# Decision Support System for Achieving Scholarship Selection by Using Profile Matching Method

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**Abstract— Learning is one of the obligations of students to do in every school activity where they study. However, sometimes many students are less able to digest the subject matter delivered by the teacher. Therefore, the school held a scholarship program for outstanding students. In order to motivate students to study harder. Achievement scholarships are given with the aim of motivating students to study harder. Currently the scholarship is not right on target because it is still done manually and it is not clear the criteria for a student to get an achievement scholarship. To conduct an assessment in awarding scholarships to high achieving students use a decision support system to help solve a problem. For this reason, to conduct an assessment in the awarding of scholarships, a decision support system using the Profile Matching method is used. Profile Matching method is one of the methods used in decision making. In this study, there are several aspects of the assessment for awarding achievement scholarships, namely the KKM Aspect, the Attendance Aspect, the Behavior Aspect, the Craft Aspect or the Discipline, the Neatness Aspect.**

Keywords— Profile Matching, Decision Support System, Achievement Scholarships

## I. INTRODUCTION

Bina Insan Mandiri Vocational School is one of the High Vocational Schools that provides achievement scholarships with the aim of motivating students to study harder. Scholarships are aids to individuals to continue the education being pursued (Sari 2018). Not all prospective scholarship recipients will receive a scholarship, only candidates who meet the established criteria will receive the scholarship ( rani irma Handayani 2017)

At present the awarding of scholarships is still done manually and subjectively to the lengthy process of determining the scholarship (Oktavia 2018). Due to limited time and limited ability to see all aspects accurately often leads to mistakes in decision making (R. I. Handayani 2015)

Therefore, an assessment is needed for awarding scholarships to high achieving students by using a decision support system to help solve a problem (Saryoko, Aziz, and Nurmalia 2020). Methods that can be used in assessing scholarships for high achieving students, namely the Profile Matching method. This method is used to avoid mistakes in decision making (Budi Sudrajat 2018). This profile matching method can also facilitate schools in decision-making (Indriyani et al. 2019). Decision making is based on aspects or criteria that have been determined (Apriana 2016)

## II. LITERATURE REVIEW

## A.  Decision support system

Decision support system (DSS) is an interactive information system that provides information, modeling, and manipulating data (Kusrini 2007)

## B. Profile Matching

In the profile matching process in outline is a process of comparing between each criteria for each assessment in a proposal research proposals submitted so the difference in scores is known (also called GAP (Gross Across Product)), the smaller the GAP produced, the greater the weight value which means it has a greater chance for eligibility / graduation priority. (Apriana 2018)

The steps in profile matching are:
1.  Determine the mapping variables Competency gaps determine the aspects that will be used in processing employee grades.
2. Calculating the results of the competency Gap mapping referred to by the Gap here is the different profiles between employees and the expected standard profile or can be shown in the formula below:

*Gap = Employee profile – Profile matching..(1).*

After obtaining a gap in each employee, each employee's profile is weighted by benchmarking the gap value weight table.
Then each aspect is grouped into 2 groups, namely the Core Factor and Secondary Factor groups. Core Factor calculations are shown using the formula below:

$$NCF = \frac{\Sigma \, Nc}{\Sigma \, Ic} \dots \dots \dots \dots (2)$$

NCF = The average value of the core factor
NC = The number of core factor values
IC = Number of core factor items

Meanwhile, the secondary factor calculation is indicated by the following formula:

$$\mathbf{NSF = \frac{\Sigma \, NS}{\Sigma \, IS}} \dots \dots \dots \dots (3)$$

NSF = The average value of the secondary factor
NS = Total number of secondary factor values
IS = Number of secondary factor item

After calculating the Core factors and Secondary factors, then calculate the total value based on the percentage of core and secondary that is estimated to affect the performance of each profile. Examples of calculations can be seen in the formula below:

(x)% NCF (Core Factor Average Value) + (x)% NSF (Average Factor Secondary Value) = N (Total of aspects) ......... (4)

Information :

(x)% = The percent value inputted
Finally the Ranking calculation, the calculation can be shown by the formula below
Ranking = (x)% N1 + (x)% N2 + (x)% N3 ....... (5)

Information:
*N1,N2,N3* : Total aspect value calculated
 (x)%        : Percent value entered

## III. DISCUSSION
In the selection of recipients of Scholarship Assessment for Student Achievement in West Jakarta Bina Insan Mandiri Vocational School by using the profile matching method there are several aspects assessed and from these aspects there are sub criteria, namely as follows:

**Table 1. Aspects of Providing Scholarships for Outstanding Students**

| Scholarship aspects |
| --- |
| **1.  KKM Aspects** |
| a. Mathematics |
| b. Indonesian |
| c. English |
| d. Natural science |
| e. Social studies |
| f. Computer Skills and Information Managemen |
| **2.  Aspect of Presence** |
| a. Punctuality in coming to school |
| b. Punctuality in entering class |
| c. Punctuality in participating in ceremonial activities |
| d. Punctuality in participating in practicum activities |
| **3.  Behavior Aspects** |
| a.  Respect, respect the teacher or classmates and keep the classroom atmosphere in good condition (not making noise, chatting, or laughing that has nothing to do with the lesson) |
| b. Knock on the door, ask for permission to enter or exit the class, behave politely or friendly |
| c. Does not violate the rules |
| d. Obey all commands of the teacher while in the school environment |
| e. Not asking before the teacher asks |
| **4.  Crafts / Discipline Aspects** |
| a. Full attention during learning (asking or answering), carrying textbooks and taking notes |
| b. Chase and collect tasks on time |
| c. The student concerned always complies |

| | | |
|---|---|---|
| | with the provisions of school entrance after school and school hours | |
| **5.** | **Neatness aspects** | |
| | a. The students concerned always dress neatly and politely | |
| | b. Based on the following with the complete uniform attributes that have been determined from the school | |
| | c. Use black shoes and white socks | |

**Table 2. Value of Aspect Sub Criteria**

| Sub Criteria Value | |
|---|---|
| 1 | Very less |
| 2 | Less |
| 3 | Enough |
| 4 | Well |
| 5 | Very good |

## A. Competency Gap Mapping

In calculating the Competency gap mapping, the gap referred to here is the difference between the scholarship acceptance profile and the student profile or can be submitted in the formula below:
:
*Gap = Student Profile - Scholarship Acceptance Profile*

Calculation of competency gap mapping is based on existing aspects. The following is the calculation of the gap for each aspect:

**Table 3. Mapping Competency Gap Aspects of KKM Scholarship Acceptance**

| No | Student's name | KKM1 | KKM2 | KKM3 | KKM4 | KKM5 | KKM6 | |
|---|---|---|---|---|---|---|---|---|
| 1 | Afifah Husna | 4 | 4 | 4 | 4 | 4 | 4 | |
| 2 | Antoni Gunawan | 3 | 4 | 4 | 4 | 4 | 5 | |
| 3 | Arifia Nur Jauza | 3 | 4 | 4 | 4 | 4 | 4 | |
| 4 | Dinar Astriani | 4 | 4 | 4 | 3 | 4 | 4 | |
| 5 | Nadia Nur Maidah | 4 | 4 | 4 | 4 | 4 | 4 | |
| 6 | Nur Elisa Fitria | 5 | 4 | 4 | 4 | 4 | 4 | |
| 7 | Ricky Ega Pratama | 3 | 4 | 4 | 4 | 4 | 3 | |
| 8 | Saprina Putri Rosita | 4 | 4 | 4 | 5 | 4 | 4 | |
| 9 | Wahyu Febby Setiawan | 3 | 4 | 4 | 4 | 4 | 5 | |
| | Scholarship | 5 | 5 | 5 | 5 | 5 | 5 | GAP |
| 1 | Afifah Husna | -1 | -1 | -1 | -1 | -1 | -1 | |
| 2 | Antoni Gunawan | -2 | -1 | -1 | -1 | -1 | 0 | |
| 3 | Arifia Nur Jauza | -2 | -1 | -1 | -1 | -1 | -1 | |
| 4 | Dinar Astriani | -1 | -1 | -1 | -2 | -1 | -1 | |
| 5 | Nadia Nur Maidah | -1 | -1 | -1 | -1 | -1 | -1 | |
| 6 | Nur Elisa Fitria | 0 | -1 | -1 | -1 | -1 | -1 | |
| 7 | Ricky Ega Pratama | -2 | -1 | -1 | -1 | -1 | -2 | |
| 8 | Saprina Putri Rosita | -1 | -1 | -1 | 0 | -1 | -1 | |
| 9 | Wahyu Febby Setiawan | -2 | -1 | -1 | -1 | -1 | 0 | |

Information :
KKM1 : Mathematics
KKM2 : Indonesian
KKM3 : English
KKM4 : Natural science
KKM5 : Social studies
KKM6 : Computer Skills and Information Managemen

## B. Determination Weight of Gap Value

After obtaining a gap in each student, after the student profile is given a weight value by benchmarking the gap value gap table..

**Table 4. Weight of Gap Value**

| No | Difference | value weights | Information |
|---|---|---|---|
| 1 | 0 | 5 | There is no difference (competency as needed) |
| 2 | 1 | 4,5 | Individual competence is 1 level / level |
| 3 | -1 | 4 | Individual competencies lack 2 levels / levels |
| 4 | 2 | 3,5 | Individual competence is excess of 2 levels / levels |
| 5 | -2 | 3 | Individual competencies lack 2 levels / levels |
| 6 | 3 | 2,5 | Individual competencies are over 3 levels / level |
| 7 | -3 | 2 | Individual competencies lack 3 levels / levels |
| 8 | 4 | 1,5 | Individual competence is |

| | | | over 4 levels / level |
|---|---|---|---|
| 9 | -4 | 1 | Individual competencies lack 4 levels / levels |

**Table 5. Determination of the Gap Weighting Aspects of KKM Aspects for Giving Scholarships**

| No | Student's Name | Variable | | | | | |
|---|---|---|---|---|---|---|---|
| | | KKM1 | KKM2 | KKM3 | KKM4 | KKM5 | KKM6 |
| 1 | Afifah Husna | -1 | -1 | -1 | -1 | -1 | -1 |
| 2 | Antoni Gunawan | -2 | -1 | -1 | -1 | -1 | 0 |
| 3 | Arifia Nur Jauza | -2 | -1 | -1 | -1 | -1 | -1 |
| 4 | Dinar Astriani | -1 | -1 | -1 | -2 | -1 | -1 |
| 5 | Nadia Nur Maidah | -1 | -1 | -1 | -1 | -1 | -1 |
| 6 | Nur Elisa Fitria | 0 | -1 | -1 | -1 | -1 | -1 |
| 7 | Rizky Ega Pratama | -2 | -1 | -1 | -1 | -1 | -2 |
| 8 | Saprina Putri Rosita | -1 | -1 | -1 | 0 | -1 | -1 |
| 9 | Wahyu Febby Setiawan | -2 | -1 | -1 | -1 | -1 | 0 |
| **Weight Value** | | | | | | | |
| 1 | Afifah Husna | 4 | 4 | 4 | 4 | 4 | 4 |
| 2 | Antoni Gunawan | 3 | 4 | 4 | 4 | 4 | 5 |
| 3 | Arifia Nur Jauza | 3 | 4 | 4 | 4 | 4 | 4 |
| 4 | Dinar Astriani | 4 | 4 | 4 | 3 | 4 | 4 |
| 5 | Nadia Nur Maidah | 4 | 4 | 4 | 4 | 4 | 4 |
| 6 | Nur Elisa Fitria | 5 | 4 | 4 | 4 | 4 | 4 |
| 7 | Rizky Ega Pratama | 3 | 4 | 4 | 4 | 4 | 3 |
| 8 | Saprina Putri Rosita | 4 | 4 | 4 | 5 | 4 | 4 |
| 9 | Wahyu Febby Setiawan | 3 | 4 | 4 | 4 | 4 | 5 |

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

After determining the weight of the gap value for the five aspects. These are the kkm aspect, the attendance aspect, the behavioral aspect, the craft or discipline aspect, and the neatness aspect in the same way. Then each aspect is divided into two factors, namely core factor and secondary factor.

**Table 6. Core Factor and Secondary Factor Values of KKM**

| No | Student's Name | CF | NF | NKKM |
|---|---|---|---|---|
| 1 | Afifah Husna | 4 | 4 | 4 |
| 2 | Antoni Gunawan | 3,66667 | 4,33333 | 3,933334 |
| 3 | Arifia Nur Jauza | 3,66667 | 4 | 3,800002 |
| 4 | Dinar Astriani | 4 | 3,66667 | 3,866668 |
| 5 | Nadia Nur Maidah | 4 | 4 | 4 |
| 6 | Nur Elisa Fitria | 4,33333 | 4 | 4,199998 |
| 7 | Rizky Ega Pratama | 3,66667 | 4 | 3,800002 |
| 8 | Saprina Putri Rosita | 4 | 4,33333 | 4,133332 |
| 9 | Wahyu Febby Setiawan | 3,66667 | 4,33333 | 3,933334 |

## D. Scholarship Score Calculation

The score from this process is the score of the candidate who was submitted to receive the scholarship. Determination of the score refers to the results of certain calculations. The calculation can be shown by the formula below :

$Score(x)\%Nkkm+(x)\%Nkhd+(x)\%Nkel+(x)\%Nkk+(x)\%Nkrp$

Information :
Nkkm: KKM value
Nkhd: Presence Value
Nkel: Behavior Value
Nkk: Value of Crafts / Discipline
Nkrp: Neat Value

**Table 7. Assessment Weight at SMK BINA INSAN MANDIRI**

| No | Assessment criteria | Scholarship SMK BINA INSAN MANDIRI | |
|---|---|---|---|
| | | Criteria | Weight |
| 1 | KKM | ✓ | 40% |
| 2 | Presence | ✓ | 20% |
| 3 | Behavior | ✓ | 10% |
| 4 | Craft / discipline | ✓ | 20% |
| 5 | Neatness | ✓ | 10% |
| | Amount | | 100% |

1. Afifah Husna Score
   = (40%*4)+(20%*4,8)+(10%*4)+(20%*4,4)+(1 0%*3,7)
   = 1.6 + 0,96 + 0.4 + 0.88 + 0.37
   = 4,21

2. Antoni Gunawan Score
   = (40%*3,933334)+(20%*4)+(10%*3)+(20%*3,7)+(10%*4,7)
   = 1,5733336 + 0,8 + 0,3 + 0,74 + 0,47
   = 3,883333

3. Score Arifia Nur Jauza
   = (40%*3,800002)+(20%*3)+(10%* 4,400002)+(20%*4,7)+(10%*4)

$= 1,5200008 + 0.6 + 0,4400002 + 0.94 + 0,4$
$= 3,900001$

4. Dinar Astriani Score
$= (40\%*3,86668)+(20\%*3)+(10\%* 3,999998)$
$+(20\%*3)+(10\%*5)$
$= 1.546672 + 0.6 + 0.3999998 + 0.6 + 0.5$
$= 3,6466718$

5. Nadia Nur Maidah Score
$= (40\%*4)+(20\%*2)+(10\%*5)+(20\%*4)+$
$(10\%*3,3)$
$= 1.6 + 0.4 + 0.5 + 0.8 + 0.33$
$= 3.63$

6. Nur Elisa Fitria Score
$= (40\%* 4,199998)+(20\%*4)+(10\%*4)+$
$(20\%*4,7)+(10\%*4)$
$= 1.6799992 + 0.8 + 0.4 + 0.94 + 0.4$
$= 4.219999$

7. Rizky Ega Pratama Score
$= (40\%* 3,800002)+(20\%*4)+(10\%*4)+$
$(20\%*3,6)+(10\%*4,3)$
$= 1, 5200008 + 0,8 + 0,4 + 0,72 + 0,43$
$= 3,870001$

8. Skor Saprina Putri Rosita
$= (40\%*4,133332)+(20\%*4)+(10\%*4,2)+$
$(20\%*3)+(10\%*4,1)$
$= 1,6533328 + 0,8 + 0,42 + 0.6 + 0.41$
$= 3,883333$

9. Skor Wahyu Febby Setiawan
$= (40\%* 3,933334)+(20\%*4)+(10\%*3)+$
$(20\%*4)+(10\%*4)$
$= 1,5733336 + 0,8 + 0,3 + 0,8 + 0,4$
$= 3,873334$

Thus the one entitled to receive a scholarship is Nur Elisa Fitria who received the highest final score of 4.219999 and was ranked 1 (First) out of 9 prospective recipient students at SMK Bina Insan Mandiri West Jakarta.

**Table 8. Final Results and Scores**

| No | Student's Name | Score | Ranking |
|----|----------------|-------|---------|
| 1 | Nur Elisa Fitria | 4,219999 | 1 |
| 2 | Afifah Husna | 4,2 | 2 |
| 3 | Arifia Nur Jauza | 3,900001 | 3 |
| 4 | Antoni Gunawan | 3,883334 | 4 |
| 5 | Saprina Putri Rosita | 3,883333 | 5 |
| 6 | Wahyu Febby | 3,873334 | 6 |
| | Setiawan | | |
| 7 | Rizky Ega Pratama | 3,870001 | 7 |
| 8 | Dinar Astriani | 3,646672 | 8 |
| 9 | Nadia Nur Maidah | 3,63 | 9 |

## IV. CONCLUSION

After conducting research on the granting of scholarships to outstanding students at SMK BINA INSAN MANDIRI West Jakarta, a number of conclusions were obtained, namely:
1. There are 5 aspects of the scholarship grading assessment used by SMK BINA INSAN MANDIRI West Jakarta in assessing the selection of scholarship recipients for outstanding students, namely: KKM, Attendance, Behavior, Crafts or Discipline, and Neatness.
2. The scholarship selection system application can be used as a tool for decision making while still being based on a decision support system using the Profile Matching method

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