International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Decision Support Systems for Determine Exchange of Students Using Simple Additional Weight (Saw) Method

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Abstract: ***Student exchange is a program with a selection and assessment process. this results in doubts in the decision making that allows a decision error. The selected participant is sometimes far from what was expected because the participant did not have proper criteria. So the research objective is to design and build a decision support system with the Simple Additive Weight (SAW) method and the determination of the weights of each criterion including, English Language Discussion 4%, Ranking 2%, Achievement Value 2%, Non Academic Achievement 3%, Personality Value 4% With the establishment of these criteria to assist in determining student exchange participants. The results of the study in the form of a student exchange decision support system, with this system can help principals in providing alternative decisions in choosing student exchange participants equipped with grades by referring to predetermined decision-making.***

Keywords: Decision Support System, Student Exchange, Simple Additive Weight (SAW)

1. Introduction

The development of Decision Support System (DSS) or Decision Support System (DSS) was first disclosed in the early 1970s by Michael S. Scott Morton with the term Management Decision System, the system is a computer-based system intended to help make decisions with utilize data from certain models to solve various problems that are not structured. Decision Support System is part of a computer-based information system that addresses this problem. One method used in decision support systems is the SAW (Simple Additive Weigth) method. School is an educational institution that is specifically designed to educate students or students in the supervision of teachers or teachers. one of the student exchange programs abroad for outstanding students every year. Students must meet several criteria, assessment criteria both academically and non-academically. in the selection and evaluation of participants at this time is still not effective, this results in doubts in making decisions that allow for decision errors.

In this study it can be expected to be the best solution for determining student exchange.

2. Literature Review

2.1 Decision Support System

Decision support system is a collection of data and information processing procedures oriented to the use of models to produce various answers that can help management in decision making (Maryam alavi and H. Albert Napier in Suryadi and Ramdhani, 2000)

Decision support system is an interactive system, helping decision making through the use and models of decisions to solve problems that are semi-structured and unstructured. Unstructured problems (unstructured problems) are problems that do not have elements or relationships between elements that are understood by people who solve problems. While the semistructured problem is a problem that occurs over several elements or relationships that are understood by the problem solver and some that are not understood (Mann and Watson in the book Suryadi and Ramdhani, 2000)

Decision support system is a decision making process assisted by using computers to help decision makers by using certain data and models to solve some unstructured problems. The existence of SPK in companies or organizations is not to replace the tasks of decision makers, but is a tool that helps them in making decisions. by using the data that is processed into information to make decisions from semi-structured problems. in the implementation of the SPK, the results of the decisions of the system are not the benchmark, decision making remains with the decision maker. the system only produces outputs that calculate data as a decision maker considers. so that the work of decision makers in considering decisions can be simplified (Wibowo, 2011).

2.2 Simple Additive Weigth (SAW)

SAW method is often also known as the weighted sum method. The basic concept of the SAW method is to find a weighted sum of the performance ratings on all attributes. The SAW method requires the decision matrix normalization process (X) to a scale that can be compared with all existing alternative ratings. (Kusumadewi, 2006).

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3. Research Methodology

The methodology used in this research is software development model Waterfall. According to Pressman[3], the waterfall model is a classic model that is systematic and sequential in building the software. The stages of the Waterfall method can be seen in figure bellow:

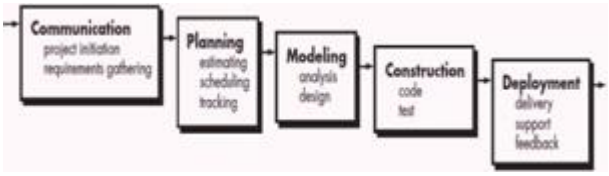

Figure 1: Waterfall Methodology Stages

The Waterfall method consists of five stages. The following is an explanation of each step in the Waterfall method:

1) Communication
At this stage an analysis of software requirements and data collection is carried out by conducting meetings with customers and collecting data through library research.

2) Planning
At this stage the user requirement document will be produced or can be said as data relating to the user's desire in making software, including plans to be carried out.

3) Modeling
At this stage, you will be able to translate the requirements into a software design that can be estimated before coding is made. This process focuses on the design of data structures, software architectures, interface representations, and procedural details.

4) Construction
The construction phase is the stage of the code making process. Coding or coding is a design translation in a language that can be recognized by a computer. The programmer will translate the transaction requested by the user. This stage is a real step in working on software,meaning that the use of computers will be maximized in this stage. After the coding is complete, the system will be tested for testing. The purpose of testing is to find errors in the system and then repair them.

5) Deployment
This stage is the final stage in making a software or system. After doing the analysis, design and coding, the system that has been created will be used by the user. Then the software that has been made must be regularly maintained.

4. Research Result

In this reasearch the Waterfall Method was carried out only until the construction stage. The following are the results of each stage, the calculation of the SAW, and the results of the software.

4.1 Communication

Before starting work that is technical, it is necessary to have communication in order to understand and achieve the goals to be achieved. The result of this communication is project initialization, such as analyzing existing problems and collecting necessary data.

4.2 Planning

Planning and management to achieve project objectives with the initial stage of project activities since the project is agreed to be worked on. Then the problem analysis is needed to be able to do and do it. the problem that can be concluded from the results of the interview is the number of participants who registered exceeds the required or specified quota, for example the case is the total quota of participants is 2 people while the participants who register reach 20 people it makes it difficult for the principal in choosing or making decisions in determining prospective student exchange participants. Therefore it is necessary to have a system that is able to help make decisions in selecting student exchange participants.

Modeling
At this stage system design is done using context diagrams, DFD, and ERD. The following are the diagrams used in system design:

1) Context Diagram

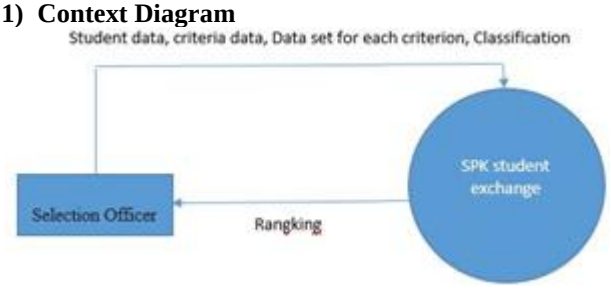

Figure 2: Context Diagram of DSS for Student Exchange

2) Level 0 of Data Flow Diagram

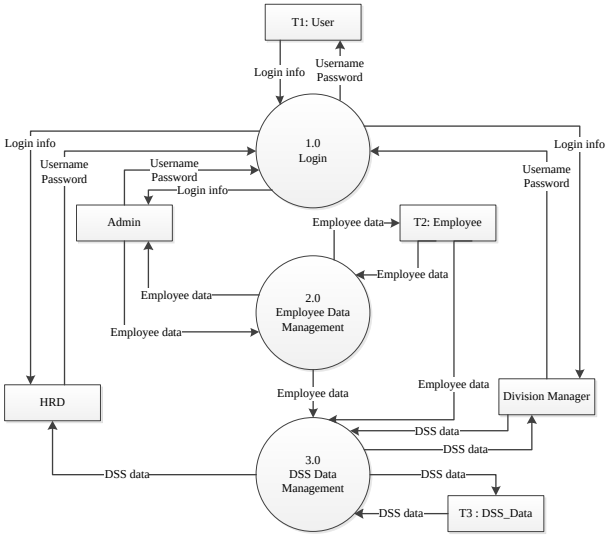

Figure 3: DFD Diagram of DSS for Student Exchange

3) Entity Relationship Diagram (ERD)

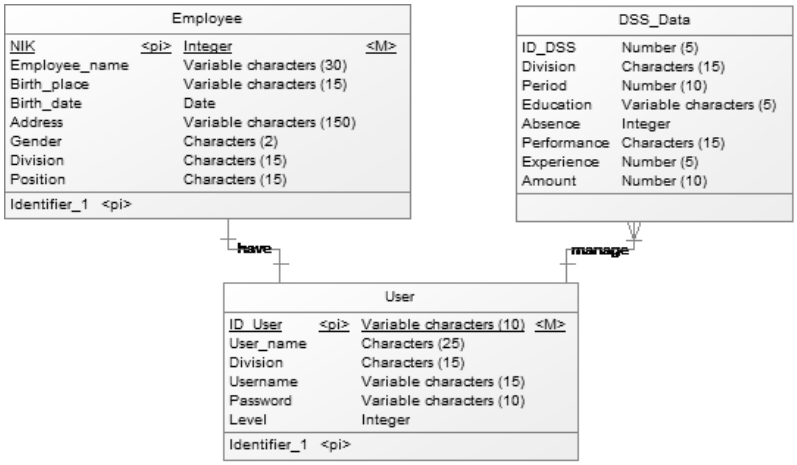

Figure 4:ERD of DSS for Student Exchange

4.3 Construction

The construction phase consists of calculation of the SAW method and the construction of a web-based decision support system. The following is an explanation of each stage:

4.3.1 The Calculation of Simple Additive WeigthProcess

The initial step in the calculation phase of the SAW method for the student exchange decision support system determines the priority priority weights that will be used in the SAW calculation method.

The Construction of Web-Based Decision Support System

At this stage, a real system is made that refers to user needs that have been determined in the previous stages. The results obtained in this stage are a system that can be run. The system is built using the PHP programming language and MySQL database. The following are some of the interfaces of the system that have been built:

1. Login Page

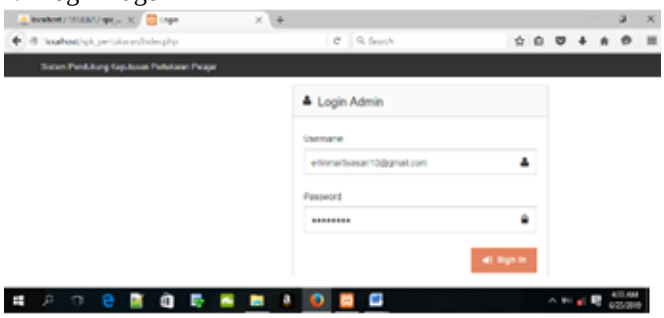

Figure 5: Interface of Login PageStudent Exchange

2. Home Page

Figure 6: Interface of Home PageStudent Exchange

The decision-making system that has been built is then tested using the black box method. The results of the test can be seen in Table 10.

Table 1: Blackbox Testing Result

No	*Function*	*Expected Output*	*Output*	*Conclusion*
1	Login	System displaying the home page	System displaying the home page	Success
2	Menu student	System successes in putting, editing, deleting employee data	System success inputting, editing, deleting employee data	Success
3	Inputing DSS data	System successes inputting DSS data	System success inputting DSS data	Success
4	Printing DSS data	System successes printing needed DSS data	System successes printing needed DSS data	Success
5	Displaying DSS data result	System successes displaying result from calculation of DSS data	System successes displaying result from calculation of DSS data	Success

5. Conclusion

In the system there are several key features such as student features that are equipped with additional students, change and delete student data. The criteria set feature is supplemented by adding sets, modifying and deleting set data. Classification feature for inputting grades from each student is equipped with added classification, change and delete classification data. Feature analysis to perform calculation results and ranking of all alternatives with the calculation method of Simple Additive Weight (SAW).make it easy for the selection officer to provide alternative decisions in choosing students with priority values with reference to the decision criteria that have been set.

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