



# DECISION SUPPORT SYSTEM FOR THE BEST TEACHER ELECTION WITH SIMPLE ADDITIVE WEIGHTING METHOD BASED ON WEB (CASE STUDY ON AL-IJTIHAT VOCATIONAL SCHOOL)

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**Abstract**–The teacher have an important role in advancing the school especially learners. The main task of the teacher is to educate, teach, guide, direct, practice, assess and evaluate learners. Based on teacher assessment handbook overachievers, the selection of the best teacher are intended among other things to encourage motivation, dedication, loyalty, and professionalism of teachers who are expected to be influential positif on performance improvements. The performance improvements can be seen in the quality Of graduate education units as qualified human resources, productive and competitive. Electoral system of teachers excel in SMK Al-ijtihad is still done by spreading quesioer to students teachers, and based on an assessment of the principal. Data from the results of the quesinoer recap and at rankings based on highest value to lowest value. The assessment process that runs this time take a long time so that the information obtained is not fast. With existing problems then it needs a system that can assist the school in determining the best teacherswith the criteria you've specified. Based on problems occurred for itdecision support system required the selection of the best teachers that can help accelerate the academic part of decision making about the selection of the best Teacher at SMK Al-Ijtihad. One of method for decision maker is Simple Additive Weighting. The system will be developed by using the programming language PHP and the Mysql database. Result of testing system show that the system has a function that the correspondens to the needs of SMK Al-Ijtihad by generating the best teacher output

**Keywords:** System of decision-making; Simple Additive Weighting; Best Teacher;

## I. INTRODUCTION

Rapid development is not only in hardware and software technology, but also in the growing computing method. One of the computational methods that developed today is the method of decision-making system (Decisions Support System).The development of information technology has become a necessity in almost all aspects of life, it is characterized by the development of computer and internet usage in various fields In information technology, decision-making system is a branch of science that lies between information systems and intelligent systems, meaning that decision-making systems require information technology, this is because of the era of globalization that requires a company or agency to move quickly in taking a decision and action.

The development of information technology especially in Indonesia is increasing rapidly with the modernization in the technology-based software to business activities run in each company as a medium of information. Information is important for companies to grow in services to help user. Schools are part of the national education system that is expected to have an important and strategic role to achieve educational goals. Schools are educational levels before students take college education that includes diploma programs, undergraduate programs, master programs, doctoral programs, and professional programs, as well as specialist programs, organized by universities based on the culture of the Indonesian Nation [Law no. 12 of 2012]. Teachers play an important role in advancing schools, especially learners. The main task of teachers is to educate, teach, guide, direct, train, assess, and evaluate learners. Based on the guidebook of the achievement of Master's achievement, the selection of the best teachers is intended to encourage motivation, dedication, loyalty, and professionalism of teachers, which is expected to positively affect performance improvement. Such performance improvement can be seen from the quality of graduates of education units as qualified, productive and competitive human resources. In this regard, the Government has given serious attention to empower teachers, especially for outstanding teachers. Law No.14 Year 2005 on Teachers and Lecturers, Article 36 Paragraph (1) mandates that "Teachers who excel, have extraordinary dedication, and / or work in specific areas are entitled to an award". The system of selecting high performing teachers in many high schools is still done by distributing questionnaires to students / teachers, and based on assessments by the principal. Data from the questionnaire results are recaptured and ranked by the highest value to the lowest value. The current assessment process takes a long time so that the information obtained is not fast. With the problems that exist then required a system that can help the school in determining the best teachers with predetermined criteria. Based on the background that has been described above, the researcher is interested to make research to make a Decision Support System in choosing the best Teacher by using Simple Additive Weighting Method.

The purpose of making this system to facilitate the school in accelerating the calculation of values to determine the best teachers

#### **A. Research Problems**

The formulation of the problem based on the background that has been described is as follows:

- 1) How to design and implement decision support systems that can facilitate the process of selecting the best Teacher election?
- 2) How to apply the Simple Additive Wighting (SAW) method in decision support system to make it easier to rank the best teachers?

#### **B. Limitation of Research**

In order for researchers in making this system to be directed, it is necessary to be given the following problem limits:

- 1) Application to be designed include: Manage teacher data (input, edit, delete, search), Manage criteria data and weight criteria (input, edit, delete), Teacher Assessment, Best Teacher Predicate, Predicate Evaluation Report Teacher, using the Simple Additive Weighting method.
- 2) Development method using System Development Life Cycle (SDLC) step method, in analysis phase using Object Oriented Analysis (OOA), Design Model using Unified Modeling Language (UML), and implementation stages using Xampp application, MySql Database, PHP Programming Language

#### **C. Purpose And Objectives**

The objectives of this research are:

- 1) Help schools in facilitating and accelerating decision-making from the best Teacher selection based on the best available Master candidates.
- 2) To apply the Simple Additive Wighting method in a best teacher decision-making system, so ranking calculations in determining the best Teacher can be done easily, quickly, and appropriately.
- 1) Facilitate the academic part in conducting the assessment process and ranking the best teacher selection according to the assessment format.
- 2) Produce a better teacher selection decision support system to improve the effectiveness in providing information.
- 3) Produce a decision support system for teacher selection to improve the quality of the best teacher selection currently running.

## **II. THEORY FUNDAMENTAL**

#### **A. Literature Review**

Much previous research has been conducted on monitoring systems from other relevant studies. In the effort to develop and improve the system needed literature study (literature review) as one of the application of research methods undertaken, the benefits of literature studies include:

- 1) Identify gaps from previous studies.
- 2) Avoid reinventing the wheel so it saves time and also avoids mistakes that have been made in previous research.
- 3) Identify methods that have been done and relevant from previous research.
- 4) Continuing what previous research has been achieved so that with the literature of this review, the research that will be done can build on the platform of existing knowledge or ideas.
- 5) Describe the linkage between one study and other research related to our point of interest.

**The following is a review literature used as a reference for this research:**

- 1) Research conducted by Rotua SihombingHutasoit, Agus Perdana Windarto, Dedy Hartama, Solikhun, research entitled Decision Support System For Best Teacher Selection In Smk Maria Goretti Pematangsiantar Using Simple Additive Weighting (Saw) Method (Case Study: SMK Maria Goretti Pematangsiantar) proposed to improve performance through the application of information technology and determine the approach used in the decision-making process, to evaluate the interactive selection. One of the most commonly used methods in decision support systems is the Simple Additive Weighting (SAW) method. Simple Additive Weighting (SAW) method is chosen because it can 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 this case the alternative is the determination of the best teacher in Mary Goretti Pematangsiantar SMK using simple additive weighting (SAW) method. With the ranking method is expected to be more appropriate assessment because it is based on the criteria and weight of the predetermined so that will get maximum results.
- 2) Research conducted by Faiza Rini, research entitled Decision Support System of the Best Teacher Selection at Islamic Vocational School Al-Arief Muaro Jambi proposed to determine the best teacher by selecting some best teacher position alternative based on predetermined selection criteria previous. The problem with selecting the best teacher is the difficulty of determining the best teacher based on many criteria. Another problem is that not all criteria can be quantitatively measured. Fuzzy Multi Attribute Decision Making (FMADM) is a method used to find the optimal alternative of a number of alternatives with certain criteria. The core of FMADM is to determine the weight value for each attribute, then proceed with the ranking process which will select the alternatives already given using Borland Delphi application.
- 3) Research conducted by RanidaPradita and Nurul Hidayat, a study entitled DECISION SUPPORT SYSTEM FOR SELECTION OF TEACHER ACHIEVEMENT USING PROMETHEE METHOD proposed to select teacher of achievement and aimed at Education Department of Surabaya city which still use manual system in assessing teacher candidate achievement. So that this system is expected to assist the agency in the process of assessment and determination of outstanding teachers in the municipality of Surabaya quickly and precisely. The method used in ranking the selection of outstanding teachers in this system using the Promethee method; a method that belongs to the Multi Criteria Decision Making (MCDM) problem-solving group. The results of ranking in this system are influenced by the selection of preference criteria and threshold determination entered into the system. Thus, the results are the same and some are not the same as the manual selection process. The test of this system uses data from 45 teachers, ranking divided according to Kindergarten, SD / MI, SMP / Tsanawiyah, SMA / MA, and SMK. Of the several trials that have been done to determine the achieving teacher, the ranking results are much faster and more accountable.

The difference of previous research with this thesis research is on the object of research, scope of research, research purposes, and system development method used. In this research, SDLC model development method, using Object Oriented Analysis Design (OOAD), with object oriented design using UML model, and system testing technique using Black Box Testing approach. From several previous studies that have been explained then obtained research conducted by RotuaSihombingHutasoit, Agus Perdana Windarto, Dedy Hartama have in common with research that will researchers do.

## **B. Decision Support System**

According to Khana, Decision Support System (SPK) is usually built to support the solution of a problem or for an opportunity, the application of decision support system (SPK) is in decision making, the application of decision support system (CBSS) using CBIS (Computer Based Information System) that is flexible, interactive, and adaptable, developed to support solutions to specific unstructured management issues.

The definition of decision support systems according to experts are:

- 1) According to Mann and Watson, decision support systems are interactive systems, assisting decision-making through the use of data and decision models to solve semi-structured and unstructured problems.
- 2) According to Maryam Alavi and H.Albert Napier, decision support systems are a set of data-oriented processing and information-oriented procedures for the use of models to generate answers that can assist management in decision-making.

- 3) According to Litle, Decision Support System is a computer-based information system that produces various alternative decisions to assist management in handling various problems that are structured or unstructured by using data and models.

### C. Definition of Simple Additive Weighting

According to Ika, the SAW method is often also known as the weighted summing method. The basic concept of the SAW method is to find the weighted sum of performance ratings on each alternative on all attributes. SAW method is recommended to solve selection problem in multiprocessing decision making system. SAW method is a method that is widely used in decision making that has many attributes. The SAW method requires the normalization of the decision matrix (x) to a scale comparable to all available alternative ratings. This method is the most famous and most widely used method of dealing with Multiple Attribute Decision Making (MADM) situations. MADM itself is a method used to find the optimal alternative of a number of alternatives with certain criteria. This SAW method requires decision makers to assign weights to each attribute. The total score for the alternative is obtained by summing all the results of the multiplication between the ratings (which can be compared across attributes) and the weight of each attribute. The rating of each attribute must be dimensionless in the sense that it has passed the process of normalizing the previous matrix.

## III. METHODOLOGY

### A. Research Stages

According to Al Jufri the steps of the design stage are:

- 1) **Preparing the detail System Design;** The analyst works with the user and documents the new system design with the tools described with the technical module. Some tools make it easy for analysts to prepare top down documentation, starting with a big picture and gradually leading in more detail. This top down approach is characterized by a structured design, ie the design moves from the system level to the subsystem level. The most popular documentation tools are:
  - a. Data flow diagram (data flow diagram)
  - b. Entity relationship diagram (entity relationship diagram)
  - c. Data dictionary (Data dictionary)
  - d. Flowchart
  - e. Model of object relationships
  - f. Class specifications
- 2) **Identify Various Alternatives to System Configuration;** The analyst identifies the configuration, not the brand or model of computer equipment that will provide the best results for the system in completing the processing.
- 3) **Evaluate various System Configuration Alternatives;** Analysts working with managers to evaluate alternatives. The chosen alternative is the most enabling subsystem to meet the performance criteria, with the constraints.
- 4) **Choosing the Best Configuration;** The analyst evaluates all subsystem configurations and adjusts the combination of equipment so that all subsystems become a single configuration. Once completed the analyst makes recommendations to the manager for approval. When the manager approves the configuration, further approval is made by MIS.
- 5) **Set Up Deployment Proposals;** The analyst prepares an implementation proposal that summarizes the assignment tasks to be performed, the expected benefits, and the costs.
- 6) **Approving or Rejecting System Implementation;** The constant to continue at the stage of implementation is very important, as this effort will greatly increase the number of people involved. If the expected profit from the system exceeds the cost, then the application will be approved:

### B. Black Box Testing Technique

- 1) According to Agustiar Budiman, argues that "black box testing is a method of designing test data based on software specifications. Test data is generated, executed on the software and then the output of the software is tested whether it has been as expected".
- 2) According to Rizky, Black Box Testing is a type of testing software that treats unknown internal performance.
- 3) Based on the above definition, it can be concluded that black box testing is a method of testing on the system to determine the performance of system software.

## IV. RESULT AND DISCUSSION

### A. Analysis of Current System

Procedure of the best teacher election system that runs today at SMK Al-Itihat as follows:

- 1) Academic Section gives questioner to student to give assessment to teachers.
- 2) After the student gives the assessment then the questioner will be processed by the part academic.
- 3) Once processed then the value will be sorted from the largest value to the smallest value.

4) Academic Section makes the best teacher report then given to headmaster.

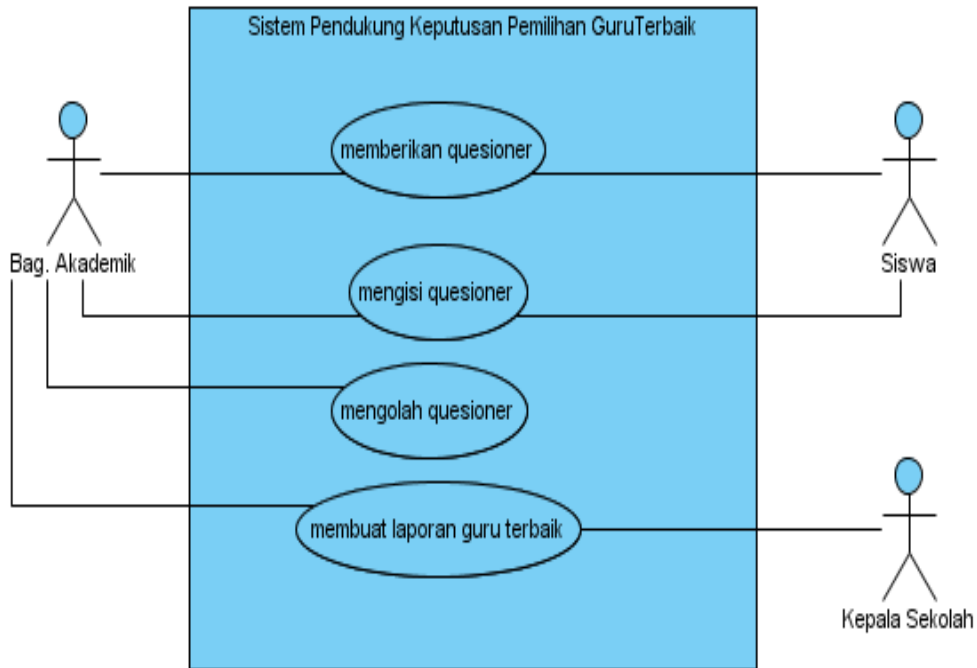


Figure 1: Use Case Current System

### B. Activity Diagram of Current System

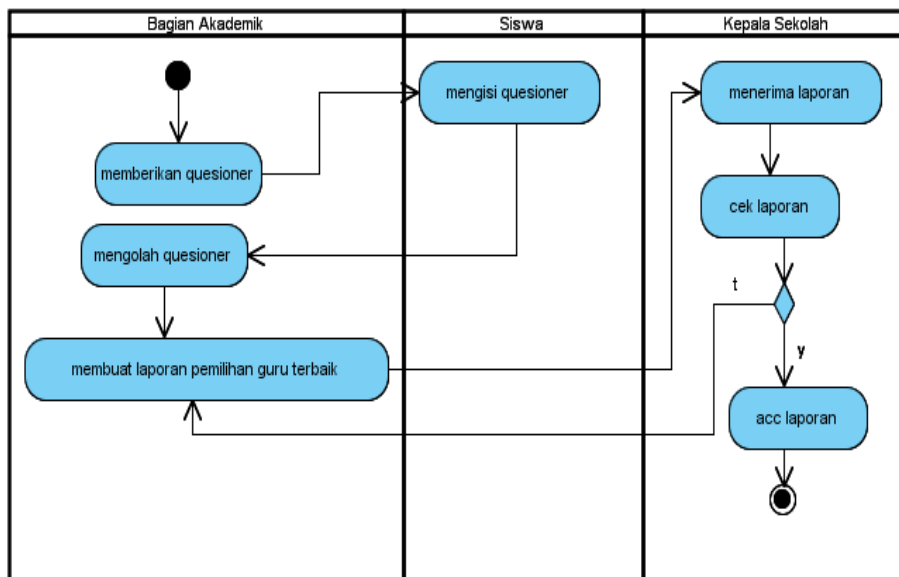


Figure 2: Activity Diagram Current System

Based on Figure 2 there is an explanation of the object used from the Activity Diagram system running as follows:

- 2) Initial Node, The object that begins.
- 3) 7 Action states of the system that reflect the execution of an action including:
  - a. Provide questioner
  - b. Fill the questioner
  - c. Processing questioner
  - d. Create the best teacher report
  - e. Receive report
  - f. Check reports
  - g. Acc Report
- 4) 1 Activity Final Node, the ending object.
- 5) 1 Decision node used for condition selection

### C. System Implementation

At the implementation stage, stages of the information portal that has been designed. Implementation of the design that has been made poured into the form of coding program. In addition, the implementation of the results of the analysis at the design stage with software operations made to occur in the suitability of performance. The main purpose of the implementation phase is to implement the architecture and design of the system as a whole.

### D. Implementation Environment

The design of this system can run well because it is supported by the supporting devices of software and hardware.

1) The supporting software used is as follows:

- a. The operating system used is windows 7 Windows 7 Business Edition Service Pack 1
- b. Programming PHP version 5.5 output HTML version 5
- c. The database application program used is MySQL 5.0.10
- d. Using Notepad ++ Version 6.9.2 for editing Source Code
- e. Using Adobe Photoshop CS4 for the application design process

2) Supporting hardware used is as follows:

- a. AMD Turion X2 Processor 64
- b. Memory 3148 MB.
- c. 14 inch monitor
- d. 250 GB hard drive
- e. HP Laptop
- f. Epson Pi90 printer

### E. USER INTERFACE

#### 1) Login Page




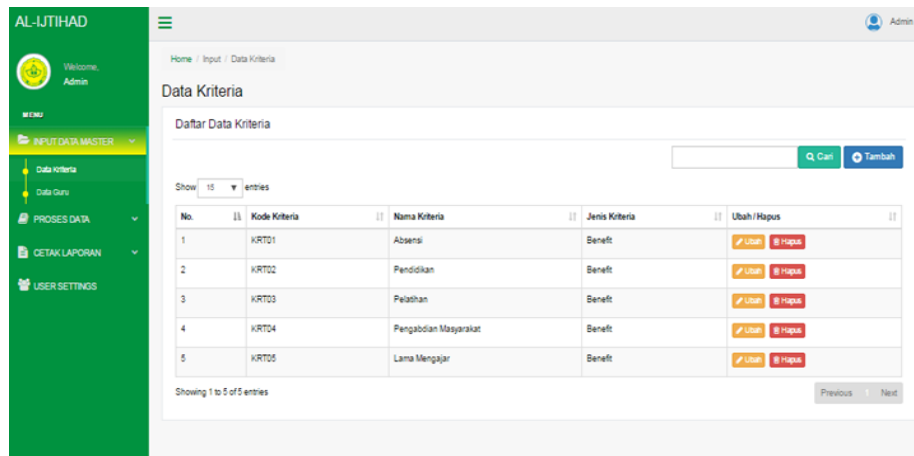
Figure 3: Login Page

#### 2) Dashboard



Figure 4: Dashboard

### 3) Data Criteria



No.	Kode Kriteria	Nama Kriteria	Jenis Kriteria	Ubah/Hapus
1	KRTD1	Absensi	Benefit	Ubah Hapus
2	KRTD2	Pendidikan	Benefit	Ubah Hapus
3	KRTD3	Pelatihan	Benefit	Ubah Hapus
4	KRTD4	Pengabdian Masyarakat	Benefit	Ubah Hapus
5	KRTD5	Lama Mengajar	Benefit	Ubah Hapus

Figure 5: Data Criteria

### 4) Assessment Report



Yayasan Pendidikan Islam AL-IJTIHAD  
**SMK AL-IJTIHAD**

Laporan Ranking Penilaian Guru

Tahun Ajaran: 2016/2017

Semester: Gasal

Peringkat	Nama Guru	Nilai Rata-rata
1	SAFIRAH NURANTI	95.3840
2	MAMSEKI MURSYIDIN	84.2010
3	AGUNG GUMELAR	74.0070

Figure 6: Assessment Report

## V. CONCLUSION

- 1) Decision Support System The Best Teacher Selection can assist the academic part in managing teacher data to get the best teacher selection results every school year.
- 2) With the decision support system the best teacher selection can be reducing miscalculation of valuation and can help the academic part accelerate decision making about the best Teacher election at SMK Al-Ijtihad.

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