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DEVELOPMENT OF DECISION SUPPORT SYSTEM APPLICATION FOR ADMISSION OF NEW STUDENTS AND DETERMINATION OF MAJOR USING SIMPLE ADDITIVE WEIGHTING (SAW)

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Abstract

The process of accepting new students at Taman-Siswa of Senior High School has so been manual namely, prospective students register with a writer on the registration form. So recapitulated by new student committee into the computer. In the process of recapitulating only Microsoft Office was for managing and haven't used an information system so need a long time and was found less effective. A Decision Support System (SPK) is an interactive information system interactive that provides information, modelling and data manipulation. This system is used to assist decision-making in semi-structured and unstructured situations. The SAW method is often also known as the weighted sum method. The basic concept of the SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes. The Decision Support System uses the SAW (Simple Additive Weighting) method. used to provide recommendations to students to choose majors. The result of the system calculation is the ranking of the scores for Mathematics Report Cards, Indonesian Language Report Scores, English Report Scores, Science Report Scores, IPS Report Scores, Science Interests, Social Science Interests, Science Parents' Advice, IPS Parents' Advice wished for next developing in information system It has interactive facilities based on Android which can be installed on the smartphones of all concerned users. Information system websites for acceptance and determination of majors would be better if facilitated by an SMS Gateway to remind online test schedules.

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INTRODUCTION

Admission of new students is one of the processes that exist in public and private schools that is useful for screening prospective students who are selected according to the criteria determined by the school. In general, the process of accepting new students is carried out through the stages of registration, file selection, and announcement of student admissions. The stages of the new student admission process are also carried out by Taman Siswa Of senior high school. Taman Siswa of Senior High school that's one of the agencies engaged in education requires appropriate data sources and data processors to create efficiency and data accuracy that can support the operation processes, management, and good decision-making processes. Every

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year the Taman Siswa accepts 250 new students with good data system processing make good information so that it can support all of the activity with certain institutions. A decision support system (DSS) is an interactive information system that provides information, modelling, and manipulates data. The system is used to assist decision-making in semi-structured and unstructured situations, where no one knows for sure how decisions should be made. The process of accepting new students at SMA Taman Siswa so far has been used manually, that is, prospective students in the registration process enter data by writing on the registration form after the data is written on the registration form, then the PSB committee recaps it into the computer. In this data recap process, the committee only uses Microsoft Office in processing data and has not used an information system. In determining the majors, it is still manual based on other values and criteria, so it takes too long. Based on the description above, there is a need for an application for a new student admissions decision support system to facilitate the school in the selection process for new student admissions, so that prospective new students have been selected as students.

Related research

Based on research that's ever done about supporting system decisions using the SAW method. Research conducted by

1. Febry San Pratama and Wiyli Yustanti with the title "Decision Support System for Admission of New Students Using the Saw Method (Case Study: SMK Ipiems Surabaya" which explains that all students who have graduated from junior high school, of course, want to continue to a higher level, namely SMA/K. SMP graduates who continue to the SMA/K level are not directly proportional to the quota of seats available at the targeted SMA/K. Based on the results of registration data at SMK IPIEMS Surabaya, enthusiasts in 2010 reached 700 registrants, while the quota at SMK IPIEMS Surabaya at that time was only 560 students. It is a shame if there are potential applicants who have to be excluded, just because they are not included in the quota. The decision support system for new admissions uses the Simple Additive Weighting method, this can make it easier to select registrant students who are indeed competent to meet the quota at SMK IPIEMS Surabaya so that truly competent student will be selected[1].

2. Achmad Syafi Zain and Rita Purniawati with the title "New Student Admission Decision Support System With Simple Additive Weighting Method "that's explained admission the new studentship once of the process which is in the institution of education for screening prospective students are selected according to the specified criteria. In general, the process of new student admissions is carried out through the stages of registration, file selection and student acceptance. This decision support system is designed with a ranking method.

Using Simple Additive Weighting (SAW) normalization using Interpolation and scale. This method was chosen because it can select the best alternative from several alternatives, in this case, the intended alternative is those who pass the selection of new students based on the specified criteria. The research was conducted by finding the weight value for each attribute, then a candidate ranking process was carried out which would determine the alternative optimal, namely prospective students who pass the selection. The new student admissions decision support system is the final result of this writing, this system can assist the school in making decisions about new student admissions appropriately and accurately following the criteria desired by the school.

3. Angelina Puput Giovani, Tuti Haryanti and Laela Kurniawati with the title "Decision Support System for Admission of New Students with the simple Additive weighting (SAW) Method at Al-Azhar Islamic Middle School 6 Jakapermain Bekasi which explains that the increase in the number of students registering in a school makes the school need to holding students selection based on criteria determined by the school, students admissions systems that are still manual, errors often both in data input and decision making, which become a problem in student admission. This problem is needed that can be used in the process of calculating criterion values and then applied to the decision support system to make it easier to process data. The purpose of this study is to assist in the process of selecting new students at Al-Azhar Islamic Junior

School 6 Jakapermai which is currently still manual using the Simple Additive method[2].

Weighting with the criteria and the weight of the criteria that have been determined later implemented on the system using Visual Basic .Net and SQL Server 2008. The criteria for new student admissions are Indonesian language grades, mathematics, English, and natural science. The SAW method begins by giving a number in every criterion, weighting, normalization and ranking from highest to lowest value. A ranking that's can determine students who accepted and unaccepted. The application of a computerized system can make it easier to determine new student admissions according to the criteria, reduce human errors and data security more secure because it is saved into optimal, namely prospective students who pass the selection. The new student admissions decision support system is the final result of this writing, this system can assist the school in making decisions about new student admissions appropriately and accurately by the criteria desired by the school database. Where this system will be used by administrative staff in data processing and presentation[3].

4. Aderiani Wahyuti, Heru Sutejo entitled "Sistem Pendukung Keputusan Penerimaan Siswa Baru SMK Negeri 1 Jayapura Menggunakan Metode Simple Additive Weighting (SAW)" who explained that they had difficulty in calculating the assessment of candidates who chose the majors according to their wishes because the number of applicants was increasing every year. To deal with these problems, an application for a new student admissions decision support system was made using the SAW method. The assessment criteria indicators include; Completeness of the file (C1), majoring expertise (C2), English value (C3), Indonesian language value (C4), math score (C5), interview test score (C6), medical test (C7). The new student admissions committee can use this application by entering weight data, criteria data, and assessments then processing using the SAW method. The output of this system is a report of prospective students who are accepted into SMK N 1 Jayapura based on the majors that have been selected with the highest to lowest scores of all prospective students as an alternative to giving easiness for the selection committee in evaluating each prospective student. This application can be implemented to assist the committee in making decisions[4].

METHOD

The research method used in this study is the Structured Systems Analysis and design (SSAD)methodology. This methodology has several important steps that must be carried out at Taman Siswa Bandar Lampung High School. The stages that will be used include the following:

1. System Policy and Planning Following the policy and system planning set by the Taman Siswa school, the proposed admission and selection system is expected to achieve the goal of seizing opportunities that the old system couldn't achieve and the old system had weaknesses that needed to be fixed so that it can improve the quality of the academic system, especially in terms of acceptance and determination of student majors

2. System Analysis

At this stage, an analysis of the system running at the Taman Siswa school is carried out to identify existing problems so that system development can be proposed.

3. System Design and Design

The proposed system design is displayed in the form of context diagrams and data flow diagrams.

4. The system selection

the stage is the stage for selecting hardware and software for the information system. This task requires sufficient knowledge for those who carry it out to meet the design needs that have been carried out.

5. System Implementation

This stage is done by changing the design form that has been made at the design stage into one which is applied to the form of a coding program to form software (application). In this stage, the coding implementation is written using PHP and MYSQL as data storage databases

RESULTS AND ANALYSIS

Based on Reza et al, a system has to support and analyze the data and information in an institution for any solution

everywhere[5]. so that there are no more citizens who have difficulty getting reference information materials that must be digital[6].

Agreed with Husnita et al, Information is needed for everyone, whether it is knowledge, opinion or even decision. Information is a form that is closely related to data. So that it can be interpreted that information is data that is processed to produce something that benefits everyone. Data[7][8].

It is also supported by Saputra et al, An expert system is a computer application that is intended to assist decision making or solving problems in a specific field. This system was created to be being able to assist in making decisions in admitting new students for new majoring by calculating the results of the questionnaire survey that was distributed[9].

4.1 Simple Additive Weighting

The following are the results of calculations using the SAW method applied in the system. C1 for Maths report cards, C2 for Indonesian report cards, C3 for English report cards, C4 for Science report cards, C5 for Social Studies report cards, C6 for Science Interests, C7 for Social Studies Interests, C8 Parents' suggestions for Science, C9 for IPS parent advice. The criteria are listed in table 1 below:

Table 1. Criteria Table

Criteria		IPA	IPS
C1	Math Report Score	SB	K
C2	Indonesian Report Score	B	B
C3	English Report Score	B	B
C4	Natural Science Report Score	SB	C
C5	Social Science Report Score	C	SB
C6	Natural Science Interest	SB	K
C7	Social Scient Interest	K	SB
C8	Natural Science Parents' Advice	B	K
C9	Social Science Parents Advice	K	B

Table 2. Table of Weight Values

Criteria	IPA	IPS
C1	1.0	1.0
C2	0.8	0.8
C3	0.8	0.8
C4	1.0	0.6
C5	0.6	1.0
C6	1.0	0.4
C7	0.4	1.0
C8	0.8	0.4
C9	0.4	0.8

Table 3. Table of Weights Abbreviations

Weight	Abbreviation	Information
1	SB	Very good
0.8	B	Good
0.6	C	Enough
0.4	K	Not Enough
0.2	SK	Verry Less

Table 4. Value Category Table

Table 4 Value Category	Classification
91-100	SB
81-90	B
71-80	C
61-70	K
50-60	SK

Table 5. Table of Interest Categories

Interest Category	
Interest Level	**Information**
SM	Very Interest
M	Interest
C	Enough
KM	Less Interest
TM	Not Interested

Table 6. Table Category Suggestions

Category Suggestions	
Classification	**Information**
SM	Very Recommend
M	Recommend
C	Enough
KM	Less Recommend
TM	Not Recommend

Table 7. Alternative Table 1

Alt	C1	C2	C3	C4	C5	C6	C7	C8	C9
A1	70	65	81	80	70	SM	KM	SM	TM
A2	70	79	75	73	70	M	TM	KM	C
A3	75	60	72	70	73	C	KM	M	TM
A4	81	70	70	70	85	TM	M	C	KM

A5	75	76	75	81	75	TM	SM	TM	M

Table 8. Alternative Table 2

Alt	C1	C2	C3	C4	C5	C6	C7	C8	C9
A1	2	2	4	3	2	5	2	5	1
A2	2	3	3	3	2	4	1	2	3
A3	3	1	3	2	3	3	2	4	1
A4	4	2	2	2	4	1	4	3	2
A5	3	3	3	4	3	1	5	1	4

Table 9. Normalization Table

Alt	C1	C2	C3	C4	C5	C6	C7	C8	C9
A1	0.5	0.66	1	0.75	0.5	1	0.4	1	0.25
A2	0.5	1	0.75	0.75	0.5	0.8	0.2	0.4	0.75
A3	0.75	0.33	0.75	0.5	0.75	0.6	0.4	0.8	0.25
A4	1	0.66	0.5	0.5	1	0.2	0.8	0.6	0.5
A5	0.75	1	0.75	1	0.75	0.2	1	0.2	1

The following is a proposed system model that is designed to overcome the problems that exist in the admission system and the determination of majors for SMA Taman Siswa Bandar Lampung students[10]. The proposed system flow is displayed in the form of context diagrams and data flow diagrams.

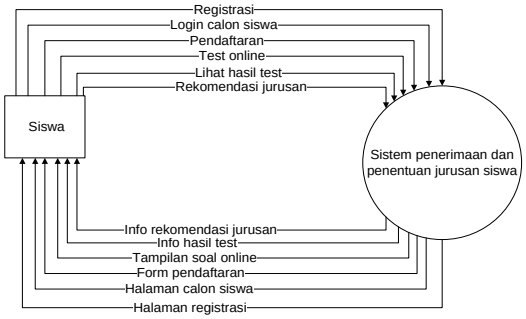

Figure 1. Context Diagram

Figure 1 shows the context diagram of the system, and the system design describes the overall data flow.

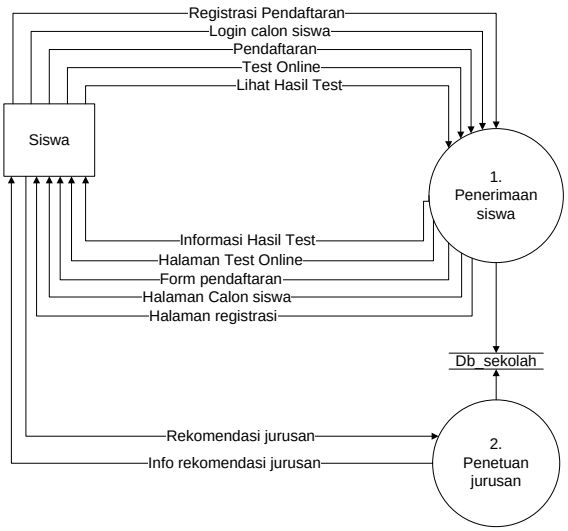

Figure 2. DFD Level 0 system

Figure 2 shows a data flow diagram of the system, where the proposed system design consists of two sub-systems, namely the reception sub-system and the department-determination sub-system and 2 external entities associated with the system[11].

5. Implementation Results

The results of the implementation of the design of the student admissions information system and the determination of the majors in SMA Taman Siswa Bandar Lampung are as follows:

1. Index / Main Page

The picture below is the main page on the design of the student admissions information system and the determination of majors in SMA Taman Siswa Bandar Lampung. The display index / main page can be seen in Figure 3

Figure 3. Main Page

2. Home Administration

The main page of Administration. Home Administration can be seen in Figure 4

Figure 4. Home Administration

3. Student page

Student main page. Student pages can be seen in Figure 5

Figure 5. Student Pages

4. Manage student data

The student data management page can be seen in Figure 6

Figure 6. Manage student data

5. Manage teacher data

The teacher data management page can be seen in Figure 7

Figure 7. Manage Teacher Data

6. Manage registration data

Displays registration data managed by the Administration. The registration data management page can be seen in Figure 8

Figure 8. Manage Registration Data

7. Manage data Kriteria

Displays the criteria data managed by the Administration. The criteria data management page can be seen in Figure 9

Figure 9. Manage Data Criteria

8. Manage Question data

Displays question data managed by the Administration. The attribute data management page can be seen in Figure 10.

Figure 10. Manage Question Data

9. Manage Majoring data

Displays major data managed by the Administration[12]. The major's data management page can be seen in Figure 11.

Figure 11. Manage Data Majoring

CONCLUSION

Based on the background and discussion in the previous chapters, it can be concluded that

1. With the school website, the system to be built is only intended for the process of accepting new students and determination of majors by using the Decision Support System SAW method.
2. Decision Support System with SAW (Simple Additive Weighting) method. used to provide recommendations to students to choose majors.
3. The result from the system calculation is ranking from the Scores of the Math Report, Secore of the English Report, Score of Nature Science, Score of Social Science, Nature Science Interests, Social Science Interests, Social Science Parents' Advice, and Social Science Parent's Suggestions.

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