
Optimization Of Learning Scheduling Using Linear Regression

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Abstract

Scheduling is a process, method, manufacture, or schedule to be included in the schedule (KBBI). Scheduling that is needed in general and that occurs at one point of education in making study schedules requires various supporting factors from the division of teacher tasks. Based on this, efforts to facilitate learning schedules are made to optimize an activity so as to increase productivity and effectiveness. To carry out learning activities that are carried out conventionally and for a long time, teachers who have teaching schedules in two or more different classrooms at the same time must be revised by changing their respective schedules or reducing the hours that occur as guided by the teacher. At SD S Muhammadiyah Sambirejo, which is a school located in Sambirejo Village, Binjai District, Langkat Regency, and has several educators and educational staff at this school, I focus on the case study of learning scheduling, so that teaching and learning activities in a school must pay attention to the learning schedule and avoid clashes. This makes it easier to prepare a study schedule. The method used is linear regression as an optimization of learning scheduling. The results of testing the linear regression method in optimizing learning scheduling using linear regression with a total of 10 forecasting data as analysis and determining the forecasting result value of 2.0063334474495 obtained data results with the number of conflicting hours.

Keywords: Optimization, Learning Scheduling, Linear Regression

INTRODUCTION

Scheduling is a process, method, manufacture, schedule to include in the schedule (KBBI). Scheduling is needed in general, which occurs in educational units in making study schedules, various supporting factors are needed from the division of teacher tasks, based on this, efforts to facilitate the making of study schedules to optimize an activity, so as to increase productivity and effectiveness. For smooth learning activities carried out conventionally and for a long time, often teachers who have teaching schedules in two or more different classrooms at the same time, the impact that occurs the schedule that has been made must be revised by exchanging each schedule or reducing the hours assigned. taught by the teacher.

At SD S Muhammadiyah Sambirejo which is a school located in Sambirejo Village, Binjai District, Langkat Regency, and has several educators and education staff at this school, I focus on the case study of learning scheduling, so that teaching and learning activities in a school must pay attention to the learning schedule and avoid clashes. This makes it easier to arrange study schedules. The method used is linear regression as an optimization of learning scheduling. The results of the regression analysis in the form of coefficients on each variable X (independent) obtained by predicting the value of the Y variable with an equation then calculated with two objectives at once, to minimize the deviation between the actual value and the estimated value of the Y variable (dependent) based on existing data (N. Almutazah, et.al, 2021). Hours and days so that teachers can teach the expected subjects with such optimization provide sufficient time availability for ongoing learning, and resolve conflicting lesson hours. In order to be able to apply a quick

solution to the problem of learning scheduling by arranging several subject schedules that depend on the teaching and learning process, at the beginning of the academic year.

RESEARCH METHODS

The problem solving method used is linear regression, the analysis system was developed with variable factors and effect variables so that it becomes a problem with scheduling arrangements if an analysis is not carried out and knowing the occurrence of a clash will occur in decision making, then it is determined through the structured learning schedule. The purpose of using this linear regression method is to determine the relationship expressed in the form of a straight line slice, namely the number of learning hours taught where the test in the form of equations includes coefficients and constants if the test results are met and ensure that the related variables form a straight line. Basically the linear regression analysis in the experiment must be applied and checked for feasibility and can be revised with a new model with an appropriate and relevant approach. Predicting accuracy with the hope of providing a clear picture of the data used is secondary data in contacting or relating data related to the conclusion that there is a value/nature/attribute of the object, activity or variation that is studied and taken (Lakon Utamakno, et.al, 2019)

RESULTS AND DISCUSSION

Analysis And Design

Research methodology is a science that studies how to make a correct scientific research. Activities carried out with strict rules and the aim is to build knowledge which ultimately gives birth to knowledge that is multidimensional, can be defined in various ways, each of which is not a complete definition. In the way of thinking, with a scientific attitude as the main characteristic of science. Others emphasize the importance of the way of doing things, namely the scientific method, as a central feature of science. On the other hand, people consider the result of the application of scientific methods, namely a collection of knowledge that is systematically and coherently arranged, as the main characteristic of science. (R. Afira, et. al, 2021).

The following is the flow of activities in conducting research methods as below:

1. Problem Identification

Is the initial stage in research, namely by explaining the background of the problem, the purpose of the problem, the benefits of the research conducted by limiting the problem, the objectives and benefits of the research conducted by limiting the problem so as not to get out of the focus of the discussion.

2. Theory Study

At this stage the researcher seeks information from sources related to the problems encountered with several library sources such as books, journals and the internet as a support and basis for writing a thesis.

3. Data Collection

- a. This stage is collecting data needed in making a thesis such as interviews, observations which can then be processed to the next stage. For this research the author uses three ways in collecting data so that this thesis can be completed
- b. Decision research (Library Research), which is taking the theory and necessary data from various libraries such as books, articles and other scientific works according to the discussion. Observation, namely observing and researching the system running at SD Muhamadiyah Sambirejo
- c. Interview (Interview), namely conducting questions and answers with competent parties at SD S Muhammadiyah Sambirejo to obtain information about the Selection of the Best Rubber Tree Planting Land.

4. Data Analysis

At this stage the researcher manages data, descriptions and sources of more complete information, the authors collect data and manage it into and related to decision support system theory and the Linear Regression method.

5. Testing And Implementation

This process is done by making software programming (coding) and entering some sample data. Then test the application programmer before use.

6. Evaluation

At this stage the researcher evaluates the existing system, whether the system is in accordance with what the user expects. Assess and evaluate the system output or results. Testing the process management input and system output.

Application of the Linear Regression Method

The application of the Linear Regression method for predicting learning scheduling at SD S Muhammadiyah Sambirejo is as follows:

1. The first step :

Determine the causal factor variable (X) and the effect variable (Y)

The causal factor variable (X) = Number of Monthly Meetings

Consequence factor variable (Y) = Number of Teaching Teachers

2. Second Step:

The following is the data that has been collected by study scheduling in tabular form:

Table 1. Scheduling Data for SD S Muhammadiyah Sambirejo

Subjects	Number of Meetings	Number of Teaching
	Monthly	Teachers
Mathematics	38	1
Indonesian	38	1
Natural science	20	2
Social science	21	1

Civic education	19	1
Art and culture	10	1
Physical education	10	2
English	10	2
Islamic education	10	2
Computer Information Technology	8	2

3. Third step :

The following is a table that has been calculated for X^2 , Y^2 , XY and the total.

Table 2. Category of Delay

Number of Meetings Monthly (X)	Number of Teaching Teachers (Y)
38	1
38	1
20	2
21	1
19	1
10	1
10	2
10	2
8	2

Calculation X^2 :

$$38^2 = 1444$$

$$38^2 = 1444$$

$$20^2 = 400$$

$$21^2 = 441$$

$$19^2 = 361$$

$$10^2 = 100$$

$$10^2 = 100$$

$$10^2 = 100$$

$$10^2 = 100$$

Calculation Y^2 :

$$1^2 = 1$$

$$1^2 = 1$$

$$2^2 = 4$$

$$1^2 = 1$$

$$1^2 = 1$$

$$1^2 = 1$$

$$1^2 = 1$$

$$2^2 = 4$$

$$2^2 = 4$$

Calculation XY :

$$1444 * 1 = 1444$$

$$1444 * 1 = 1444$$

$$400 * 4 = 1600$$

$$441 * 1 = 441$$

$$361 * 1 = 361$$

$$100 * 1 = 100$$

$$100 * 4 = 400$$

$$100 * 4 = 400$$

Table 3. Jitter Categories

X	Y	X^2	Y^2	XY
38	1	1444	1	1444
38	1	1444	1	1444
20	2	400	4	1600
21	1	441	1	441
19	1	361	1	361
10	1	100	1	100
10	2	100	4	100
10	2	100	4	400
10	2	100	4	400
8	2	64	4	256

4. Fourth Step:

Calculating A and B based on the linear regression formula
 Value of Regression Constant

$$a = \frac{12*4490 - 176*6290}{9*12^2 - 12^2}$$
$$a = -17658904$$

Regression Coefficient Value

$$b = \frac{9*6290 - 176*12}{9*18^2 - 12^2}$$
$$b = 52242$$

Fifth Step:

Calculating the forecasting prediction of the causal factor variable or the effect variable. Prediction of clashing additional hours of Computer Information Technology subjects with a total of 8 hours in a month teaching.

$$Y = -17658904 + 52242 * 8$$
$$Y = -13480968$$

So if the Computer Information Technology subjects amount to 8 hours of teaching hours in a month then the result is that there are 13 hours of meetings in a month that clash with other subjects.

CONCLUSION

1. The linear regression algorithm in this study was able to determine the value of the coefficients used in the linear regression model in predicting learning scheduling.
2. Criteria in forecasting the number of meetings per month as a cause and the number of teachers teaching as a result for linear regression in optimizing learning scheduling using linear regression.
3. The results of testing the linear regression method in optimizing learning scheduling using linear regression with a total of 10 forecasting data as analysis, and determining the forecasting results Value of 2.0063334474495 obtained data results with the number of conflicting hours.

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