions

With the application of the Profile Matching method in determining outstanding students at SMK Karya Serdang Lubuk Pakam, with the following aspects: 1) Knowledge; 2) Skills; 3) Extracurricular. Of the 20 candidates who have been determined, the best student is Putri with a score of 2.16.

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