

## Forecasting Straight Line Methodin The Les Monitoring System Read The Great Children (AHE) in Kudus

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### ABSTRACT

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The existence of the Covid-19 virus has an impact on almost all fields, one of which is in the field of education. With the Covid-19 virus, the learning process has changed to distance learning or online. Online learning requires parents to be able to accompany their children in learning. However, not all parents can accompany their children to study because of their busy schedule at work, or the parents' low level of education. Therefore, the existence of tutoring or tutoring places is sought to assist parents in educating their children in the midst of a pandemic. Les Baca Anak Hebat (AHE) is a special community tutoring for reading and writing. Its development in Indonesia is increasing from village to village. In Kudus City itself there are many villages that have units. With this significant number of students, the number of existing students also affects the continuation of the unit. To avoid a spike in the number of students, we need a system that can monitor or predict the number of students in the future so that no units are closed. To estimate the number of students can use one of the fields of science such as forecasting. One of the forecasting methods is the Straight Line Method. In developing the system the author uses the waterfall method with the PHP programming language and MySQL database. This web-based system is used to monitor AHE units in Kudus.

**Keywords:** *Forecasting; AHE; PHP; MySQL;*

## I. INTRODUCTION

Covid-19 or Corona virus was first discovered in the city of Wuhan, China at the end of 2019. As many as 200 countries have reported cases of Covid-19. In March 2020, Indonesia reported its first Corona case. The existence of the Covid-19 virus has had a tremendous impact on almost all fields, one of

which is in the field of education. With the Covid-19 virus, the learning process has changed from face-to-face to distance or online learning. Elementary schools or Madrasah Ibtiyah (MI) also use distance learning with parental guidance. Students conduct online learning and interact with teachers using several applications under parental supervision[1].

Learning that is carried out online is very influential on the effectiveness of learning. Online learning also has an impact on elementary schools, where not all students can use and access information technology properly. Therefore, children have difficulty following online. Online learning requires parents to be able to accompany their children in learning, but not all parents can accompany their children in learning because parents are busy at work, or the level of parental education is low, so they are unable to accompany their children to study as needed. Therefore, the existence of a tutoring or tutoring place is sought to assist parents in educating their children in the midst of a pandemic[2].

*Les Baca Anak Hebat* (Ahe) is a non-formal educational institution that is a partnership and was established at the initiative of the community. The purpose of the establishment of AHE is to help grade 1 SD/MI students who are not able or are not fluent in reading or writing so that they do not feel inferior and are able to take part in learning smoothly. Therefore, the presence of AHE in the community accompanies parents whose children have difficulties in learning to read or write[3].

Great children's lessons have been established since 2009 and are growing every year. Since the pandemic hit Indonesia, the rate of increase in the number of *AHE* tutoring units has increased. As of now, the number has reached 4,400 units. 40 units are in the Holy City. The increasing number of units, of course, has its own impact and the impact is clearly visible, namely the unequal number of students that affects the increase and decrease in each unit.

In this situation, a facility is needed that can be used to monitor the development of each unit from the number of students. To estimate the number of students, one can use one of the fields of science such as forecasting. Forecasting is done by making predictions or forecasts about what will happen in the future by looking at the situation in the past.

Similar research that has been done previously applies the straight line method. The straight line method can provide information on the time and amount that must be met in the supply of goods to prevent possible delays in the supply of goods so that customer needs are always met[4].

In accordance with the needs in this study, a straight line method is applied which can predict data with previous data within a certain period of time. The implementation of this straight line method can be customized according to the needs used to build a system that can monitor unit improvement based on the data of *AHE* students in Kudus.

## 1.1 Literature Review

An information system is a set of entities consisting of hardware, software and brainware that are related to providing processed data so that it can be useful and useful for the recipient of the data[5]. Meanwhile, according to Ratu, an information system is defined as collecting, processing, storing, analyzing, and developing information for a specific purpose. Like other systems, information systems consist of input (in the form of data or instructions) and output (in the form of reports and calculations)[6]. In conclusion, an information system is a collection of hardware, software and brainware that work together to collect, store and process information data for a specific purpose. The results of the information system in the form of reports.

Forecasting/ forecasting from Siti Khoiriyah is using data or information to determine future events, in the form of calculations or estimates from previous data[7]. Forecasting is a process carried out to estimate some future needs including needs in terms of quality, quantity, time and location needed in order to meet the needs of goods or services[4]. It can be concluded that forecasting is a process to estimate future data or needs according to previous data.

There are three types of forecasting methods, namely[8]:

- a. The Time Series method is a statistical technique that uses historical demand data to predict future demand.
- b. Regression method, is a statistical method that performs forecasting using the development of mathematical relationships between variables, namely the dependent variable (Y) and the independent variable (X). In the regression method, a model needs to be specified before data collection is carried out.
- c. Qualitative method, is a method used to decide matters relating to a long planning process using management judgment,

expertise, and opinions so that an estimate can be produced.

One of the time series methods in forecasting is the Straight Line Method. The Straight Line Method is a simple depreciation method that is most widely applied by companies engaged in business or trade. The equation formula for the Straight Line Method can be seen in equation (1) as follows[9]:

$$\begin{aligned}
 yc &= a + bx & (1) \\
 a &= (\sum y)/n \\
 b &= (\sum xy)/(\sum x^2)
 \end{aligned}$$

Information :

- yc :Projected Values(future data)
- y :Actual Values(previous data)
- x : Markregression
- a :Average actual value data (moving average)
- b : Regression coefficient for the variable "x"
- n : The amount of data is calculated from the base year (units can be weeks, months, semesters, years)

PHP (Hypertext Preprocessor)is an open source programming language. Which is devoted to web development and can be embedded in HTML. PHP itself describes several programming languages such as C, Java and Perl and is easy to learn[10]. Ratu stated that PHP (Hypertext Preprocessor) means a server-side scripting language that integrates with HTML to form dynamic web pages. The syntax and commands from PHP are executed on the server and the results will be sent to the browser in HTML format[6]. It is concluded that PHP (Hypertext Preprocessor) is an open source programming language that is integrated with HTML to form a dynamic web page. PHP syntax will be processed and then displayed to the browser page using HTML format.

MySQL is an open source database as a result it is widely used for media. Although it is free, MySQL is still of high quality and has provided relatively adequate performance[10]. Meanwhile, Muhamad Tabrani, stated that MySQL is a database that connects PHP scripts using the same query and character escape commands using PHP[11]. According to Ratu, MySQL is an RDBMS (or database server) that manages databases to quickly accommodate

very large numbers and can be used by many users[6]. It can be concluded, that MySQL is an open source database that works with PHP scripts using query commands. MySQL can accommodate large amounts of data and can be accessed by many users using adequate quality.

UML is the "language" used as an industry standard for visualizing, designing and documenting software systems[12]. According to Muhamad Tabrani, UML (Unified Modeling Language) means a system development technique that uses a graphical language as a sense for documenting and performing specifications on the system[11]. In conclusion, UML is a technique in the form of designing a system to become a standard or specification of the software system to be made.

According to Winston Royce in the 70s, the waterfall method is a sequential software development process, in which progress is seen as continuously flowing down like a waterfall through the phases of planning, modeling, implementation and testing. The development of the waterfall method has a coherent stage. The stages of the waterfall method are shown in Figure 1:

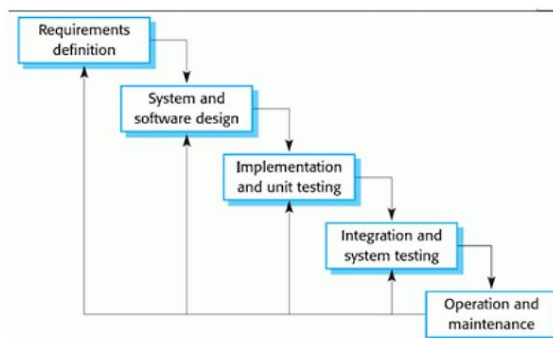


Figure 1. The Waterfall Method according to Winston Royce

a. Requirements(needs analysis)

Collecting data in this stage by conducting research, interview, or literature study. This stage produces data related to the wishes of the user in making the system. This document is used as a reference for the analysis system to translate into a programming language.

b. System design(system design)

The design process will translate the requirements into a software design that can be estimated before coding. This stage produces a document called software requirements. This document is used by programmers to carry out system creation activities.

c. Coding & testing(program syncoding / implementation)

Coding is the translation of the design into a language that can be recognized by the computer. This stage is a real stage in working on a system. In the sense that the use of computers will be maximized in this stage. After that, testing of the system that has been made earlier will be carried out. The goal is to find errors in the system which are then corrected.

d. Application / program testing (integration & testing)

It can be said that this is the final stage in the creation of the system. After doing the analysis, design and coding, the finished system is used by the user.

e. Maintenance (operation & maintenance)

Software that has been delivered to customers will definitely experience changes. The change will be faulty because the software must adapt to the new environment, or because the customer requires functional development[13].

## II. METHODOLOGY

This research methodology section will explain the stages that are passed when carrying out the research. The steps taken are as follows:

- a. Determination of Research Problems  
Define the problem by conducting a field study and finding the required data.
- b. Determination of Computational Approach  
The method used in the analysis and design is UML, while the method in system development uses the waterfall method.
- c. Software Development  
This research uses PHP programming and MySQL database as a means of making the application prototype.

In developing the system in this study, the waterfall method is used as shown in Figure 2.

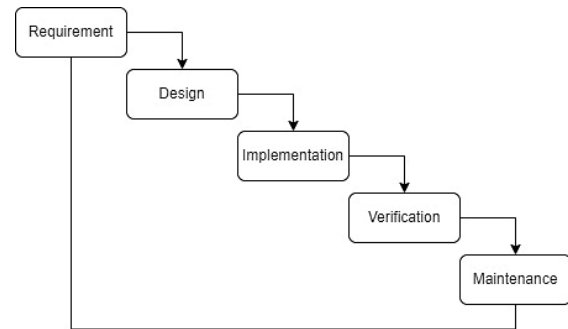


Figure 2. Waterfall Method

The stages that are passed are as follows[14]:

### 1. Software analysis

Data collection requires collaboration with the relevant agencies, in this case, the center for Reading Lessons for Children *Hebat* and units for *Les Baca Ahe* in Kudus. The steps taken in data collection.

The data obtained through the process of interviews and observations at the relevant agencies. Collecting data through observations was carried out using the author's way of going directly to several units that are active in Kudus. The author observes the learning process, the location of the unit and collects data from the official website of the center. Interviews were conducted using certain communications with unit owners who had the status of related trainers using the problems studied. In addition, the author also contacted each unit owner via messages related to the problem being studied.

The data generated from books and literature include literature studies and document studies. Library study data collection is taken from books or literacy in accordance with the theme of the problem studied by the author. While the document study, data collection was taken from the official website of *Les Baca Anak Hebat*, the registration form from each unit and the google form that has been filled out by each unit owner. In this case, the author only asks for unit data and student data.

### 2. System design

At the design stage, the author makes interface design and system design to assist in designing the software to be made. In designing the program the author uses UML (Unified Modeling Language) which consists of use

cases, activity diagrams, sequence diagrams and class diagrams.

interface design includes the design of the form used to estimate and adjust the screen size of the device. The interface design is shown in Figure 3.

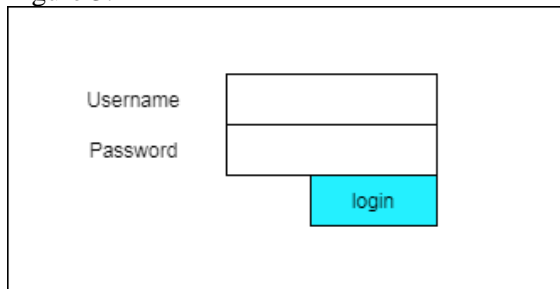


Figure 3. Login form

Use case diagrams is a series or description of a group that is interrelated and forms a system regularly carried out or initiated by actors. Use case describes the behavior of objects in an example and is realized in collaboration[15]. Use case diagrams are used to describe the relationship between actors and use cases in the software to be developed. The use case of this system can be seen in Figure 4.

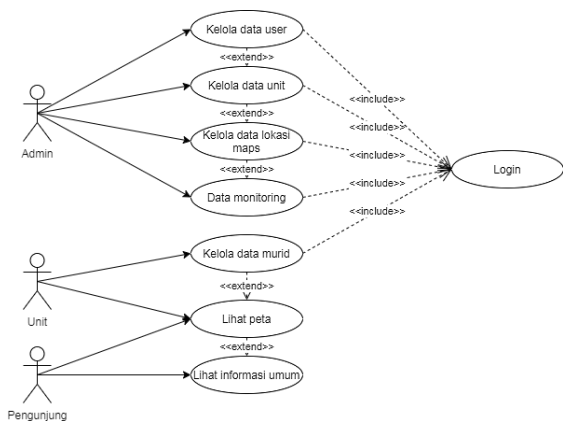


Figure 4. Use case diagrams

Activity diagrams reveal various activities that occur in the system that is being designed. Activity diagrams are also able to describe parallel processes that may occur in several punishments.[15]The activity diagram is shown in Figure 5.

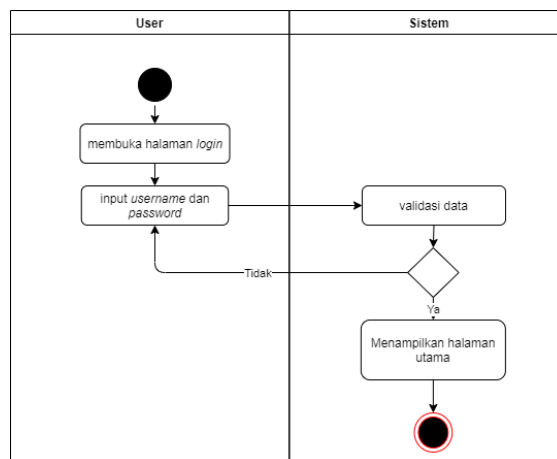


Figure 5. Activity diagrams

Sequence diagrams is a diagram that shows the relationships between objects in a system arranged in a sequence or time series. Sequence diagrams are used to describe the scenario of the steps taken as a response to an event to make certain results[15]. The sequence diagram can be seen in Figure 6.

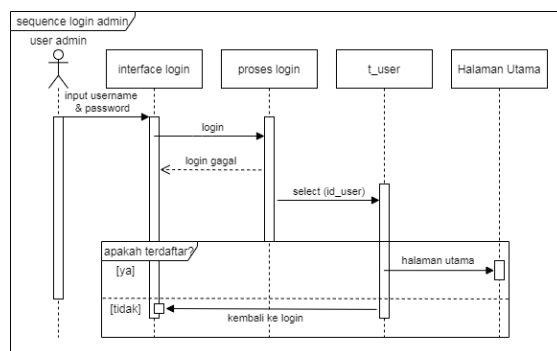


Figure 6. Sequence diagrams

From the use case explanation, we get several nouns or objects that are system architecture. From these objects can be used to create class diagrams. The class diagram can be seen in Figure 7.

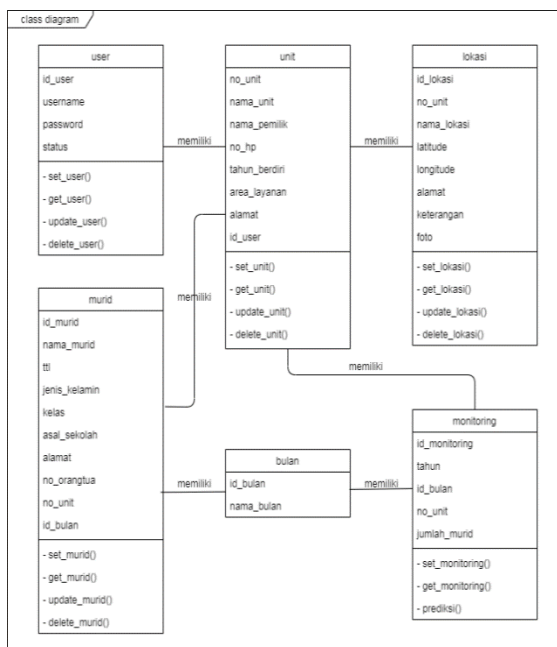


Figure 7. Class diagrams

### 3. Program code generation

At this stage, the author begins the preparation of the program code. Making the program code consists of creating a database and displaying the designed system.

Databases means the data storage area that will be used in this system. The structure of the user table can be seen in table 1.

| Name              | Type         | Information |
|-------------------|--------------|-------------|
| no_unit           | Int(11)      | Primary Key |
| unit_name         | Varchar(255) | not null    |
| Name of the owner | Varchar(255) | not null    |
| Phone number      | Varchar(255) | not null    |
| Since             | Int(11)      | not null    |
| Service_area      | Varchar(255) | not null    |
| Address           | Text         | not null    |
| Id_user           | Int(11)      | Foreign Key |

### 4. Test

At this stage, the program is tested to ensure that the system performance is appropriate. System testing is carried out using two methods, black-box testing and user acceptance testing.

### 5. Maintenance (maintenance)

The last stage is system maintenance carried out in the future. There are changes in the system due to errors (bugs) that occur after

testing the software. This maintenance also evaluates the existing system back.

## III. RESULTS AND DISCUSSION

### 3.1 Login view

The login display is the display used to input the username and password which then the system will detect the user's status and grant access rights to the user. Display The user display can be seen in Figure 8.

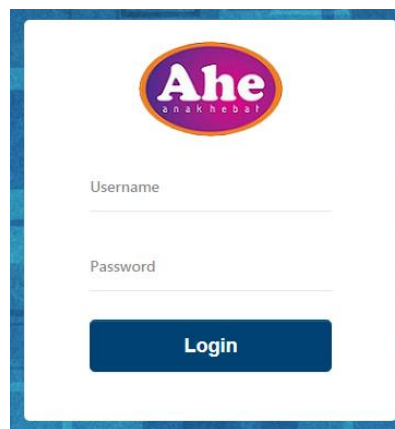


Figure 8. Login view

### 3.2 Amin Dashboard

The admin dashboard is the interface that first appears when logging into the system using the admin status. The admin dashboard display is shown in Figure 9.

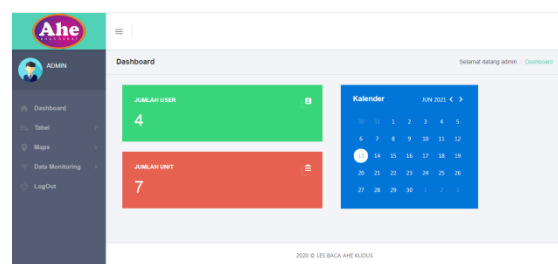


Figure 9. Admin dashboard view

### 3.3 User Data Display

User data display is an interface display that contains all user data that has access rights to the system. User data display can be seen in Figure 10.

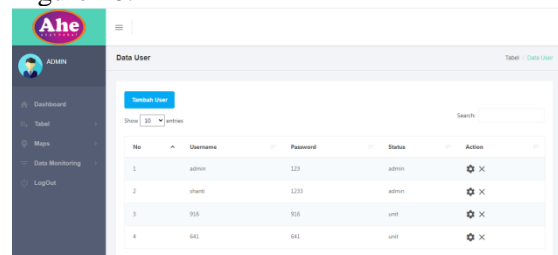


Figure 10. User data display

### 3.4 Display Add User Data

Add user data is used to add a new user to the system. The display of added user data can be seen in Figure 11.

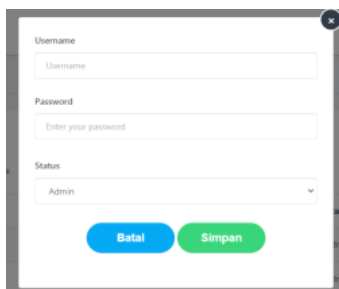


Figure 11. Display add user

### 3.5 Forecasting View

Forecasting view is an interface display that contains forecasting calculation data from the selected unit. The forecasting view can be seen in Figure 12.

Figure 12. Forecasting view

In the forecasting view, the system takes data from the related unit which is then calculated according to the forecasting formula that has been included. The results of this forecasting calculation are the number of statistics from students in each unit that must be held in the following month.

To predict the number of students that must be held, the calculation is carried out using the straight line method. This forecast is calculated using data from the previous 6 months to calculate the number of students in the following months. Therefore, data from each unit is needed for the previous 6 months starting from July to December 2020. The unit data sample is seen in table 2.

Table 2 Forecasting unit sample table 916

| Month | No Unit | The number of students | X | X <sup>2</sup> | XY |
|-------|---------|------------------------|---|----------------|----|
|-------|---------|------------------------|---|----------------|----|

|           |     |     |    |    |     |
|-----------|-----|-----|----|----|-----|
| July      | 916 | 25  | 1  | 1  | 25  |
| August    | 916 | 26  | 2  | 4  | 52  |
| September | 916 | 35  | 3  | 9  | 105 |
| October   | 916 | 33  | 4  | 16 | 132 |
| November  | 916 | 36  | 5  | 25 | 180 |
| December  | 916 | 38  | 6  | 36 | 228 |
| Amount    |     | 193 | 21 | 91 | 722 |

Is known :

$n = 6$  (number of months to be forecast)

$a = ((\sum y)/n) = 193/6 = 32.167$

$b = ((\sum xy)/((\sum x^2))) = 722/91 = 7.934$

$x =$  inputted prediction value

Forecasting calculation using straight line method for the next 3 months:

$yc = a+bx = 32.167+(7.934) = 55.934$  rounded up to 55.

The final result of the forecasting process is a report on the number of students in the following months. Below is an example of data from students in one of the units that will be analyzed and forecasted in the next few months. An example of the analyzed data can be seen in table 3.

Table 3. Example data unit 916

| Year | Month     | The number of students |
|------|-----------|------------------------|
| 2020 | July      | 25                     |
| 2020 | August    | 26                     |
| 2020 | September | 35                     |
| 2020 | October   | 35                     |
| 2020 | November  | 36                     |
| 2020 | December  | 38                     |

To predict the number of students in the following month, a test is carried out using the Straight Line Method technique. Forecasting calculations from the analyzed data can be seen in table 4.

Table 4. Calculation of forecasting data unit 916

| Month | No unit | Number of students (y) | x | xx | xy |
|-------|---------|------------------------|---|----|----|
|-------|---------|------------------------|---|----|----|

|           |     |     |    |    |      |
|-----------|-----|-----|----|----|------|
| July      | 916 | 25  | -5 | 25 | -125 |
| August    | 916 | 26  | -3 | 9  | -78  |
| September | 916 | 35  | -1 | 1  | -35  |
| October   | 916 | 35  | 1  | 1  | 35   |
| November  | 916 | 36  | 3  | 9  | 108  |
| December  | 916 | 38  | 5  | 25 | 190  |
| Total     |     | 195 | 0  | 70 | 95   |

Is known :

$n = 6$  (number of months to be forecast)

$a = (\sum y)/n = 195/6 = 32.5$

$b = (\sum xy)/(\sum xx) = 95/70 = 1.36$

$z =$  inputted prediction value

Forecasting calculations using the straight line method for January 2021 are:

$yc = a+bz = 32.5+(1.36 \times 1) = 33.86$  rounded up to 33.

The following are the results of forecasting the number of students for the next 6 months which can be seen in table 5.

Table 5. Forecasting calculation results

| No | Month    | Amount |
|----|----------|--------|
| 1. | January  | 33     |
| 2. | February | 35     |
| 3. | March    | 36     |
| 4. | April    | 37     |
| 5. | May      | 39     |
| 6. | June     | 40     |

The calculation of the Mean Absolute Percent Error (MAPE) in the straight line method means the average of the overall errors (difference) between the actual data using forecasting data displayed in percentage form. The formula for calculating MAPE can be seen in equation (2) below:

$$MAPE = ((\sum[(y-yc)]/y)/n) \times 100 \quad (2)$$

In determining the MAPE, is done by giving weights to the data from the forecasting results as can be seen in table 6.

Table 6. Weighting of sample data

| Number of previous students (y) | Next number of students (yc) | (y-yc)/y |
|---------------------------------|------------------------------|----------|
| 25                              | 33                           | 0.35     |
| 26                              | 35                           | 0.35     |
| 35                              | 36                           | 0.04     |
| 35                              | 37                           | 0.08     |
| 36                              | 38                           | 0.09     |
| 38                              | 40                           | 0.07     |
| Total                           |                              | 1        |

Is known :

$n = 6$  (months)

$MAPE = ((\sum[(y-yc)]/y)/n) = 1/6 \times 100 = 16.67\%$

So the average error of the straight line method is 16.67%.

In the previous study, the forecasting calculation for the X value used odd numbers as the regression value, namely 11-9-7-5-3-1 etc. to -11 while in this study using 5-4-3-2-1 to -5. This difference is to maximize forecasting results. In addition, the calculation of the time period used is different, namely 1 year and 6 months. This study uses a shorter period of time to adjust to the condition of the unit where a lot of data is tucked away and lost so that it can only use data for the previous 6 months.

So the use of forecasting methods should be adjusted to the time, for the use of more accurate numbers.

### 3.6 System testing

Black-box testing is carried out to find out whether all the functions contained in the application have been running properly as needed or if there are still errors (bugs). The general black-box testing can be seen in table 7.

Table 1. System testing

| No | Tested part | Test scenario | Expected results | Results |
|----|-------------|---------------|------------------|---------|
|----|-------------|---------------|------------------|---------|



|    |                  |  |   |               |
|----|------------------|--|---|---------------|
| 1. | <i>Login</i>     | Enter username and password  | The system will identify the user status and enter the main page according to the user status   | In accordance |
| 2. | User data        | Pressing or clicking on user data in the menu  | The system displays user data registered in the database  | In accordance |
| 3. | Add user data    | Entering new user data into the system which will later be used to access the system   | The data is saved to the database and displayed in the table  | In accordance |
| 4. | Change user data | Pressing the edit icon, after the edit page appears, change the form as needed, click the update button                                      | The system will process the changed data and update it  | In accordance |
| 5. | Delete user data | Pressing the cross icon, after the delete page appears, click the delete button  | The system will process the selected data and then delete it from the database  | In accordance |
| 6. | Monitoring data  | Selecting the unit to be monitored, after the forecasting page appears, the data can be added or predicted according to the specified choice | The system displays the forecasting page along with the calculation results, processes the incoming data and the data you want to predict according to the prediction options | In accordance |

#### IV. CONCLUSION

Conclusions that can be drawn based on the results and discussion are as follows:

1. The student registration process in each unit is easier and the data can be stored properly. So that the consultant or agent can monitor the development of the unit in Kudus.
2. Monitoring results in the form of predictions of the number of students in the future in the form of data.
3. Reducing the use of paper with a computerized system.

The suggestions for improving the system in the future to make it more optimal are:

1. In using the Straight Line Method for maximum results, data from a longer period of time can be used.
2. Can add other features, for example the calculation of tuition for each child.
3. Can be developed into android so that the monitoring process can be more effective.

#### BIBLIOGRAPHY

- [1] R. Yunitasari and U. Hanifah, "Pengaruh Pembelajaran Daring terhadap Minat Belajar Siswa pada Masa COVID-19," *J. Ilmu Pendidik.*, no. 3, pp. 232–243, 2020.
- [2] M. Sadri, "Peran Rumah Bimbingan Belajar dalam Membimbing Belajar Siswa Jenjang SD/MI saat Sekolah Daring," *J. BASICEDU*, vol. 6, no. 2, pp. 1696–1703, 2022.
- [3] S. Q. A'yuni, "Analisis Pelaksanaan Konsep dan Teori Mutu Pendidikan di Les Baca Anak Hebat (Ahe) Yogyakarta," *ÁL-FÂHIM*, vol. 1, no. 2, pp. 159–179, 2019.
- [4] L. Fajarita and E. N. Hati, "Penerapan Forecasting Stright Line Method Dalam Pengadaan Stok Barang Mendatang Studi Kasus : PT. Bina Karya Kusuma," *Pros. SINTAK*, 2018.
- [5] A. Herliana and P. M. Rasyid, "Sistem Informasi Monitoring Pengembangan Software Pada Tahap," *J. Inform.*, no. 1, pp. 41–50, 2016.
- [6] Aris, R. T. Tanbiroh, N. M. Putri, and D.

- M. Sofyan, "Aplikasi Sistem Informasi Monitoring Capaian Kinerja Berbasis Android Pada PUSAT PELAPORAN DAN ANALISISTRANSAKSI KEUANGAN," *Semin. Nas. Teknol. Inf. dan Multimed.* 2016, pp. 31–37, 2016.
- [7] S. Khoiriyah and R. M. Manikam, "Analisa dan Perancangan Sistem Perhitungan Insentif Marketing Trade Menggunakan Sistem Remunerasi," *EDUMATIC J. Pendidik. Inform.*, vol. 3, no. 2, pp. 99–108, 2019, doi: 10.29408/edumatic.v3i2.1691.
- [8] T. Khotimah and R. Nindiyasari, "Forecasting Dengan Metode Regresi Linier Pada Sistem Penunjang Keputusan Untuk Memprediksi Jumlah Penjualan Batik ( Studi Kasus Kub Sarwo Endah Batik Tulis Lasem )," *J. Mantik Penusa*, vol. 1, no. 1, pp. 71–75, 2017.
- [9] F. Musadat, L. M. F. Israwan, and H. Wijaya, "Penerapan Statistical Straight Line Method Pada Sistem Pendukung Keputusan Prediksi Harga Pangan Application of Straight Line Statistical Methods in Decision Support Systems for Food Price Predictions," *J. Inform. Unidayan*, vol. 9, no. 1, pp. 68–75, 2020.
- [10] M. Sabar, A. Heryanto, and F. Lestari, "Sistem Informasi Monitoring Kegiatan Santri Berbasis Android Studi Kasus : Pesantren Al-Hidayah Garut," *J. Ilm. Teknol. Infomasi Terap.*, vol. 5, no. 3, pp. 30–35, 2019, doi: 10.33197/jitter.vol5.iss3.2019.297.
- [11] M. Tabrani and I. R. Aghniya, "Implementasi Metode Waterfall Pada Program Simpan Pinjam Koperasi Subur Jaya Mandiri Subang," *J. Interkom J. Publ. Ilm. Bid. Teknol. Inf. dan Komun.*, vol. 14, no. 1, pp. 44–53, 2020, doi: 10.35969/interkom.v14i1.65.
- [12] D. E. Profesi, "Analisis Dan Perancangan Sistem Informasi Kepegawaian Menggunakan Unified Modeling Language ( Uml )," *J. Sist. Inf. Dan Teknol. Inf.*, vol. 7, no. 1, pp. 22–33, 2018.
- [13] C. Trisianto, "Penggunaan Metode Waterfall Untuk Pengembangan Sistem Monitoring Dan Evaluasi Pembangunan Pedesaan," *J. Teknol. Inf. ESIT*, vol. 182, no. 23, p. 321, 1942, doi: 10.1093/nq/182.23.321-a.
- [14] H. Nur, "Penggunaan Metode Waterfall Dalam Rancang Bangun Sistem Informasi Penjualan," *Gener. J.*, vol. 3, no. 1, p. 1, 2019, doi: 10.29407/gj.v3i1.12642.
- [15] Rismayani and H. SY, "Sistem Informasi Monitoring Penyewaan Scooter dan Mobil Mainan Elektrik Berbasis Android," *Semin. Nas. Teknol. Inf. dan Multimed.* 2016, pp. 6–7, 2016.