JMTAS: Journal of Multimedia Technology and Applied Software
Published: 14 - 11 - 2024
E-ISSN:3047-4760

THE APPLICATION OF SIMPLE ADDITIVE WEIGHTING AND PROFILE MATCHING METHODS AS A SUPPORT FOR STUDENT ADMISSIONS AT SMK MUHAMMADIYAH TASIKMALAYA

Dani Rohpandi [1st] *, Yuda Purnama Putra [2nd] *, Egi Badar Sambani [3rd] *, Syarif Muhajir [4th]

Informatics Engineering 1, STMIK Mardira Indonesia 1, INFORMATICS Engineering 2, STMIK Mardira Indonesia 2, Informatics Engineering 3, STMIK Mardira Indonesia 3,

Email: , danirtms@gmail.com 1, yudaestilo@gmail.com 2,egibadar@gmail.com 3,

Abstrack

Most of the junior high school graduates want to continue their education to vocational schools, this can be evidenced by the large number of junior high school graduates who take the entrance exam to vocational schools. The unfortunate thing is that they are not mature in choosing a major. This kind of situation has an impact on the education costs that have already been incurred, both by the parents of the students and by the government that subsidizes the school to be useless because the student does not have adequate abilities for the major he has chosen, sometimes there are students who drop out.

Based on the information obtained from the new student admission committee, the number of departments at SMK Muhammadiyah Tasikmalaya City consists of five majors, namely the department of light vehicle engineering, software engineering, network computer engineering, motorcycle engineering and marketing. The major is based on the student's choice when registering by listing their interests for major 1 and major 2. In addition, the major is determined by grades. The system to support the decision of admission and selection of majors with the Simple Additive Weighting (SAW) method and Profile Matching, is expected to help the admission committee of new students in determining majors for students. This decision support system is web-based so that it can be accessed anywhere by prospective students to register online, then the data will be processed to determine the right major for each student.

Keywords: Profile Matching, Majoring, Students, SAW

Abstrak

Sebagian besar siswa lulusan SMP berkeinginan melanjutkan pendidikannya ke SMK, hal tersebut dapat dibuktikan dengan banyaknya siswa lulusan SMP yang mengikuti ujian masuk ke SMK. Hal yang patut disayangkan adalah kurang matangnya mereka memilih jurusan. Situasi semacam ini berdampak pada biaya pendidikan yang terlanjur dikeluarkan, baik oleh orang tua siswa maupun oleh pemerintah yang mensubsidi sekolah menjadi tidak bermanfaat karena siswa tersebut tidak memiliki kemampuan yang memadai untuk jurusan yang sudah dipilihnya, terkadang ada siswa yang drop out.

Berdasarkan informasi yang diperoleh dari panitia penerimaan peserta didik baru jumlah jurusan yang ada pada SMK Muhammadiyah Kota Tasikmalaya terdiri dari lima jurusan yaitu jurusan teknik kendaraan ringan, rekayasa perangkat lunak, teknik komputer jaringan, teknik sepeda motor dam pemasaran. penjurusan didasarkan pada pilihan siswa saat melakukan pendaftaran dengan mencatumkan minat untuk jurusan 1 dan jurusan 2. selain itu penjurusan ditentukan oleh nilai.

Sistem pendukung keputusan penerimaan & pemilihan jurusan dengan metode Simple Additive Weighting (SAW) dan Profil Matching, diharapkan dapat membantu panitia penerimaan peserta didik baru dalam menentukan jurusan bagi siswa. Sistem pendukung keputusan ini berbasis web sehingga dapat diakses dimana saja oleh calon siswa untuk melakukan pendaftaran secara online, kemudian data akan diolah untuk menentukan jurusan yang tepat untuk masing-masing siswa.

Kata kunci: profile matching, penjurusan, siswa, saw

INTRODUCTION

Admitting new students and determining majors is an important process that must be done quickly and accurately. At SMK Muhammadiyah Tasikmalaya City, this process is still carried out manually, so it takes a long time and is not optimal, especially in compiling reports and making decisions. In fact, the number of applicants at this school continues to increase every year, and the right selection is needed to get students who are superior and in accordance with the needs of existing majors.

The selection process for new students not only considers academic grades, but must also pay attention to the skills and abilities of students who are in accordance with the chosen major. The use of information technology can help schools match the choice of majors with students' abilities, thereby reducing mismatches and confusion in the selection of majors.

Published: 14 - 11 - 2024
E-ISSN:3047-4760

To answer these challenges, a system is needed that can assist the committee in the selection and decision-making process. Therefore, in this journal, a Decision Support System (SPK) will be designed that applies the Simple Additive Weighting (SAW) method to rank prospective students based on predetermined criteria, as well as the Profile Matching method to determine the major that best suits students' academic abilities and skills.

According to (S. Kusumadewi, 2006) the Simple Additive Weighting (SAW) method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of the performance ratings on each alternative on all attributes. In Diana (2018), Kusrini states that Profile Matching is a mechanism in decision-making by assuming that there is an ideal standard level of predictive variables that must be met by the subject, not a minimum level that is passed or must be met.

With this system, it is hoped that the process of accepting new students at SMK Muhammadiyah Kota Tasikmalaya can be carried out more efficiently, accurately, and supporting the improvement of the quality of education at the school in accordance with the majors and abilities of the students.

METHODOLOGY

The method used in this study is a qualitative research method with a descriptive approach. The data in this study is primary data collected by the author directly through the object of research, in this case data from SMK Muhammadiyah Kota Tasikmalaya. Secondary Data, which is data obtained indirectly from the object of research, in other words the author obtains data by studying data and records related to the problem being researched such as PPDB supporting documents, PPDB report files, various literature materials related to the writing of this Thesis, literature related to the development of a website. The data collection techniques used were interviews, observations, and literature studies.

The system approach method is to use object-oriented analysis and design and system development using the Prototype method.

RESULTS AND DISCUSSION

A. Analysis of running system procedures

Analysis of the system that is running is one of the steps to determine the procedure that is being designed, because with system analysis we can find out the advantages and disadvantages of the system we have created. This analysis activity aims to gain an overall understanding of the developed system.

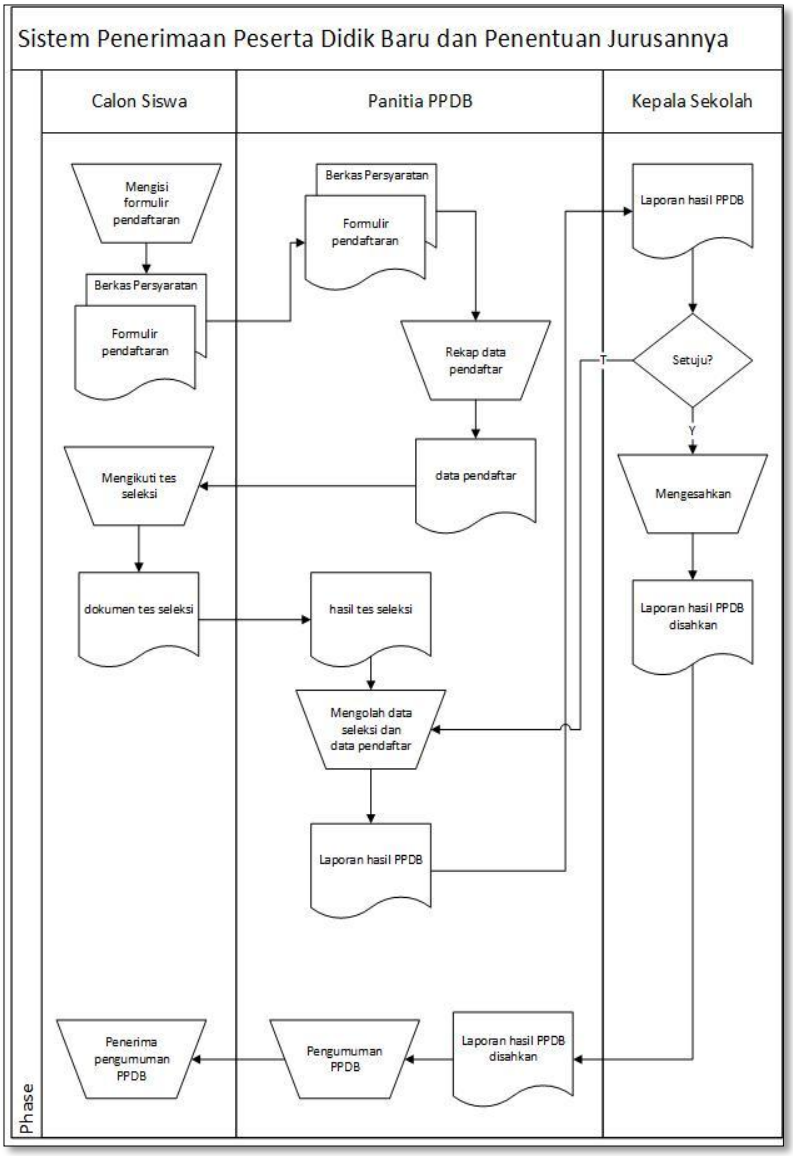
During the author's analysis of the major determination system that runs at SMK Muhammadiyah Tasikmalaya City, the author finds problems in the process. Among them, the decision-making process for determining majors still uses manual calculations by taking into account report card scores and written test results only.

The procedure for determining the current major includes:

1. Prospective students fill out the registration form by entering the choice of the first major and the second major as an alternative. Then submit the form with the requirements file to the new student admission committee (PPDB)
2. The PPDB committee summarized the data of registrants and their academic scores.
3. Prospective students conduct a selection for new student admissions
4. The PPDB committee processes the data on the results of the selection and academic scores and then determines which applicants are accepted for each major.
5. The PPDB committee makes a report on the results of new student admissions and submits it to the principal
6. The principal checked the PPDB report. If there is still something missing, it will be returned to the committee for revision. If it is appropriate, then the principal certifies the results of PPDB
7. The committee announced the results of PPDB to prospective students

B. Flowmap Running System

A flow map is a flow chart that describes the movement of processes between different work units, as well as depicting the flow of documents, physical data flows, information system entities and operational activities related to information systems.



Picture 1 Flowmap Running System

C. Evaluation of Running Systems

1. System Strength
   a. The system that is running for data processing from input documents already uses a standard worksheet management application so that the data is ready to be transferred to the database.
   b. Have reliable human resources for computer application operators.
2. System Weakness
   a. Difficulties in the new student admission committee (PPDB) will arise because the data of prospective students is processed quite a lot and the time available to process the data is limited.
   b. The process of processing data for determining majors that still uses a standard number management application/worksheet so that the data on students' final grades is not guaranteed to be fast, accurate and accurate.
   c. There has been no calculation with a specific method to make a ranking of the process of majoring prospective students.
3. Opportunity System (Opportunity)

   The development and utilization of information and computer technology provides a good opportunity for the development of existing systems into computerized systems and supports data automation in reports so that they can improve service quality. In addition, it can also improve performance even better, so that human resources in each part of the work can be optimized so that they become effective and efficient.
4. System Challenges (Threats)

   Based on the development of information technology at this time, it can motivate schools to be able to make decisions with the help of information obtained from computer-based decision support systems.

D. Simple Additive Weighting (SAW) Method Analysis

Published: 14 - 11 - 2024
E-ISSN:3047-4760

The SAW method is often also known as the weighted addition method, the basic concept is to determine the weight value for each attribute then proceed with a ranking process that will select the best alternative from a number of alternatives. In supporting the decision-making process, the Simple Additive Weighting (SAW) model is used which is built to help catalyze prospective students in the admission of new students at SMK Muhammadiyah Tasikmalaya by taking the following steps:

1. Input of the criteria values of each model
2. Weight input of each criterion
3. Calculate normalization from weights

For the process of accepting new students, there are 8 criteria that are used as a reference in decision-making, where 4 of the criteria are taken from the student's national exam scores and the other 4 are criteria taken from the selection process. These criteria include:

Table 1 Criteria data table

Code	Criteria Name	Weight
C1	Sports Test Scores	2
C2	Health Test Scores	3
C3	Interview Test Scores	4
C4	Written Test Scores	4
C5	UN Mathematics Score	5
C6	UN Science Score	3
C7	UN English Score	5
C8	UN Indonesian Value	4

From each of these weights, a variable is made which will be converted into a fuzzy number. Its fuzzy sets are very low, low, middle, many. The suitability rating of each alternative on each criterion, is rated with 1 to 5, namely:

Table 2 Match rating table

Test Scores	Compatibility Rate	Value
0-20	Very Low	1
21-40	Low	2
41-60	Enough	3
61-80	Good	4
81-100	Very Good	5

In the previous school year's admission, several data on prospective students were taken as follows:

Table 3 Prospective student data table

Prospective Students	Criterion							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	52	79	100	64	53	51	74	86
A2	79	52	88	75	91	69	66	51
A3	62	96	75	52	52	93	84	76
A4	74	59	82	95	95	63	87	58
A5	88	94	66	88	92	87	59	64
A6	71	55	59	91	54	64	55	56
A7	96	96	59	84	95	76	64	81
A8	86	53	61	99	70	52	52	90
A9	55	62	71	84	53	80	89	61
A10	92	72	72	90	51	58	97	82
A11	98	94	55	57	73	59	89	70
A12	87	86	74	72	86	77	65	76

The match rating of each alternative on each criterion can be seen in the following table.

Published: 14 - 11 - 2024
E-ISSN:3047-4760

Table 4 Match Rating Table of Each Alternative

Alternative	Criterion							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	3	4	5	4	3	3	4	5
A2	4	3	5	4	5	4	4	3
A3	4	5	4	3	3	5	5	4
A4	4	3	5	5	5	4	5	3
A5	5	5	4	5	5	5	3	4
A6	4	3	3	5	3	4	3	3
A7	5	5	3	5	5	4	4	5
A8	5	3	4	5	4	3	3	5
A9	3	4	4	5	3	4	5	4
A10	5	4	4	5	3	3	5	5
A11	5	5	3	3	4	3	5	4
A12	5	5	4	4	5	4	4	4

Based on table 4 above, the X matrix will be obtained as follows:

$$X = \begin{vmatrix} 3 & 4 & 5 & 4 & 3 & 3 & 4 & 5 \\ 4 & 3 & 5 & 4 & 5 & 4 & 4 & 3 \\ 4 & 5 & 4 & 3 & 3 & 5 & 5 & 4 \\ 4 & 3 & 5 & 5 & 5 & 4 & 5 & 3 \\ 5 & 5 & 4 & 5 & 5 & 5 & 3 & 4 \\ 4 & 3 & 3 & 5 & 3 & 4 & 3 & 3 \\ 5 & 5 & 3 & 5 & 5 & 4 & 4 & 5 \\ 5 & 3 & 4 & 5 & 4 & 3 & 3 & 5 \\ 3 & 4 & 4 & 5 & 3 & 4 & 5 & 4 \\ 5 & 4 & 4 & 5 & 3 & 3 & 5 & 5 \\ 5 & 5 & 3 & 3 & 4 & 3 & 5 & 4 \\ 5 & 5 & 4 & 4 & 5 & 4 & 4 & 4 \end{vmatrix}$$

Next, the X matrix is normalized to calculate the value of each criterion based on the following formula:

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{max_{ij}} \; Jika\ j\ adalah\ atribut\ keuntungan\ (benefit) \\ \dfrac{min_{ij}}{x_{ij}} \; Jika\ j\ adalah\ atribut\ biaya\ (cost) \end{cases}$$

In the criteria in determining the major, all criteria are criteria that are beneficial. Thus the normalization of the X matrix based on the criteria is assumed as the following assessment criteria (***example for A1***):

A1 = $r_{11} = \frac{3}{\max\,(3,4,4,4,5,4,5,5,3,5,5,5)} = \frac{3}{5} = 0.60$

$r_{12} = \frac{4}{\max\,(4,3,5,3,5,3,5,3,4,4,5,5)} = \frac{4}{5} = 0.80$

$r_{13} = \frac{5}{\max\,(5,5,4,5,4,3,3,4,4,4,3,4)} = \frac{5}{5} = 1.00$

$r_{14} = \frac{4}{\max(4,4,3,5,5,5,5,5,5,3,4)} = \frac{4}{5} = 0.80$

$r_{15} = \frac{3}{\max(3,5,3,5,5,3,5,4,3,3,4,5)} = \frac{3}{5} = 0.60$

$r_{16} = \frac{3}{\max(3,4,5,4,5,4,4,3,4,3,3,4)} = \frac{3}{5} = 0.60$

$r_{17} = \frac{4}{\max(4,4,5,5,3,3,4,3,5,5,5,4)} = \frac{4}{5} = 0.80$

$r_{18} = \frac{5}{\max(5,3,4,3,4,3,5,5,4,5,4,4)} = \frac{5}{5} = 1.00$

The above calculation is also carried out for A2, A3, A4, to A12, so that the R matrix obtained from the results of the normalization of the X matrix is obtained as follows:

$$\begin{vmatrix} 0{,}6 & 0{,}8 & 1 & 0{,}8 & 0{,}6 & 0{,}6 & 0{,}8 & 1 \\ 0{,}8 & 0{,}6 & 1 & 0{,}8 & 1 & 0{,}8 & 0{,}8 & 0{,}6 \end{vmatrix}$$

0,8	1	0,8	0,6	0,6	1	1	0,8
0,8	0,6	1	1	1	0,8	1	0,6
1	1	0,8	1	1	1	0,6	0,8
0,8	0,6	0,6	1	0,6	0,8	0,6	0,6
1	1	0,6	1	1	0,8	0,8	1
1	0,6	0,8	1	0,8	0,6	0,6	1
0,6	0,8	0,8	1	0,6	0,8	1	0,8
1	0,8	0,8	1	0,6	0,6	1	1
1	1	0,6	0,6	0,8	0,6	1	0,8
1	1	0,8	0,8	1	0,8	0,8	0,8

Where rij is the normalized value rating of the Ai alternative on the Cj attribute; i=1.2,...,m and j=1.2,...,n. Decision making gives weight to preferences taken from all criteria that have a round value of 30. Meanwhile, the weight values sorted from criteria 1 to 8 are as follows:

Value vector : **W = [2,3,4,4,5,3,5,4]**

The preference value for each alternative (Vi) is given as:

$$V_i = \sum_{j=1}^{n} w_j \cdot r_{ij}$$

A larger Vi value indicates that the Ai alternative is preferred.

Next, matrix multiplication and multiplication will be made to obtain the best alternative by ranking the largest values as follows (e.g. for A1, A2 and A3):

V_1 =	$(W_1 . R_{11})$ +	$(W_2 . R_{12})$+	$(W_3 . R_{13})$+	$(W_4 . R_{14})$+	$(W_5 . R_{15})$+	$(W_6 . R_{16})$+	$(W_7 . R_{17})$+	$(W_8 . R_{18})$
=	(2 . 0,6) +	(3 . 0,8)+	(4 . 1,0)+	(4 . 0,8)+	(5 . 0,6)+	(3 . 0,6)+	(5 . 0,8)+	(4 . 1,0)
=	1,2 +	2,4+	4,0+	3,2+	3,0+	1,8+	4,0+	4,0
=	23,6							
V_2 =	$(W_1 . R_{21})$ +	$(W_2 . R_{22})$+	$(W_3 . R_{23})$+	$(W_4 . R_{24})$+	$(W_5 . R_{25})$+	$(W_6 . R_{26})$+	$(W_7 . R_{27})$+	$(W_8 . R_{28})$
=	(2 . 0,8) +	(3 . 0,6)+	(4 . 1,00)+	(4 . 0,8)+	(5 .1,0)+	(3 . 0,8)+	(5 . 0,8)+	(4 . 0,6)
=	1,6 +	1,8+	4,0+	3,2+	5,0+	2,4+	4,0+	2,4
=	24,4							
V_3 =	$(W_1 . R_{31})$ +	$(W_2 . R_{32})$+	$(W_3 . R_{33})$+	$(W_4 . R_{34})$+	$(W_5 . R_{35})$+	$(W_6 . R_{36})$+	$(W_7 . R_{37})$+	$(W_8 . R_{38})$
=	(2 . 0,8) +	(3 . 1,0)+	(4 . 0,8)+	(4 . 0,6)+	(5 .0,6)+	(3 . 1,0)+	(5 . 1,0)+	(4 . 0,8)
=	1,6 +	3,0+	3,2+	2,4+	3,0+	3,0+	5,0+	3,2
=	24,4							

Do the same calculation for A4 to A12.

Table 5 Table of results of the calculation of the preference value of each alternative

Alternative	Criterion								V
	C1	C2	C3	C4	C5	C6	C7	C8	
A7	3	4	5	4	3	3	4	5	26,8
A5	4	3	5	4	5	4	4	3	26,4
A4	4	5	4	3	3	5	5	4	26,2
A12	4	3	5	5	5	4	5	3	26,0
A10	5	5	4	5	5	5	3	4	25,4
A9	4	3	3	5	3	4	3	3	24,4
A2	5	5	3	5	5	4	4	5	24,4
A3	5	3	4	5	4	3	3	5	24,4
A8	3	4	4	5	3	4	5	4	23,8
A11	5	4	4	5	3	3	5	5	23,8
A1	5	5	3	3	4	3	5	4	23,6

A6	5	5	4	4	5	4	4	4	20,6

Based on the calculation of the SAW and the results are sorted according to the value of the largest V to the smallest, data is obtained as in table 5. If the school limits the admission of new students to a certain capacity, such as 10 students will be accepted. Then the committee can take 10 people from table 5 above, so that A1 and A6 are declared unaccepted.

E. Profile Matching Method *Analysis*

SMK Muhammadiyah Tasikmalaya has 5 expertise competencies, for the implementation of this SPK 2 departments are used as case studies. The Ideal Profile values of the 2 majors can be seen in the following table.

Table 6 Table of Ideal Profile Value Criteria

Code	Department	Criterion							
		C1	C2	C3	C4	C5	C6	C7	C8
P1	Software Engineering	2	3	4	3	4	3	5	3
P2	Network Computer Engineering	3	3	3	3	5	2	4	3

Then the data from the SAW ranking results is used as input on this *Profile Matching* method . Student data is as shown in the table below.

Table 7 Student Data Table

Alternative	Criterion							
	C1	C2	C3	C4	C5	C6	C7	C8
A7	3	4	5	4	3	3	4	5
A5	4	3	5	4	5	4	4	3
A4	4	5	4	3	3	5	5	4
A12	4	3	5	5	5	4	5	3
A10	5	5	4	5	5	5	3	4
A9	4	3	3	5	3	4	3	3
A2	5	5	3	5	5	4	4	5
A3	5	3	4	5	4	3	3	5
A8	3	4	4	5	3	4	5	4
A11	5	4	4	5	3	3	5	5

Then a GAP mapping was made for each student with the ideal profile of each major. For the choice of P1 and P2 majors, the gab map is obtained as follows.

Table 8 Table Gap Mapping

Alternative	Criterion							
	C1	C2	C3	C4	C5	C6	C7	C8
A7	3	4	5	4	3	3	4	5
A5	4	3	5	4	5	4	4	3
A4	4	5	4	3	3	5	5	4
A12	4	3	5	5	5	4	5	3
A10	5	5	4	5	5	5	3	4
A9	4	3	3	5	3	4	3	3
A2	5	5	3	5	5	4	4	5
A3	5	3	4	5	4	3	3	5
A8	3	4	4	5	3	4	5	4
A11	5	4	4	5	3	3	5	5
P1	**2**	**3**	**4**	**3**	**4**	**3**	**5**	**3**
A7	-1	-1	-1	-1	1	0	1	-2
A5	-2	0	-1	-1	-1	-1	1	0
A4	-2	-2	0	0	1	-2	0	-1
A12	-2	0	-1	-2	-1	-1	0	0
A10	-3	-2	0	-2	-1	-2	2	-1
A9	-2	0	1	-2	1	-1	2	0
A2	-3	-2	1	-2	-1	-1	1	-2
A3	-3	0	0	-2	0	0	2	-2

A8	-1	-1	0	-2	1	-1	0	-1
A11	-3	-1	0	-2	1	0	0	-2
P2	**3**	**3**	**3**	**3**	**5**	**2**	**4**	**3**
A7	-1	-1	-2	-1	2	-1	0	-2
A5	-2	0	-2	-1	0	-2	0	0
A4	-2	-2	-1	0	2	-3	-1	-1
A12	-2	0	-2	-2	0	-2	-1	0
A10	-3	-2	-1	-2	0	-3	1	-1
A9	-2	0	0	-2	2	-2	1	0
A2	-3	-2	0	-2	0	-2	0	-2
A3	-3	0	-1	-2	1	-1	1	-2
A8	-1	-1	-1	-2	2	-2	-1	-1
A11	-3	-1	-1	-2	2	-1	-1	-2

Then from the gap, weights are given to each criterion according to table 2.1, so that a weight table is obtained as below.

Table 9 Table Weight Mapping for P1

Alternative	**Major's Choice P1**							
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**
A7	4	4	4	4	4,5	5	4,5	3
A5	3	5	4	4	4	4	4,5	5
A4	3	3	5	5	4,5	3	5	4
A12	3	5	4	3	4	4	5	5
A10	2	3	5	3	4	3	3,5	4
A9	3	5	4,5	3	4,5	4	3,5	5
A2	2	3	4,5	3	4	4	4,5	3
A3	2	5	5	3	5	5	3,5	3
A8	4	4	5	3	4,5	4	5	4
A11	2	4	5	3	4,5	5	5	3

Table 10 Table Weight Mapping for P2

Alternative	**Adult Choice P2**							
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**
A7	5	4	3	4	3,5	4	5	3
A5	4	5	3	4	5	3	5	5
A4	4	3	4	5	3,5	2	4	4
A12	4	5	3	3	5	3	4	5
A10	3	3	4	3	5	2	4,5	4
A9	4	5	5	3	3,5	3	4,5	5
A2	3	3	5	3	5	3	5	3
A3	3	5	4	3	4,5	4	4,5	3
A8	5	4	4	3	3,5	3	4	4
A11	3	4	4	3	3,5	4	4	3

The next step is to calculate the total *core factor* by calculating the average of the weight of the GAP value of the core factor and comparing it with the *secondary factor* with a ratio of 80% for *the core factor* and 20% for *the secondary factor*. The criteria that become *the core factors* in P1 and P2 are C3, C4, C5 and C7, while the rest of the criteria are included as *secondary factors*.

Table 11 NCF & NSF Values For P1 and P2

Alternative	**P1**			**P2**		
	NCF	**NSF**	**VALUE**	**NCF**	**NSF**	**VALUE**
A7	4,25	4,00	4,20	3,88	4,00	3,90

A5	4,13	4,25	4,15	4,25	4,25	4,25
A4	4,88	3,25	4,55	4,13	3,25	3,95
A12	4,00	4,25	4,05	3,75	4,25	3,85
A10	3,88	3,00	3,70	4,13	3,00	3,90
A9	3,88	4,25	3,95	4,00	4,25	4,05
A2	4,00	3,00	3,80	4,50	3,00	4,20
A3	4,13	3,75	4,05	4,00	3,75	3,95
A8	4,38	4,00	4,30	3,63	4,00	3,70
A11	4,38	3,50	4,20	3,63	3,50	3,60

The last step is to make a recommendation by comparing the final grades of each major and the results of the recommendations are taken from the highest scores.

Table 12 Recommendations for Choosing a Course

Alternative	P1 Value	P2 Value	Recommendations
A7	4,20	3,90	P1
A5	4,15	4,25	P2
A4	4,55	3,95	P1
A12	4,05	3,85	P1
A10	3,70	3,90	P2
A9	3,95	4,05	P2
A2	3,80	4,20	P2
A3	4,05	3,95	P1
A8	4,30	3,70	P1
A11	4,20	3,60	P1

F. Proposed System Design

Design is a part of the development methodology of a software development that is carried out after the stages to provide a detailed overview. Based on the description above, system design is a stage of the system development cycle that has been defined and preparation for the implementation design that describes how a system is formed, which can be in the form of drawing, designing, and sketching or setting several separate elements into a complete and functional unit, as well as the configuration of the hardware and software components of a system.

The system design stage has two main objectives, namely:

1. To meet the needs of the proposed system
2. To give programmers a clear picture and complete build plan.

This decision support system can be described as a system that provides facilities to assist the school in assessing and determining the major in accordance with the academic grades and test results of each PPDB applicant. The existence of this decision support system can make it easier for the school to get recommendations for determining majors in accordance with the criteria determined by the school for each prospective student.

The system design aims to provide a clear picture and design that suits the needs of the user or the user of the system itself. The objectives of the design are:

1. It can make it easier and faster in the assessment process for each prospective student.
2. It can simplify the process of determining majors based on academic assessments and selection test results.
3. It can facilitate the reporting process of determining majors and accepting new students every period.

G. UseCase Diagram

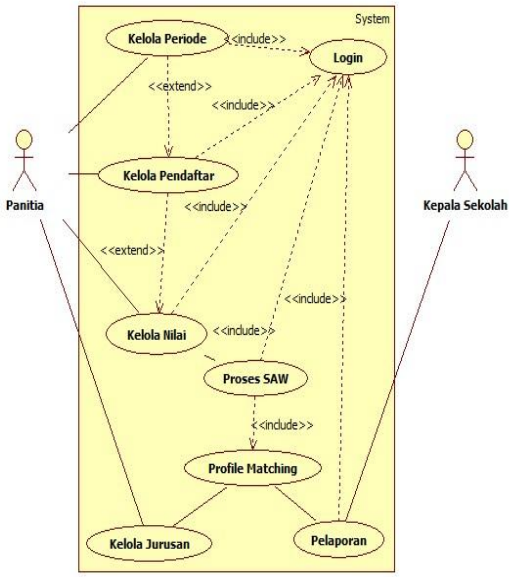


Figure 2 Usecase diagram

H. Main Menu Structure Planning

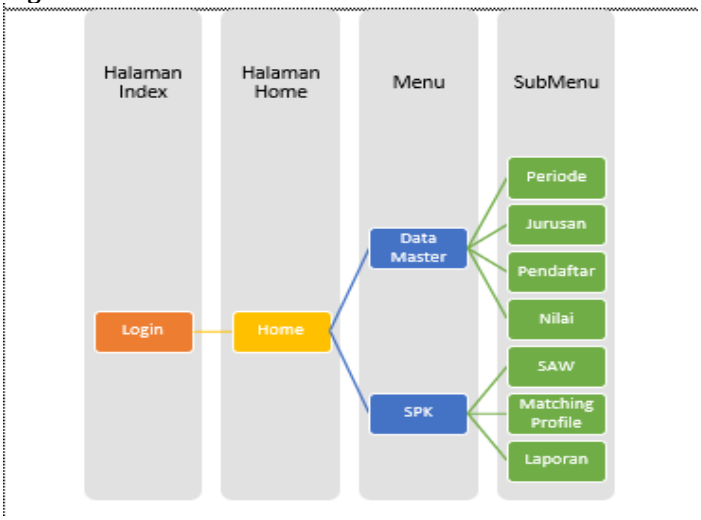


Figure 3 Main Menu Structure

1. Login Planning

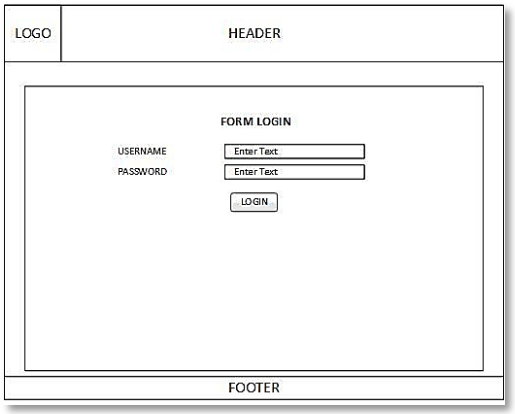


Figure 4 Login Planning

2. Home Planning

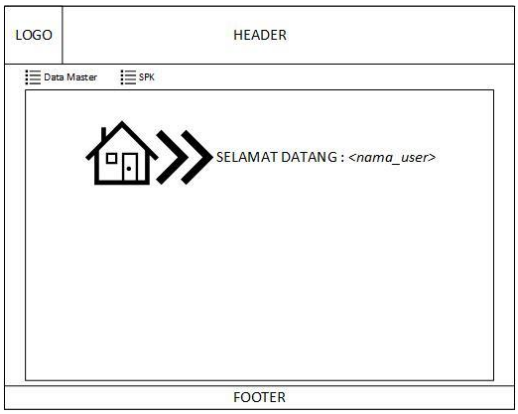


Figure 5 Home Planning

3. Input Planning

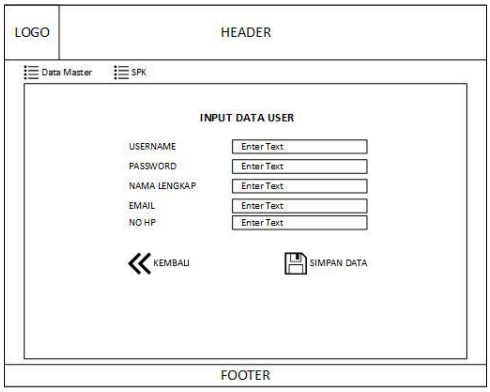


Figure 6 Input Planning

4. Planning of the Department's Data Input

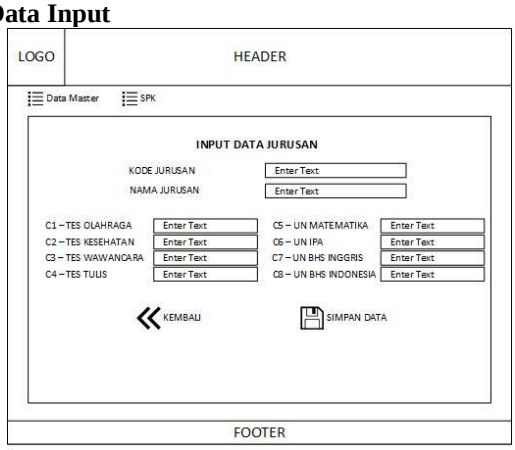


Figure 7 Planning of the Department's data input

5. Registrant page design

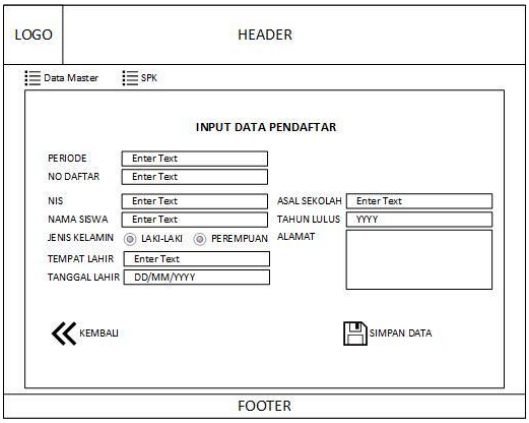


Figure 8 Registrant page design

6. Value data design

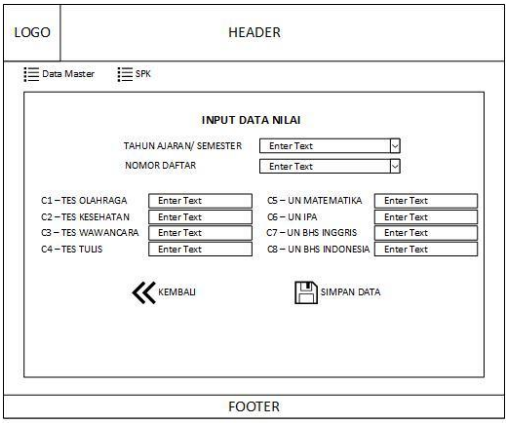


Figure 9 Value data design

7. SPK Process Planning

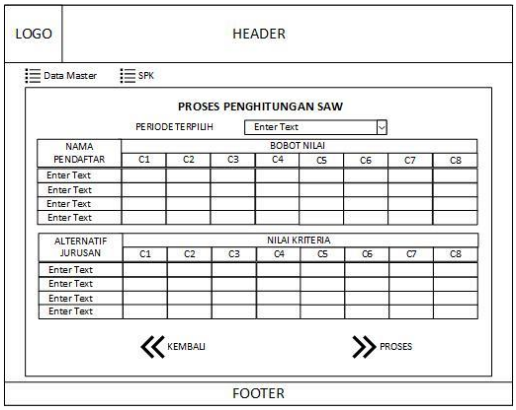


Figure 10 SPK Process Planning

8. Output volatility

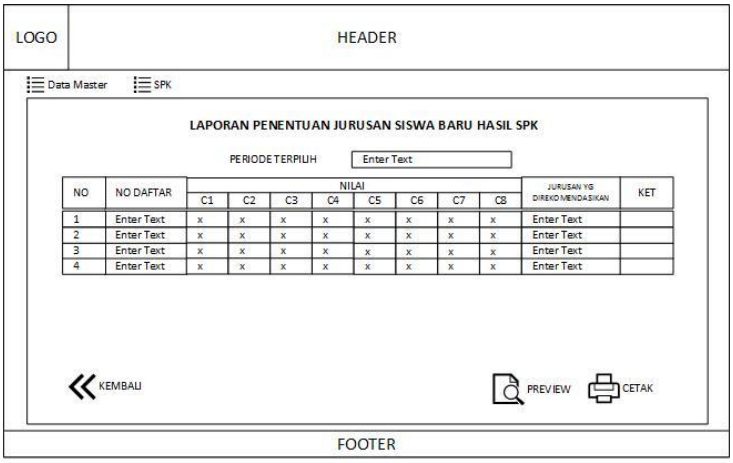


Figure 11 Output planning

CONCLUSIONS AND SUGGESTIONS

Based on the implementation and explanation that has been stated previously by the author, it can be concluded that the support system for the decision to determine the major is as follows:

1. The existence of a decision support system (SPK) can help the new student admission committee (PPDB) manage a large amount of prospective student data and help in determining suitable majors according to the academic abilities of prospective students.
2. With the existence of a decision support system (SPK) that can process data on the determination of majors so that the announcement of PPDB results is guaranteed to be fast, precise and accurate.
3. By applying the Simple Additive Weighting (SAW) and Profile Matching methods to the decision support system, an alternative ranking of suitable majors in the process of majoring prospective students is obtained.

Some suggestions considered in utilizing the decision support system for determining majors made by the author are:

Published: 14 - 11 - 2024
E-ISSN:3047-4760

1. For application development, it is recommended to add user facilities for each prospective student so that they can see information openly.
2. For application development, it is recommended to improve the security of user data so that it is not easily hacked by irresponsible parties

BIBLIOGRAPHY

[A. Kadir, *Introduction to Information Systems*. Yogyakarta: ANDI, 2008.

A. Kristanto, *Information System Design and its application*. Yogyakarta: Gava Media, 2008.

B. W. Sari, "Comparison of Profile Matching and Simple Additive Weighting Methods in the Determination of Majors of Class X Students of SMA N 2 Ngaglik," *Data Management and Technology. Inf.*, vol. 16, no. 1, p. 16, 2015.

D. Pambudi and S. ASTUTI, "DECISION SUPPORT SYSTEM FOR NEW STUDENT ADMISSIONS AT SMA NEGERI 2 PEMALANG WITH SIMPLE ADDITIVE WEIGHTING METHOD," Dian Nuswantoro University, 2013.

F. Indriyani, "THE APPLICATION OF THE PROFILE MATCHING METHOD AS A SUPPORT FOR THE DECISION TO CHOOSE A MAJOR AT SMK AL HIDAYAH," *J. Ris. Inform.*, vol. 1, no. 2, pp. 91–96, 2019.

G. L. Tobing, "A Decision Support System for Choosing Majors at Barita Vocational High School (SMK) Using the Simple Additive Weighting (Saw) Method," *Inf. and Technology. Ilm.*, vol. 4, no. 4, pp. 112–117, 2014.

J. Fajar, *Algorithms and Programming*. Jakarta: salemba infotek, 2007.

Kusrini, *Concept and Application of Decision Support System*. Yogyakarta, 2007.

L. Hakim, *building a PHP-based web with the CodeIgniter framework.* Yogyakarta: Lokomedia, 2010.

N. Hermanto, "Decision Support System Using the Simple Additive Weighting (SAW) Method to Determine Majors at Smk Bakti Purwokerto," in *National Seminar on Applied Information & Communication Technology 2012 (Semantics 2012)*, 2012, vol. 2012, no. Semantics, pp. 52–62.

O. Oktafianto and I. Aulia, "Decision Support System for New Student Admissions of Smk Ma'arif 01 Kalirejo Lam-teng Using the Saw (Simple Additive Weighting) Method," *J. TAM (Technology Accept. Type.*, vol. 2, pp. 33–38, 2017.

R. Munir, *Algorithms and Programming in Pascal, C, and C++ Sixth Edition*, 6th ed. Bandung: Informatika, 2016.

Riyanto, *Development of Desktop and WEB-Based Geographic Information System Applications*. Yogyakarta: Gava Media, 2010.

S. Kusumadewi, *Fuzzy Multi-attribute Decision Making*. Yogyakarta: Graha Ilmu, 2006.

Saputra, A. & Handoko, L. **(**2019). *Application of the Profile Matching Method to Determine the Majors of New Students Based on the Web.* Journal of Computer Technology and Systems, 7(1), 45-51.