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DECISION SUPPORT SYSTEM FOR DETERMINING DEPARTMENT USING THE PROFILE MATCHING INTERPOLATION METHOD AT WIKRAMA VOCATIONAL SCHOOL, BOGOR

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Abstract – Wikrama Vocational High School is one of the schools that routinely carries out the determination of majors every year. The majors process at Wikrama is carried out in the tenth grade by the Guidance and Counseling Teacher (BK Teacher) and the Head of Expertise Competence (Kakomli). BK and Kakomli teachers have difficulty determining the results of majors when there are more interest in one major than other majors, there is a mismatch of majors results because they are not in accordance with the existing majors in the chosen field of expertise and the process of majors is not accurate and fast. This is because it has not used an objective mechanism for determining majors, there is no weighting process, and there is no information system available. Therefore, it is necessary to develop a decision support system (DSS) to assist the process of determining majors using Profile Matching and Interpolation methods. The Profile Matching method is used for appraising decisions, while the Interpolation method is used for the weighting process. The criteria used in each field of expertise are Informatics Engineering with 11 criteria and Computers, Business Management with 8 criteria, and Tourism with 7 criteria. Based on the results of testing and validation that have been carried out by experts, it has an accuracy value of 93%. The accuracy value indicates that the system can provide recommendations for determining the right major. In addition, the interpolation weighting method is proven to increase the accuracy value compared to the ordinal weighting value in Profile Matching. The results of this study are in the form of a decision support system that helps in determining majors objectively, quickly and accurately.

Keywords – ***Decision Support System, majors, profile matching, interpolation***

I. INTRODUCTION

Determination of majors in high school is usually determined by academic ability which is supported by interest factors so that students can study a science that suits their personality characteristics. The interest factor in SMK aims to provide opportunities for students to develop attitudes, knowledge competencies, and skill competencies according to their interests, talents and/or abilities in a major. Selection of specialization groups is based on report cards and/or recommendations from BK teachers and/or placement test results at SMK [1].

Majors at Wikrama Bogor Vocational School are carried out by Counseling Teachers and Heads of Expertise Competency (Kakomli) with criteria in the field of Informatics and Computer Engineering expertise, namely MTK Middle School Report Card Scores, Middle School Report Card English Grades, MTK Matriculation Scores, Matriculation English Grades, Matriculation KDK Scores, Matriculation Algorithm Values, Logic Values, Creativity Values, Color Blindness, Major Interests and Gender, then criteria in the field of Business Management expertise, namely MTK Middle School Report Card Scores, Middle School Report Card English Grades, MTK Matriculation Scores, Matriculation English Grades, Matriculation KDK Scores , Interview Scores, Major Interests, Gender and criteria in the area of expertise in Tourism are Middle School Report Card MTK Scores, Middle School Report Card English Grades, MTK Matriculation Scores, Matriculation English Grades, Matriculation PJOK Scores, Interview Scores, Major Interests. Where each student has chosen the desired area of expertise for further selection in determining the majors in that area of expertise so that when the results have been determined they must be in accordance with the existing majors in the chosen area of expertise.

During the majors process, Counseling Teachers and Kakomli experienced difficulties in determining the results of majors when there were more enthusiasts for one major than other majors. Some students ask to change majors with reasons of incompatibility because the results of the majors are not in accordance with the existing majors in the chosen area of expertise. Then the BK teacher and Kakomli still have difficulties in an accurate and fast assessment process. This is because there is no weighting process for each criterion and the determination of the final grade calculation still uses the average so that it cannot be known which criteria have a more important effect for a particular major.

There have been many implementations of decision support systems in various fields, including in terms of determining majors including [2],[3],[4],[5],[6],[7],[8]. There are also quite a lot of methods used to determine recommendations for decision support system solutions. These include the Multifactor Evaluation Process, Simple Additive Weighting, Analythical Hierarchy Process, Techique for Order Preference by Similarty to Ideal Solution, Vise Kriterijuska Optimizacija I Kompromisno Resenje, Fuzzy C-mean Algorithm, Profile Matching.

Perdana et al (2021) explained that in order to obtain calculations with faster and more objective results[9], of course, it is necessary to carry out a weighting process and make an appraiser's decision based on proximity to the criteria. This is in line with the case study in determining

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this major. The suitable method in determining majors based on compatibility between student profiles and majors is the profile matching method. Then to get more objective and precise results, it is necessary to use interpolation in the weighting process. [10] explained that the application of interpolation weighting succeeded in increasing the accuracy value compared to the ordinal weighting method.

Based on the background above, this research focuses on the interpolation profile matching method in determining the direction that suits the needs of SMK Wikrama Bogor.

II. RESEARCH METHODOLOGY

A. Research methods

The research to be carried out is a type of quantitative research, which is to take a sample of student data along with existing indicators, then the data is processed using the Profile Matching Interpolation method, the end result is to recommend student majors.

B. Population and Sample Selection Methods

At this stage the researcher chose the population and sample, where the population was students of class x (ten) at Wikrama Bogor Vocational School and the sample was majoring data for the 2020-2021 school year with a total of 642 students.

C. Method of collecting data

Data collection uses research instruments, analysis and is quantitative or statistical with the aim of testing the hypotheses that have been applied.

Data collection methods that will be used in this study are:

1. Interview

The resource persons in this study were Counseling Guidance Teachers/Counseling Teachers at SMK Wikrama Bogor, namely Ms. Novya Azhari to gather information about the process of majoring and what are the criteria for making decisions in recommending majors.

2. Internal Data

The internal data used for this research is class x (ten) student data. The description of the data on the realization of majors at SMK Wikrama Bogor can be seen in Table 1.

D. Analysis Techniques

The analysis technique used in this study uses a Decision Support System (DSS) approach. The process of analysis was carried out on the results of the stages of data collection by interviews, observation and literature study. In the analysis process, the techniques used are:

1. Analysis of data from a running system. This is done on documents, procedures, databases, and results of reports from the running system.
2. Analysis of the needs of system users, modeling of these needs and what functions are obtained by system users.

E. Research Steps

In order for this research to be carried out properly, a structured research method is needed. The research steps carried out are presented in Figure 1.

The steps contained in Figure 3.1 include:

1. Data Setup

This stage is the initial data processing to obtain the parameters used in determining the suitability of majors with student profiles. The data is in the form of student data, value data, majors data. The preparation of this data is done by interviewing and verifying the counseling teachers.

2. Determination of Majors

At this stage, consultations were carried out with the guidance counselor to determine the majors at SMK Wikrama Bogor. It is known that at SMK Wikrama Bogor there are 7 majors which are divided into 3 areas of expertise, namely: Informatics and Computer Engineering (Software Engineering, Multimedia and Computer and Network Engineering), Business Management (Office Automation and Governance) and Tourism (Hospitality and Catering).

3. Determination of Criteria

At this stage it was carried out based on student data in consultation with the BK teacher and the Head of the Department, several parameters were obtained that influenced the determination of majors. The outputs from this stage are 11 (eleven) criteria for majors in the field of ICT expertise, 8 (eight) criteria for majors in the field of Business Management and 7 (seven) criteria for majors in the field of Tourism.

4. scoring

This stage is the determination of suitability matching between student profiles and majors. The method used to perform suitability matching is the Profile Matching method which produces a prototype of the DSS model for determining majors.

5. Model Testing

The final stage of this research is testing the resulting model (prototype). A series of tests were carried out to determine the quality of the resulting model by looking at the accuracy value. Verification of the outcome of the model (prototype) was carried out by the Counseling Teacher and Head of Department who have handled the process of determining majors at SMK Wikrama Bogor for more than 2 (two) years.

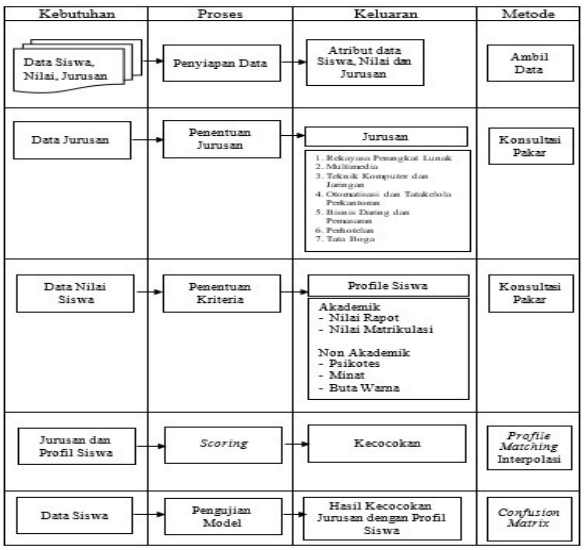

Fig 1. Research Steps

E. 1. Data Setup

At the data preparation stage, data collection was carried out. The purpose of this stage is to obtain the parameters used for the development of the SPK model for

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determining majors. The preparation of this data is done by interviewing and verifying the counseling teachers.

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Table 1. Data Preparation

Name	Middle school report cards MTK grades	Middle School Report Card English Grades	MTK Matriculation Value	Matriculation English Grades	Matriculation KDK score
1	2	3	4	5	6
Aditiya Putra Kurniawan (12007627)	87	89	91	83	83
Aditya (12007628)	79	81	86	75	93
Agung Setiawan (12007635)	73	77	95	75	95
Febiani Aulia Saputra (12007801)	87	89	87	78	90
Muhammad Alfharizzi (12007971)	79	80	81	75	75
Nadila Zari Fani (12008035)	81	78	83	80	88
Pingkan Yuki Fitria (12008083)	79	82	90	80	83
Rio Ferdinand (12008132)	81	85	87	83	88
…	…	…	…	…	…
Zalfa Maula Bagya (12008247)	78	87	90	95	85

Table 2. Criteria Weighting

Matriculation Algorithm Value	Logic Value	Creativity Value	Color blind	Department Interests	Gender
7	8	9	10	11	12
75	76	70	TBW	RPL	L
83	70	70	TBW	mmd	L
78	70	70	TBW	TKJ	L
83	85	70	TBW	RPL	P
75	70	70	TBW	TKJ	L
83	76	70	TBW	RPL	P
75	70	78	TBW	mmd	P
83	76	70	TBW	RPL	L
…	…	…	…	…	…
83	70	76	TBW	mmd	P

E.2. Determination of Majors

At this stage it was carried out based on student data in consultation with the BK teacher and the Head of the Department, several parameters were obtained that influenced the determination of majors. The outputs from this stage are 11 (eleven) criteria for majors in the field of ICT expertise, 8 (eight) criteria for majors in the field of Business Management and 7 (seven) criteria for majors in the field of Tourism. The rules that exist at SMK Wikrama Bogor include:

1. The Department of Computer and Network Engineering only accepts men and the Department of Automation and Office Management only accepts women, other than that it can be either a man or a woman.
2. The Department of Computer and Network Engineering does not accept students who are color blind
3. Provisions for majors cannot cross fields of expertise, namely when students are interested in the ICT field, the majors that must be matched are the majors in that area of expertise.

E.3. Determination of Criteria

Determination of major criteria was obtained from the results of consultations with experts at SMK Wikrama Bogor involving Counseling Guidance Teachers (BK Teachers) and Heads of Expertise Competence (Kakomli). The results of consultations with experts obtained data from 642 students who would be tested. In addition, based on consultations with experts, 11 (eleven) criteria were obtained for the area of expertise in Informatics and Computer Engineering, 8 (eight) criteria for the area of expertise in Business Management, and 7 (seven) criteria for the area of expertise in Tourism.

The criteria that will be used in this study in determining the majors are as follows:

a. Criteria in the Field of ICT Expertise
   1) Middle school report card MTK grades (K1)

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2) MTK English Grades Middle School Report Card (K2)
3) MTK Matriculation Value (K3)
4) Matriculation English Score (K4)
5) KDK Matriculation Value (K5)
6) Matriculation Algorithm Value (K6)
7) Logic Value (K7)
8) Creativity Value (K8)
9) Color Blind Value (K9)
10) Major Interest Score (K10)
11) Gender Value (K11)

b. Criteria in the Field of Management Business Expertise
1) Middle school report card MTK grades (K1)
2) MTK English Grades Middle School Report Card (K2)
3) MTK Matriculation Value (K3)
4) Matriculation English Score (K4)
5) KDK Matriculation Value (K5)
6) Interview Value (K6)
7) Major Interest Score (K7)
8) Gender Value (K8)

c. Criteria in the Field of Tourism Expertise
1) Middle school report card MTK grades (K1)
2) MTK English Grades Middle School Report Card (K2)
3) MTK Matriculation Value (K3)
4) Matriculation English Score (K4)
5) Matriculation PJOK Score (K5)
6) Interview Value (K6)
7) Major Interest Score (K7)

The following is an explanation of each of the criteria used in this study, namely:

a. ICT Expertise
1) Mathematics and English grades from junior high school report cards
Mathematics and English grades originating from junior high school report cards or equivalent are criteria that influence the determination of majors. The calculation of math scores and English scores is determined by the educational unit with the value interval i shown in Table 3.

Table 3 Criteria Interval Scores in Mathematics and English Middle School Report Cards

intervals	Weight
88-100	5
76-87	4
71-75	3
64-70	2
60-63	1
<60	0

2) Mathematics and English Scores from Matriculation Results
Mathematics and English grades derived from the matriculation results are the criteria that influence the determination of majors, where the matriculation results are obtained at the beginning of the learning period for class x (ten). The calculation of math scores and English scores is determined by the educational unit with the value intervals shown in Table 4.

Table 4. Mathematical and English score intervals for matriculation results

Intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

3) Value of Basic Computer Skills (KDK) and Algorithms
The KDK and Algorithm values derived from the results of matriculation are criteria that influence the determination of majors, where the results of this matriculation are obtained at the beginning of the learning period for class x (ten) with interval values equivalent to the scores of productive subjects in Vocational High Schools. The calculation of the KDK and Algorithm values is determined by the educational unit with the value intervals shown in Table 5.

Table 5. KDK Value Interval and Algorithm

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

4) The Value of Logic and Creativity
The value of logic and creativity that comes from the results of the psychological test is a criterion that influences the determination of majors with interval values equivalent to the scores of productive subjects in SMK. The calculation of logical value and creativity value is determined by the educational unit with the value interval i shown in Table 6.

Table 6. Logic and Creativity Value Intervals

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

5) Color Blind Value
The value of color blindness is one of the criteria that influences the determination of majors,

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especially for the Computer and Network Engineering and Multimedia Engineering major. For the two majors, there should not be students who are color blind, this is because it will affect the vocational learning process.

6) Major Interest Value
Majors Interest Value is one of the criteria that influences the determination of majors. The value of interest in this major will of course be related to the values of other criteria such as the value of logic, the value of creativity and color blindness.

7) Gender Value
The value of gender is one of the criteria that influences the determination of majors, where there are specializations such as the example for the Computer and Network Engineering major only for Men, while the Multimedia and Software Engineering major can be for Men and Women.

b. Field of Management Business Expertise

1) Mathematics and English grades from junior high school report cards
Mathematics and English grades originating from junior high school report cards or equivalent are criteria that influence the determination of majors. The calculation of math scores and English scores is determined by the educational unit with the value intervals shown in Table 7.

Table 6. Interval Criteria for Mathematics and English Middle School Report Cards

intervals	Weight
88-100	5
76-87	4
71-75	3
64-70	2
60-63	1
<60	0

2) Mathematics and English Scores from Matriculation Results
Mathematics and English grades derived from the matriculation results are the criteria that influence the determination of majors, where the matriculation results are obtained at the beginning of the learning period for class x (ten). The calculation of math scores and English scores is determined by the educational unit with the value interval i shown in Table 8.

Table 8. Mathematical and English score intervals for matriculation results

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

3) Basic Computer Skills Value (KDK)
The KDK score derived from the results of matriculation is one of the criteria that influences the determination of majors, where the results of this matriculation are obtained at the beginning of the learning period for class x (ten) with interval values equivalent to the scores of productive subjects in Vocational High Schools. The calculation of the KDK value is determined by the educational unit with the value intervals shown in Table 9.

Table 9. KDK Value Interval and Algorithm

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

4) Interview Value
The score of the interview is one of the criteria that influences the determination of majors with an interval value equal to the value of productive subjects at SMK. The calculation of the interview value is determined by the education unit with the value intervals shown in Table 10.

Table 10. Interval of Interview Values

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

5) Major Interest Value
Majors interest value is one of the criteria that influence the determination of majors. The value of this department's interest will of course be related to the values of other criteria such as interview scores.

6) Gender Value
The value of gender is one of the criteria that influences the determination of majors, where there are specializations such as the example for the Automation and Office Management majors only for Women, while the Online Business and Marketing majors can be for Men and Women.

c. Tourism Expertise

1) Mathematics and English grades from junior high school report cards
Mathematics and English grades originating from junior high school report cards or equivalent are criteria that influence the determination of majors. The calculation of math scores and English scores

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is determined by the educational unit with the value intervals shown in Table 11.

Table 11. Interval Criteria for Mathematics and English Middle School Report Cards

intervals	Weight
88-100	5
76-87	4
71-75	3
64-70	2
60-63	1
<60	0

2) Mathematics and English Scores from Matriculation Results
Mathematics and English grades derived from the matriculation results are the criteria that influence the determination of majors, where the matriculation results are obtained at the beginning of the learning period for class x (ten). The calculation of math scores and English scores is determined by the educational unit with the value intervals shown in Table 12.

Table 12. Mathematical and English score intervals for matriculation results

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

3) Value of Physical Education, Sports and Health (PJOK)
The PJOK score derived from the matriculation results is one of the criteria that influences the determination of majors, where the matriculation results are obtained at the beginning of the learning period for class x (ten) with interval values equivalent to the scores of productive subjects in SMK. The calculation of the PJOK value is determined by the educational unit with the value intervals shown in Table 13.

Table 13. PJOK Value Intervals

intervals	Weight
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

4) Interview Value
The score of the interview is one of the criteria that influences the determination of majors with an interval value equal to the value of productive subjects at SMK. The calculation of the interview value is determined by the educational unit with the value intervals shown in Table 14.

Table 14. Interval of Interview Values

intervals	Predicate
95-100	5
85-94	4
80-84	3
70-79	2
60-69	1
<60	0

5) Major Interest Value
Majors interest value is one of the criteria that influence the determination of majors. The value of this department's interest will of course be related to the values of other criteria such as interview scores.

E.4. *Scoring* Stage

At this stage a matching process is carried out between student profiles and majors which is divided into the following stages:

1. Identify the needs of the decision maker
2. Determination of the membership function of each criterion

III. RESULTS AND DISCUSSION

A. Accuracy Testing

The test results for calculating the accuracy value show that the SPK model is quite good. The test was carried out involving the BK teacher and the head of the department using 30 test data. The author tries to compare the results of accuracy testing between calculations determined by experts and decision support system applications as follows:

Table 15. Determination of Majors from Experts

Name	MTK Report Card Middle	Middle School Report Card	MTK Matriculation	Matriculation English	KDK	Algorithm	Logic	Creativity	Color blind	Department Interests	Gender	Major
Student 1	96	89	92	90	95	90	85	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 2	94	93	94	90	90	90	70	83	Not Color Blind	Multimedia	Woman	Multimedia
Student 3	81	87	89	80	90	83	70	83	Not Color Blind	Multimedia	Woman	Multimedia
Student 4	76	78	75	75	85	83	75	70	Color blind	Multimedia	Man	Software engineering
Student 5	87	83	93	85	78	83	70	82	Not Color Blind	Multimedia	Woman	Multimedia

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Name	MTK Report Card Middle	Middle School Report Card	MTK Matriculation	Matriculation English	KDK	Algorithm	Logic	Creativity	Color blind	Department Interests	Gender	Major
Student 6	82	89	83	93	91	83	76	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 7	71	68	75	75	75	75	70	70	Not Color Blind	Multimedia	Man	Multimedia
Student 8	92	89	90	82	95	90	78	70	Not Color Blind	Software engineering	Man	Software engineering
Student 9	87	89	87	78	90	83	85	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 10	90	89	92	85	78	83	78	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 11	71	73	75	75	75	75	78	70	Not Color Blind	Software engineering	Man	Software engineering
Student 12	63	71	81	75	78	83	76	70	Not Color Blind	Software engineering	Man	Software engineering
Student 13	76	77	75	75	75	75	70	70	Not Color Blind	Computer and Network Engineering	Man	Computer and Network Engineering
Student 14	83	83	90	88	93	83	76	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 15	74	78	78	75	75	75	72	70	Not Color Blind	Computer and Network Engineering	Man	Computer and Network Engineering
Student 16	73	73	75	75	85	75	70	70	Not Color Blind	Computer and Network Engineering	Man	Computer and Network Engineering
Student 17	79	80	81	75	75	75	70	70	Not Color Blind	Computer and Network Engineering	Man	Computer and Network Engineering
Student 18	65	66	77	75	75	75	70	80	Not Color Blind	Multimedia	Man	Multimedia
Student 19	64	68	89	78	75	75	76	70	Not Color Blind	Software engineering	Man	Software engineering
Student 20	84	85	90	85	88	83	70	90	Color Blind	Multimedia	man_	Multimedia
Student 21	86	86	81	83	90	83	85	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 22	80	87	90	80	93	83	70	80	Not Color Blind	Multimedia	Woman	Multimedia
Student 23	78	85	94	80	88	83	85	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 24	90	87	90	88	90	83	70	85	Not Color Blind	Multimedia	Woman	Multimedia
Student 25	80	85	90	80	90	83	70	80	Not Color Blind	Multimedia	Woman	Multimedia
Student 26	76	79	93	90	95	90	76	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 27	83	82	90	90	95	90	76	70	Not Color Blind	Software engineering	Woman	Software engineering
Student 28	83	83	90	80	93	83	70	80	Not Color Blind	Multimedia	Woman	Multimedia
Student 29	92	89	90	88	85	83	70	80	Not Color Blind	Multimedia	Woman	Multimedia
Student 30	78	87	90	95	85	83	70	76	Not Color Blind	Multimedia	Woman	Multimedia

For manual accuracy testing, it can be seen in Table 16. Experts are asked to determine the direction according to the criteria that have been presented which will then be compared with the results of the decision support system, which can be seen in Table 16.

Table 16. Accuracy Test Results with Interpolation Weighting

No	Name	Major (from Expert)	Major (from System)
1	Student 1	Software engineering	Rank 1 Software Engineering
2	Student 2	Multimedia	Multimedia Rank 1
3	Student 3	Multimedia	Multimedia Rank 5
4	Student 4	Software engineering	Multimedia Rank 117 (TKJ)
5	Student 5	Multimedia	Multimedia Rank 9
6	Student 6	Software engineering	Software Engineering Rank 6
7	Student 7	Multimedia	Multimedia Rank 119 (TKJ)
8	Student 8	Software engineering	Rank 3 Software Engineering
9	Student 9	Software engineering	Software Engineering Rank 4
10	Student 10	Software engineering	Software Engineering Rank 10
11	Student 11	Software engineering	Rank 199 Software Engineering (TKJ)
12	Student 12	Software engineering	Rank 198 Software Engineering (TKJ)
13	Student 13	Computer and Network Engineering	Computer and Network Engineering Rank 66
14	Student 14	Software engineering	Rank 8 Software Engineering
15	Student 15	Computer and Network Engineering	Computer and Network Engineering Rank 64
16	Student 16	Computer and Network Engineering	Computer and Network Engineering Rank 65
17	Student 17	Computer and Network Engineering	Computer and Network Engineering Rank 61
18	Student 18	Multimedia	Multimedia Rank 118 (TKJ)

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No	Name	Major (from Expert)	Major (from System)
19	Student 19	Software engineering	Rank 200 Software Engineering (TKJ)
20	Student 20	Multimedia	Multimedia Rank 4
21	Student 21	Software engineering	Rank 7 Software Engineering
22	Student 22	Multimedia	Multimedia Rank 6
23	Student 23	Software engineering	Rank 9 Software Engineering
24	Student 24	Multimedia	Multimedia Rank 2
25	Student 25	Multimedia	Multimedia Rank 10
26	Student 26	Software engineering	Software Engineering Rank 5
27	Student 27	Software engineering	Rank 2 Software Engineering
28	Student 28	Multimedia	Multimedia Rank 7
29	Student 29	Multimedia	Multimedia Rank 3
30	Student 30	Multimedia	Multimedia Rank 8

Based on the results of the comparison of accuracy testing in Table 16 above, it can be concluded that the manual system and the application are not much different, it's just that the application displays the calculation results in more detail down to the ranking, where the ranking will determine whether students enter the department according to the quota exist or not. With this it can be seen that the application of this decision support system has the same validity as the results of manual system determination by experts.

Table 16. displays the test results in the form of a *confusion matrix* , it can be seen that from all the test data (30 students) there were 11 people recommended to the Software Engineering major, 11 people were recommended to the Multimedia department and 8 people were recommended to the Computer and Network Engineering department.

Table 17 . Accuracy Testing *Confusion Matrix with Interpolation Weighting*

Accuracy Testing		*predicted*		
		Software engineering	Multimedia	Computer and Network Engineering
actual	Software engineering	10	1	0
	Multimedia	0	10	1
	Computer and Network Engineering	0	0	8

Table 17. Then the accuracy value can be calculated as follows:

$$Accuracy\ (\%) = \frac{(10+10+8)}{(10+1+0+0+10+1+0+0+8)} x\ 100\% = 93\%$$

From these calculations obtained an accuracy value of 93%. The accuracy value indicates that the system can provide recommendations for determining the direction correctly.

B. Comparison of Interpolation and Ordinal Weights

In making a comparison of the weighting method between interpolation weighting and ordinal weighting, the researcher performed an accuracy calculation using the ordinal weighting method with the same test data as in Table 15 and the results can be seen in Table 18.

Table 18. Accuracy Testing *Confusion Matrix* with Ordinal Weighting

Accuracy Testing		*predicted*		
		Software engineering	Multimedia	Computer and Network Engineering
actual	Software engineering	9	1	1
	Multimedia	1	7	3
	Computer and Network Engineering	2	0	6

Table 19. Then the accuracy value can be calculated as follows:

$$Accuracy\ (\%) = \frac{(9+7+6)}{(9+1+1+1+7+3+2+0+6)} x\ 100\% = 73\%$$

From these calculations obtained an accuracy value of 73%. The accuracy value indicates that the ordinal weighting is below the accuracy value calculated using interpolation weighting. To see the performance of the interpolation method, a comparison is made with the ordinal method which is the weighting of the *profile matching method* . Figure 1. presents the results of a comparison of the accuracy values of the interpolation weighting method with ordinal weighting.

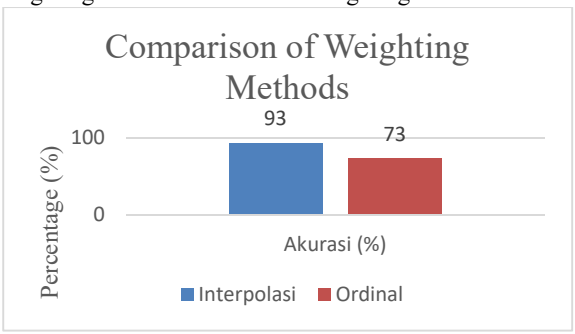

Fig 2. Comparison of Accuracy of *Profile Matching Method* with Interpolation Weighting and Ordinal Weighting

Figure 2. shows that the accuracy value of the *profile matching method* is higher when the interpolation weighting method is applied, compared to the ordinal weighting method. In interpolation weighting, the accuracy value increases compared to ordinal weighting. This can happen because in the interpolation weighting method, the resulting weight values are more accurate because they use a proportional weighting formula.

Meanwhile in ordinal weighting, the value of the weight is determined constant (fixed). Figure 3. presents an example of a comparison of weights on mathematical value parameters using the interpolated weighting method which will produce weights that are more flexible than ordinal weightings.

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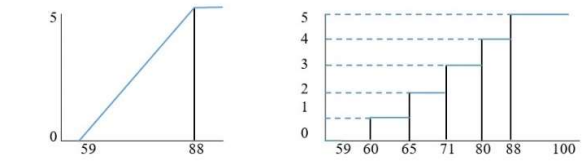

(a) Pembobotan nilai matematika Raport smp dengan metode interpolasi (b) Pembobotan nilai matematika Raport smp dengan metode ordinal

Fig 3. Comparison of determining the weighting of the criteria for the mathematics value of junior high school report cards using ordinal weighting and interpolation methods

C. User Acceptance Test (UAT)

At the testing stage with UAT, the researcher used descriptive analysis. Researchers provide or distribute questionnaires to *users* based on perceived usefulness *constructs* , perceived ease *of use constructs, and perceived user* acceptance constructs . Questionnaire-based UAT testing used a Likert scale and was given to 8 respondents from Counseling Guidance Teachers and Head of Skills Competency at SMK Wikrama Bogor as system users. The Likert scale is given a weighted value as below:

Table 18. Scale Weight

Code	Information	Weight
SS	Strongly agree	5
S	Agree	4
N	Neutral	3
TS	Don't agree	2
STS	Strongly Disagree	1

After the Likert scale is weighted, a question construct is created that will be used for the testing phase. The list of statements or questions from the questionnaire results is attached in the attachment.

1. The results of the UAT questionnaire weight in the aspect of perceived usefulness

Table 19. UAT Questionnaire Perceived Usefulness Construct

Name	Question					
	1	2	3	4	5	6
answer 1	5	5	4	4	5	5
answer 2	5	4	4	4	4	5
answer 3	4	4	4	3	4	5
answer 4	5	4	4	4	4	5
Answer 5	4	4	4	3	4	5
Respondent 6	4	4	4	3	4	5
Respondent 7	5	4	4	4	4	5
Respondent 8	4	4	4	3	4	5

2. The results of the UAT questionnaire weight in the aspect of perceived ease

Table 20. UAT questionnaire in the aspect of perceived ease

Name	Question				
	1	2	3	4	5
answer 1	5	5	4	4	5
answer 2	5	5	3	4	4
answer 3	4	5	3	3	4
answer 4	5	5	3	4	4
Answer 5	4	5	3	3	4
answer 6	4	5	3	3	4
Respondent 7	5	5	3	4	4
Respondent 8	4	5	3	3	4

3. The results of the UAT questionnaire weight in the aspect of user acceptance perception

Table 21. UAT questionnaire in the aspect of user acceptance perception

Name	Question			
	1	2	3	4
Respondent 1	5	3	5	4
Respondent 2	5	3	5	3
answer 3	5	3	5	4
answer 4	5	3	5	3
Answer 5	5	3	5	4
answer 6	5	3	5	4
Answer 7	5	3	5	3
answer 8	5	3	5	4

1. Testing Score Percentage (UAT)

For the percentage of scores the test was carried out with 8 respondents with a questionnaire referring to the UAT model. UAT testing uses a Likert scale. Likert scale values are interpreted using the intervals shown below:

Table 22. Score intervals

Score Intervals	Information
0%-19.99%	Strongly Disagree
20%-39.99%	Don't agree
40%-59.99%	Neutral
60%-79.99%	Agree
80%-100%	Strongly agree

To calculate the results of the UAT questionnaire, the following equation is used:

1. The total answer indicators are obtained by adding up each line of answer indicators
2. The actual score is obtained by multiplying the value weight by the number of answers
3. The actual total score is obtained by adding up each actual score value
4. The ideal score is obtained by multiplying the number of respondents with the highest weight
5. The ideal total score is obtained by multiplying the ideal score by the number of questions that exist.

The following is the calculation of the percentage of each determined perception aspect:

1. Percentage of Scores on Perceived *Usefulness Aspects*

Table 23. Percentage of Scores on Perceived Usefulness Aspects

Code	Weight	Questions						Total
		1	2	3	4	5	6	
SS	5	4	1	0	0	1	8	14
S	4	4	7	8	4	7	0	30
N	3	0	0	0	4	0	0	4
TS	2	0	0	0	0	0	0	0
STS	1	0	0	0	0	0	0	0
Number of Respondents		8						
Actual Score		36	33	32	28	33	40	202
Ideal Score		40	40	40	40	40	40	240

Table 23. is the result of a questionnaire study with 6 (six) questions or statements for the usability aspect submitted to the respondents, with the actual percentage score results as follows:

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$$\%\ Skor\ Aktual = \frac{Total\ Skor\ Aktual\ Kegunaan}{Total\ Skor\ Ideal} x100$$
$$\%\ Skor\ Aktual = \frac{202}{240} x100$$
$$\%\ Skor\ Aktual = 0{,}84x100$$
$$\%\ Skor\ Aktual = 84{,}17\%$$

With an actual % score of 84.17%, it can be concluded that the respondents strongly agree from the usability aspect.

2. Percentage of Scores on Perceived Ease of *Use*

Table 24. Percentage of Scores on Perceived Aspects of Ease of Use

Code	Weight	Questions					Total
		1	2	3	4	5	
SS	5	4	8	0	0	1	13
S	4	4	0	1	4	7	16
N	3	0	0	7	4	0	11
TS	2	0	0	0	0	0	0
STS	1	0	0	0	0	0	0
Jumlah Responden		8	8	8	8	8	8
Actual Score		36	40	25	28	33	168
Ideal Score		40	40	40	40	40	200

Table 24. is the result of a questionnaire research with 5 (five) questions or statements for aspects of ease of use submitted to respondents, with the actual percentage score results as follows:

$$\%\ Skor\ Aktual = \frac{Total\ Skor\ Aktual\ Kegunaan}{Total\ Skor\ Ideal} x100$$
$$\%\ Skor\ Aktual = \frac{168}{200} x100$$
$$\%\ Skor\ Aktual = 0{,}81x100$$
$$\%\ Skor\ Aktual = 81{,}00\%$$

With an actual % score of 81.00%, it can be concluded that the respondents strongly agree from the aspect of user convenience.

3. Percentage of Scores on the Aspect of User Acceptance (*Perceived User Acceptance*)

Table 25. Percentage of Scores on User Acceptance Aspects

Code	Weight	Questions				Total
		1	2	3	4	
SS	5	7	0	8	0	8
S	4	0	0	0	5	9
N	3	1	8	0	3	15
TS	2	0	0	0	0	0
STS	1	0	0	0	0	0
Number of Respondents		8				
Actual Score		38	24	40	29	131
Ideal Score		40	40	40	40	160

Table 25. is the result of a questionnaire study with 5 (five) questions or statements for aspects of user acceptance submitted to respondents, with the actual percentage score results as follows:

$$\%\ Skor\ Aktual = \frac{Total\ Skor\ Aktual\ Kegunaan}{Total\ Skor\ Ideal} x100$$
$$\%\ Skor\ Aktual = \frac{131}{160} x100$$
$$\%\ Skor\ Aktual = 0{,}82x100$$
$$\%\ Skor\ Aktual = 81{,}88\%$$

With an actual % score of 81.88%, it can be concluded that the respondents strongly agree from the aspect of user acceptance.

2. Conclusion of UAT Testing

Table 26. Test Conclusions

No	Indicator	Actual Score	Ideal Score	%Actual Score	Information
1	Perceived Usefulness	202	240	84.17 %	Strongly agree
2	Perception of Convenience	162	200	81.00 %	Strongly agree
3	Perceived User Acceptance	131	160	81.88 %	Strongly agree
Total		495	600	82.35 %	Strongly agree

Table 26. summarizes the results of UAT testing with 3 (three) aspects of testing, obtained from the percentage of model scores on the perceived usefulness aspect *of* 84.17%, the percentage of perceived ease of use aspects (perceived ease *of use*) of 81.00% and aspects of user acceptance (*User Acceptance*) of 81.88%. From the overall average test results using the UAT method of 82.35%, it is concluded that the *user* strongly agrees with the proposed system.

IV. CONCLUSION

Based on the research and discussion that has been done, it can be concluded as follows:

1. This research produces a decision support system model for determining majors using the Profile Matching Interpolation method that suits your needs.
2. Based on the results of testing the decision support system model for determining the direction, an accuracy value of 93% was obtained.
3. The decision support system model for determining the direction using the Profile Matching method with interpolation weighting has succeeded in increasing the accuracy value compared to the ordinal weighting method.

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