

# Decision Support System with the Composite Performance Index (CPI) Method in Determining Scholarship

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**Abstract:** In the world of education, especially in the schools of Upper (HIGH school), many forms of scholarship obtained by students, one of which is underprivileged scholarship. SMA Muhammadiyah Lahat is already a less capable scholarship program. Where the criteria have been set on the school. At high school, Muhammadiyah is still in the form of data collection one by one all students who enter the file. So the determination of students takes a relatively long time. The research aims to make the decision support system with the Composite Performance Index (CPI) method used to determine the assessment or rating from various alternatives based on several criteria. The alternatives that have been sorted by that value will help make the decision so that it has the same assessment of one alternative. Applications created with PHP and MySql programming. The results of this research are application of decision support system that can help the school administration in determining the students who will receive scholarships based on the criteria and the weighted weight.

**Keywords:** SPK, CPI, scholarship

## 1. Introduction

Decisions are the result of choosing the best choice among alternatives that are available. In the process of decision making, we will strive to pour out all thoughts and do the necessary activities to get the best option [1].

In SMA Muhammadiyah Lahat has one scholarship that is used to relieve the burden of students in taking the study period, especially in the problem of cost of underprivileged scholarship. The system used to select the scholarship is still manual, because many students, it is necessary that the system can independently determine the acceptance of the scholarship.

The purpose of this research is to produce a decision support system with the Composite Performance Index (CPI) method in determining scholarships that are not able for students. The Composite Performance Index (CPI) method is a composite index that can be used to determine the appraisal or rating of various alternatives based on multiple criteria [1].

## 2. Literature Review

The Decision Support System (SPK) is a system capable of providing problem solving capabilities as well as communication skills for problems with semi-structural and unstructured conditions. This system is used to help decision making, where no one knows exactly how it should be made [2].

The composite Performance Index (CPI) is a composite index that can be used to determine the rank of various I based on the criteria J. Composite Performance Index (CPI) was used to select several alternatives [1] [3].

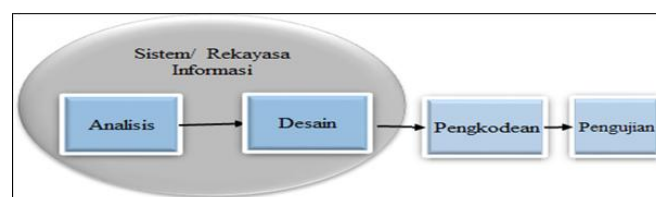
The CPI procedure is as follows [1]:

- 1) Identifying criteria including positive trends or negative trends. The criteria include the (+) trend if the higher the value is getting better and the criteria include the N (-) trend if the lower the value the better.
- 2) For the trend criteria (+) The minimum value on the criteria Setiao transformed to a hundred while the other values in the transformation is proportionally higher.
- 3) For the trend criteria (-) minimum value on each criterion with the weight of the criteria.
- 4) Calculation of alternate index value is multiplication of criteria value with criteria weight
- 5) Calculation of the combined index value by doing the summation of multiplication of criteria values with the criteria weight.

## 3. Methods

### 3.1 System development Methods

Waterfall models are often also called linear sequential or classic life cycle grooves. The waterfall Model provides a sequential or sequential flow of software approach starting from analysis, design, coding, testing, and support [6]. Here is the picture 1 model waterfall:



**Figure 1 :** Waterfall

- 1) Analysis of soft prlifting needs

The process of gathering needs is intensively to specify the needs of the software in order to understand what software is needed by the user. Specifications of the software requirements at this stage need to be interpreted.

2) Design

Software design is a multi-step process focused on software-rendering design including data structures, software architectures, interface representations, and coding procedures. This stage provides software requirements from the analysis of the needs to the design representation in order to be implemented into the program at a later stage. The design of software produced at this stage needs to be documented.

3) Program code Generation

The design should be transitioned into the software program. The result of this stage is the computer program according to the design that has been made at the design stage.

4) Testing

The focus testing on software is both logically and functional and ensures that all parts have been tested. This is done to minimize the error and ensure that the output is generated as desired.

5) Support or maintenance does not close the possibility of a software change when it is sent to the user. Changes can occur due to errors appearing and undetectable when testing or software should adapt to new environments. The support or maintenance phase can repeat the development process starting from the analysis of the specification for changes to existing software, but not to create new software

3.3 Design

3.3.1. Use Case Diagram

In the picture use diagram of admin activity and in the system, admins will login first before managing data such as student data input, profile input (school identity), input criteria, announcement input, report input. Admins can manage these data such as edit data, add data, delete data, save and view the data as a whole. But, different from the school (principal) can log in but can only see the report menu and print the report only but can not see the whole. While the user can only see, school identity, student data, data Keriteria, and also announcements.

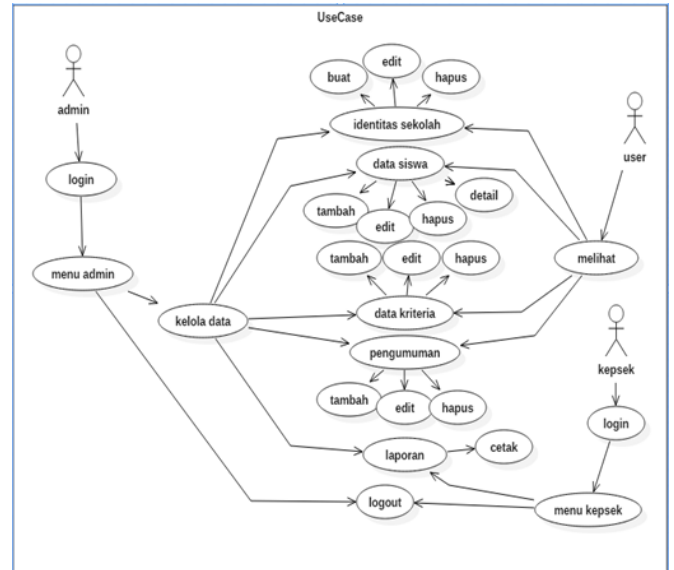


Figure 2 : Use Case Diagram

3.2 Design phase

The steps in this phase consist of determining the criteria, specifying alternatives and measuring the final result. The output of this stage is an alternative.

3.2.1. Criteria Determination

In determining the criteria has various criteria based on the results of the survey that can be seen in table 1.

Table 1

No	Criteria	Unit	Valuation Scale
1	Raport value		Numerical
2	Parents ' work		Numerical
3	Dependents		Numerical
4	Parents ' income	Rupiah	Numerical
5	PBB	Rupiah	Numerical

3.2.2. Alternative selection

Of the five criteria, the analysis of the scale of the assessment will be established. The size of the criteria can be assessed objectively so that it can be categorized into a scoring scale [5].

3.3.2. Diagram Class

The diagram class can help in showing the clas-class structure of a system and the most widely used diagram type. The diagram class is concerned with the relationship between classes and the explanation of each class in the design modeling of a system.

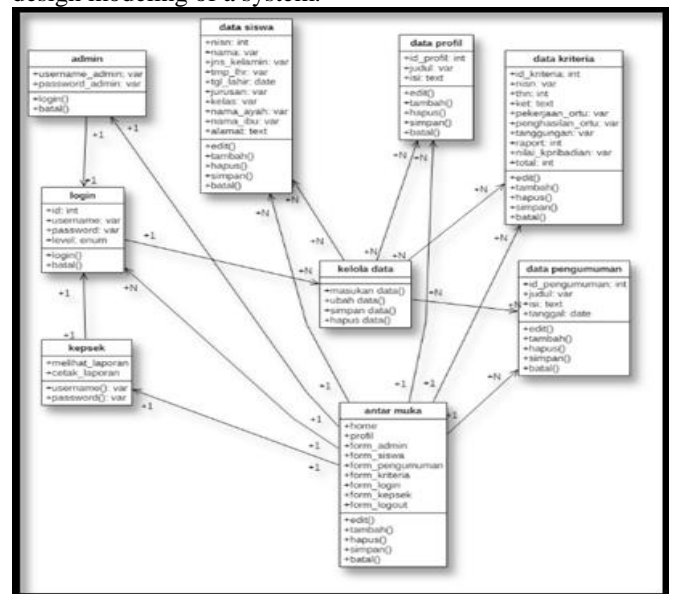


Figure 3 : Digaram Class

## 4. Results

The results of the research and analysis of the application of the decision support system with the Composite Performance Index (Cpi) method in the scholarship determination have several pages, where the type of page each has a link, which each The content of the webpage shows any information that differs.

The Criteria Assessment Form page, this Keriteria assessment data contains information about the results of the assessment based on the criteria set out to select the underprivileged scholarship at SMA Muhammadiyah Jarai. The Assessment data form page of this criterion can be seen in Figure 4.

No	NISN	Nama Siswa	Nilai Akademik (Orang Tua (DPA))	Nilai Pengamatan (Orang Tua (DPA))	Nilai Laporan (Orang Tua (DPA))	Nilai Kebersihan (Orang Tua (DPA))	Nilai Keaktifan (Orang Tua (DPA))	Nilai
1	114220071	Winda sary	27	22,5	18	14	9	88

Figure 4 : Criteria Assessment

The Criteria Assessment Data page is used to remove, delete, modify, display, or not display the assessment data of the underprivileged student selection criteria. This participant data input Form can be seen in Figure 5.

No	NISN	Nama Siswa	Jenis Kelamin	Jurusan	Kelas	Tahun Pelajaran	Pekerjaan Orang Tua (DPA)	Penghasilan Orang Tua (DPA)	Sempungan Orang Tua (DPA)	Nilai Report (DPA)	Nilai Kebersihan (DPA)	Nilai Keaktifan (DPA)	Nilai
1	114220071	winda sary	P	PiayapanPA	8	2019	27	22,5	18	14	9	90	88

Figure 5 : Criteria Valuation Data Page

## 5. Conclusion

With the creation of the decision-making system of receiving underprivileged scholarship with the method of Composite Performance Index (CPI) at SMA Muhammadiyah Lahat using Macromedia Dreamweaver, PHP, and MySQL as database, allows acquired A dynamic and easy-to-update system at any time. From the analysis that has been done at SMA Muhammadiyah Jarai then the author makes the following conclusions:

- 1) This research resulted in a decision support system to receive underprivileged scholarship with the Composite Performance Index (Cpi) method
- 2) Be made to diminish the selection of underprivileged scholarships.

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