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Application of the Analytical Hierarchy Process (AHP) in the Decision Support System for Superior Class Selection at SMP N 4 Pasaman

Neneng Yeni Rira[1], Sarmin Hadji Suwarna[2]

[1]Dharma Indonesia University
[2]Dharma Indonesia University
UNDHI Information System, Cikupa, Banten, Indonesia
E-mail; [1]nenengyenirira@undhi.ac.id, [2]sarmin.hadji@undhi.ac.id

ABSTRACT

The Excellent Class at SMP 4 Pasaman is a special class consisting of students who excel in two areas of assessment and possess above-average intelligence. This grouping aims to nurture students in developing their intelligence, abilities, skills, and potential to the fullest, enabling them to achieve the best knowledge, skills, and attitudes in line with the concept of excellence education through the Excellent Class program. This program refers to the Keputusan Menteri Pendidikan dan Kebudayaan Nomor 0487/U/1992, Article 15, which states that the implementation of excellence can be achieved through special programs, special classes, and special education programs that reflect excellence-oriented education. The selection of outstanding students for admission into the Excellent Class is usually conducted by each school to evaluate students' academic performance throughout the academic year. The selection process typically involves ranking students based on their performance, and only those who fall within the available capacity are accepted, while those beyond the capacity limit are not admitted.

Keywords: School, Website, Excellence, PHP

ABSTRAK

Kelas unggulan di SMP 4 Pasaman adalah kelas yang diikuti oleh sejumlah siswa yang unggul dalam dua ranah penilaian dengan kecerdasan di atas rata-rata yang dikelompokkan secara khusus. Pengelompokan ini dimaksudkan untuk membina siswa dalam mengembangkan kecerdasan, kemampuan, keterampilan, dan potensinya seoptimal mungkin sehingga memilki pengetahuan, keterampilan, dan sikap yang terbaik sebagaimana semangat konsep wawasan unggulan adalah melalui program kelas unggulan. Hal itu mengacu pada Keputusan Menteri Pendidikan dan Kebudayaan Nomor 0487/U/1992, pasal 15 yaitu penerapan wawasan keunggulan melalui program khusus, program kelas khusus, dan program pendidikan khusus, yang merefleksikan pendidikan keunggulan. Pemilihan siswa berprestasi untuk bisa masuk ke kelas unggulan biasanya dilakukan di setiap sekolah dalam rangka mengevaluasi hasil belajar siswa-siswinya selama satu tahun ajaran. Untuk menyeleksi calon siswa yang diterima cukup dengan mengambil sejumlah calon siswa yang terdapat pada ranking paling atas sesuai dengan kapasitas. Calon siswa yang berada pada urutan diluar kapasitas, dinyatakan tidak diterima.

Kata Kunci: Sekolah, Website, Unggul, Php,

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**Corresponding author*: nenengyenirira@undhi.ac.id

INTRODUCTION

SMP Negeri 4 Pasaman is one of the schools in West Pasaman that implements an excellent class program, which aims to group students with high academic achievements. These superior classes not only make it easier to identify outstanding students but also motivate them to improve their learning performance. The selection of students for the superior class at SMP Negeri 4 Pasaman currently focuses on academic excellence, primarily using the average scores from report cards. However, this method alone is considered less objective because other factors, such as achievements in extracurricular activities, student participation, and personal attitudes, including religious values, also influence overall student performance. Therefore, a more systematic and comprehensive approach is needed to make the selection process fair, accurate, and efficient.

To address this, the study proposes the development of a Decision Support System (DSS) application that utilizes the Analytic Hierarchy Process (AHP) method. This system is designed to assist in the determination of outstanding students by analyzing multiple criteria simultaneously, providing an objective and data-driven basis for decision-making. Furthermore, the DSS application is built to store integrated student data, enabling quick, accurate, and efficient access and retrieval of information. By combining the AHP method with a computer-based system, the selection of superior class students can be conducted more effectively and transparently.

Hypothesis

Based on the problems presented in the previous section, the following hypotheses are proposed as temporary solutions to the research problems. First, it is expected that the Analytic Hierarchy Process (AHP) method can effectively and efficiently support decision-making in determining outstanding students. Second, it is expected that the design of a Decision Support System (DSS) application using the PHP programming language and MySQL database will assist in identifying outstanding students at SMP Negeri 4 Pasaman. Third, it is expected that the construction of the DSS application using PHP and MySQL will enable integrated data storage, allowing student data to be accessed and searched quickly and accurately.

THEORETICAL FOUNDATION

Definition of System

A system is a collection of elements that are interrelated with each other and cannot be separated to achieve a certain goal. In simple terms, a system can be interpreted as a set or set of elements, components, or variables that are organized, interdependent, and integrated. A system consists of parts, parts, or components that are integrated for a single purpose (Aprisa & Monalisa, 2015)

System Characteristics

There are several characteristics of the system, including:

Components

A system is made up of components that interact with each other, which means that they work together to form a unit.

System Boundaries

A system boundary is an area that delimits one system from one another or from its external environment.

External Environment

The external environment of the system is everything outside the limits of the system that affects the operation of the system.

System Connector (Interface)

A system connector is a medium between one subsystem and another that forms a unit, so that resources flow from one subsystem to another.

Input

Input is energy or something that is put into a system, which can be in the form of input, namely the energy that is put in so that the system can operate, or an input signal, which is energy that is processed to produce an output.

Output

It is the result of energy being processed and classified into useful outputs, as well as the output or final goal of the system.

Processor

A system has a processing part that will convert inputs into outputs.

Objectives

The goal of the system is very determined once the input needed by the system and the output that the system will produce (Andrianof, 2018).

RESEARCH METHODOLOGY

Research Framework

In conducting this research, the author uses the research framework as a sequence or process with the aim of making the research carried out more structured, where the research framework carried out is described in Figure 1.

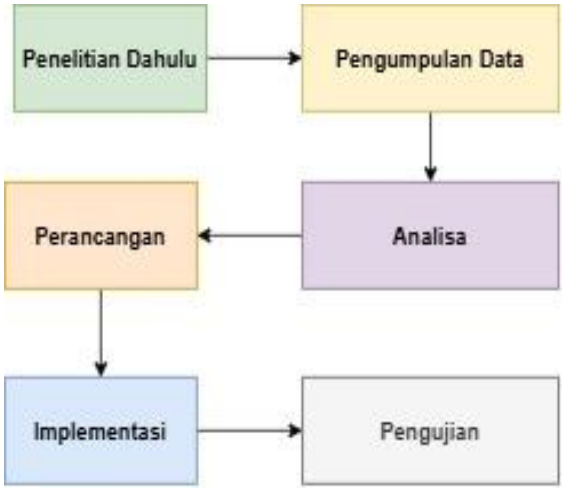

Image 1. Framework

ANALYSIS AND RESULTS

System analysis is to understand, observe, divide and identify the weaknesses and advantages of the current system and then propose the development of the system to be able to maintain the advantages of the system and minimize or even eliminate the weaknesses of the old system in order to form a perfect system.

Running System Analysis

A running system flow is a picture that shows the flow of data and processes that occur in the running system until a report is produced, as well as where data is successfully processed, and how to process data and generate reports. With an overview of the flow of the running system, it will be easier to carry out the analysis stage of the running system.

New System Analysis

To overcome existing problems, it is necessary to design a new system to define functional needs. A new system was built to facilitate the data processing process so that it no longer takes a long time and is proposed to be presented in the form of physical design and logic design (Aprisa & Monalisa, 2015). The proposed system is expected to make improvements to the shortcomings in the old system.

UML

UML (*Unified Modeling Language*) is a tool for analysis and software design. UML is a language standard that is widely used in the industrial world to define requirements, make analysis and design, and describe architecture in object-oriented programming (Management et al., 2024).

Use Case

The diagram use ***case*** will be used to describe the features that can be used by admins. This diagram is also used to verify whether all the functions described in this diagram are *Use case* has been implemented into the system. The use case model serves to describe the functional needs and describe the behavior of the system to be created, as well as to describe an interaction between one or more actors and the system to be created (Management et al., 2024). The use case diagram for this system can be seen in Figure 2.

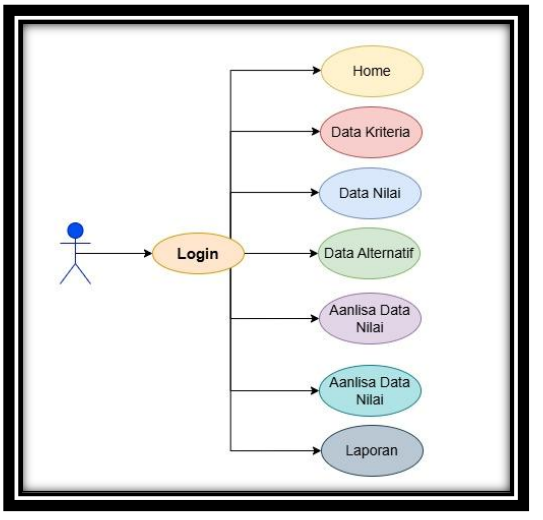

Image 2. Use Case

Class Diagram

Diagram Class displays the existence or existence of classes and relationships in the logical design of a system. A class is a specification that, if formalized, will produce an object and is at the core of object-oriented development and design (Alifah & Cahyo, 2018). The following is a class diagram of the system to be built can be seen in Figure 3.

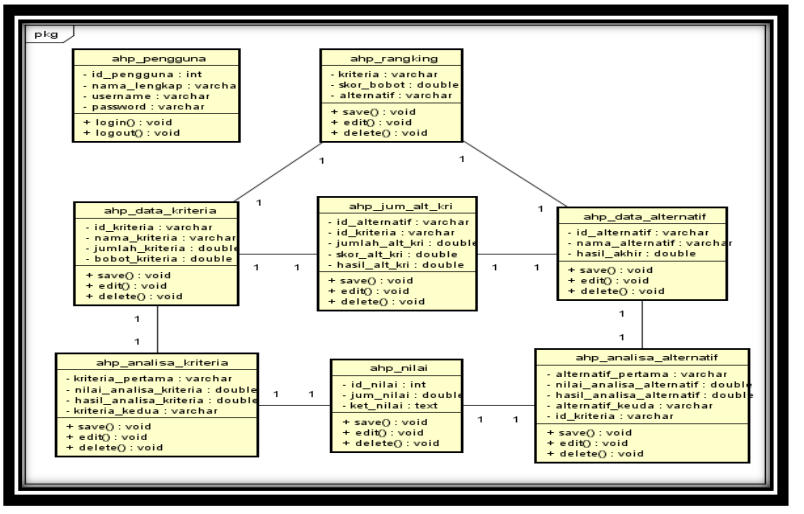

Image 3. ***Class Diagram***

Activity Diagram

An activity diagram describes the various streams of activity in the system being designed, how each flow starts, the decisions that may occur, and how they end. Activity diagrams can also depict parallel processes that occur on multiple executions. Activity diagrams describe the processes and activity paths from the top level in general. Activity diagrams describe the activities that the system does, not what the actors do (Wantoro, 2018). *Activity diagram* in this system can be seen in Figure 4. Next:

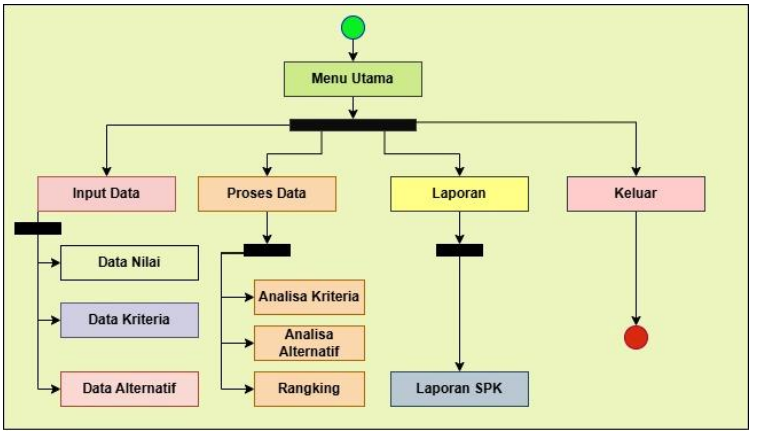

Image 4. ***Activity Diagram***

System Implementation and Testing

System Implementation

System implementation is carried out to find out how the application that has been built can be implemented into a system

(Andrianof, 2018; Gusrianty et al., 2019; Management et al., 2024; Risanty et al., 2016), as well as whether this application can benefit users. Implementation is also carried out to find out the limitations of the system that has been designed and needed to run this application.

Login

Inside the login, there is a username and password menu. For more details, see Figure 5. Next:

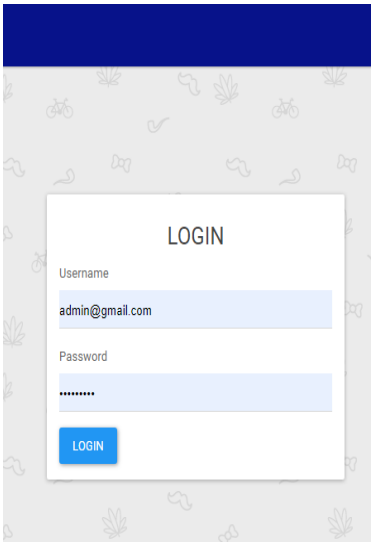

Image 5. Login

Main Menu

In the main admin menu, there is an entry menu. For more details, see Figure 6. Next:

Image 6. Main Menu Page

Preference Value Data Input Page

On this page, the data information of the preference value can be added. For more details, see Figure 7. Next:

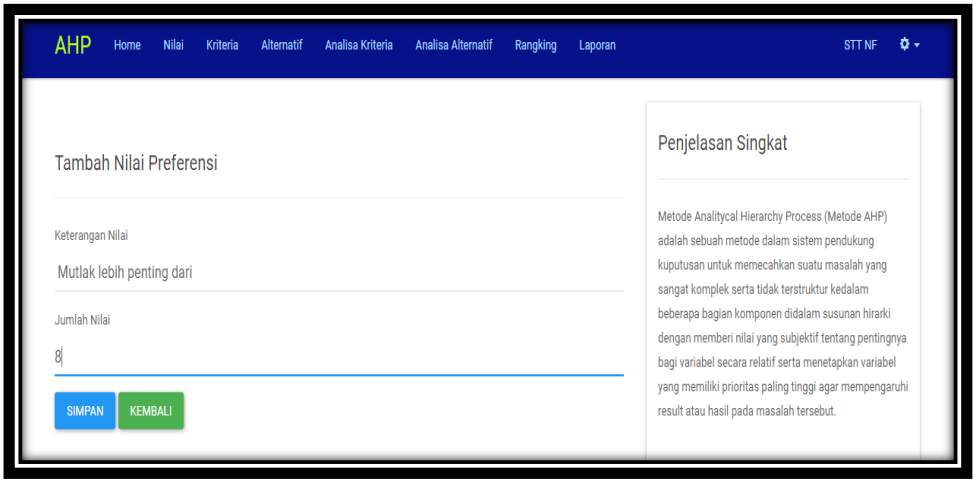

Image 7. Preference Value Data Input Page

Criteria Data Input Page

On this page, the criteria data can be completed. For more details, see figure 8. Next:

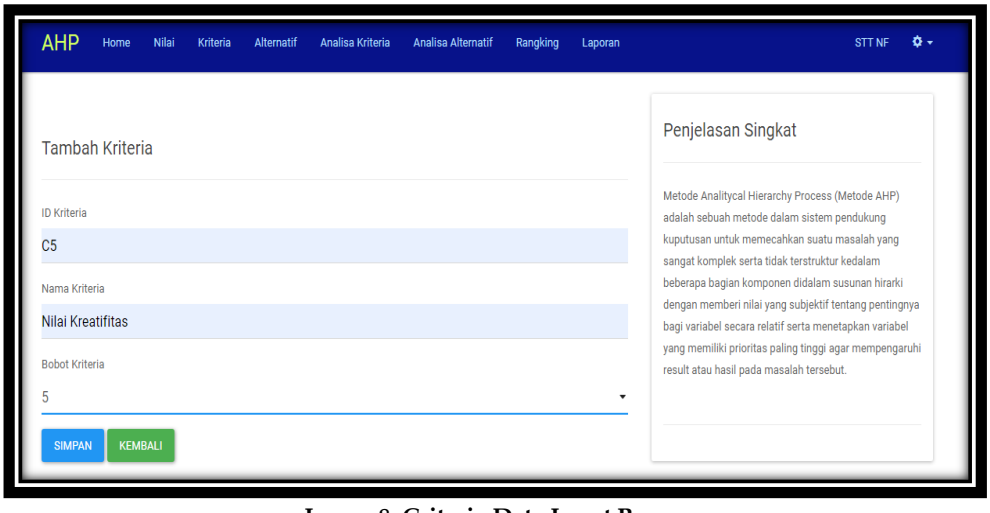

Image 8. Criteria Data Input Page

Alternative Data Input Page

On this page, you can complete alternative data. For more details, see Figure 9. Next

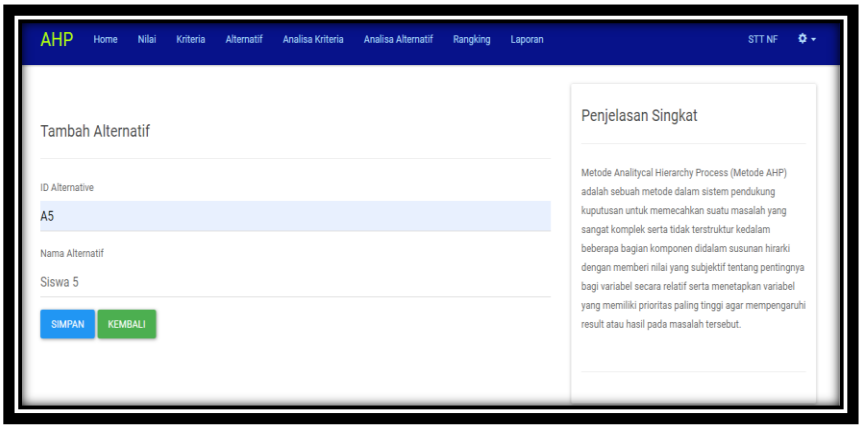

Image 9. Alternative Data Input Page

Criteria Analysis Data Input Page

On this page, the criteria analysis data can be completed. For more details, you can see in figure 10. below:

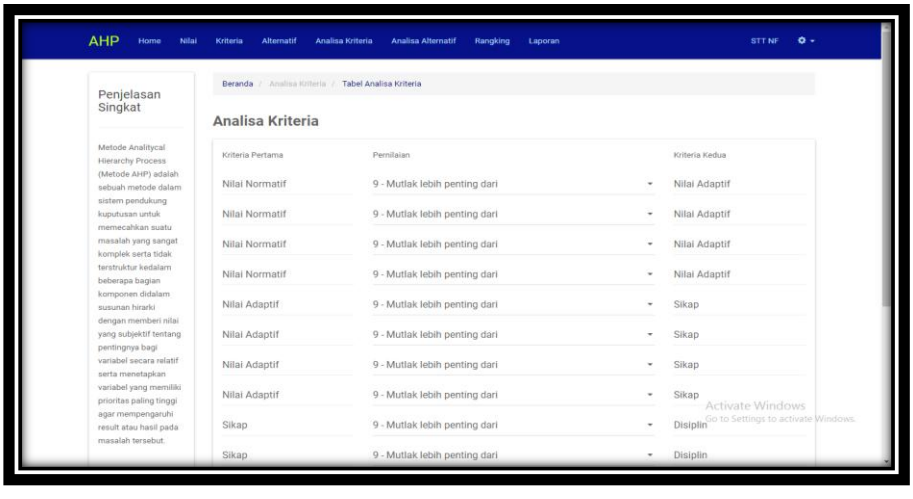

Image 10. Criteria Analysis Data Input Page

CONCLUSION

Based on the descriptions and explanations presented in the previous chapters, several conclusions can be drawn from the research conducted. First, the PHP programming language and MySQL database are simple, robust, object-oriented, and secure technologies that are suitable for problem-solving. Second, the Decision Support System application, developed using PHP and MySQL, is able to assist in identifying outstanding students at SMP N 4 West Pasaman. Third, the development of

this Decision Support System application enables integrated data storage, allowing data to be searched and processed more quickly and accurately.

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