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Research Article

E-Learning Application Design at SMK Pelita Bangsa during the Covid-19 Pandemic

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Abstract:. The corona virus (covid-19) pandemic in Indonesia has forced the Government to make several policies to break the chain of spreading this virus. There are many policies made by the government in several fields, especially the education sector. One of the policies made was distance learning or online learning which was carried out during the Covid-19 pandemic so as not to crowd. This policy changes the habits and behaviour of teachers and students so far. The problem experienced by SMK Pelita Bangsa is the large number of students and teachers it has, SMK Pelita Bangsa must follow the Government's policy of conducting a distance learning process. Meanwhile, SMK Pelita Bangsa still uses conventional face-to-face learning methods. Based on this description, it is necessary to design a website-based E-Learning which later can help the distance learning process between teachers and students. The results of this E-Learning design research were conducted to provide solutions in the teaching and learning process at SMK Pelita Bangsa. This e-Learning has three main users, namely admin, teachers and students. Some of the learning processes include the teacher uploading materials and assignments, students downloading materials and doing assignments, admin adding teacher and student data and controlling the entire learning process. The programming language for designing E-Learning is the PHP programming language and MySQL as the database.

Keywords: E-Learning, Covid-19, Online learning, PHP

1. Introduction

Learning is a teaching and learning process in which there is a process of interaction between students and educators which aims to make students have skills and abilities after the teaching and learning process. There are three methods in learning, namely conventional learning, online or distance learning, and blended learning.

Conventional learning is traditional learning that has been carried out for a long time in the learning process between educators and students. Conventional learning methods are carried out by educators providing lecture material along with explanations and giving assignments or exercises. In this learning, students listen more to the material presented by the educator and carry out tasks or exercises given by the educator. The development of information technology is growing very rapidly from time to time. Technological development is felt to touch all processes and aspects of human life, especially education. The learning process that was originally conventional is now beginning to shift towards distance learning regardless of distance, place and time limit. This learning is called E-Learning. E-Learning is used to deliver learning, training or education using electronic media such as computers and cellphones.

The corona virus (covid-19) pandemic in Indonesia has forced the Government to make several policies to break the chain of spreading this virus. One of the policies in the education sector is to carry out a distance learning process or online. This policy requires changing the behavior and habits of teachers and students where initially using conventional learning methods now must be changed to distance learning methods. Educators must provide appropriate learning media to use so that the educational process can be integrated and run well. Learning media is a tool in the learning process both inside and outside the classroom, it is further explained that learning media is a component of learning resources or physical vehicles that contain instructional material in the student environment that can stimulate students to learn [1].

Based on this description, it is necessary to design a website-based E-Learning which later can help the distance learning process between teachers and students. The results of this E-Learning design research were conducted to provide solutions in the teaching and learning process at SMK Pelita Bangsa. This e-Learning has three main users, namely admin, teachers and students. Some of the learning processes include the teacher uploading materials and assignments, students downloading materials and doing assignments, admin adding teacher and student data and controlling the entire learning process. The programming language for designing E-Learning is the PHP programming language and MySQL as the database.

2. Method

The needs analysis and design of E-Learning uses the waterfall method. The waterfall method was chosen because the design process is sequential like a waterfall flow. The stages taken are interviews, literature study, analysis, system design, programming and testing. The waterfall method can be seen in Figure 1 below:

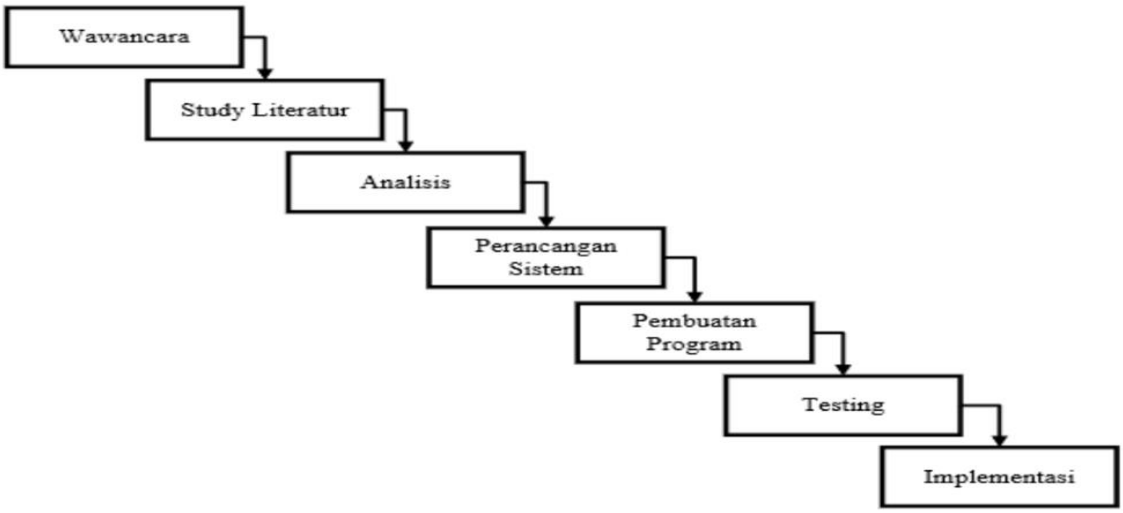

Figure 1. Waterfall Research Method

- *Interview*
  Interviews were conducted as a direct data collection process to obtain information about the flow of the learning process that exists in schools. The interview process was carried out with the principal of SMK Pelita Bangsa with the aim of obtaining detailed information.
- *Literature Study*
  The process of collecting data by studying literature, articles, journals, previous research and other information related to the design of E-Learning as material for literature review.
- *Analysis*
  At the analysis stage, the collection of needs is carried out to specify the system requirements to match the needs of SMK Pelita Bangsa. All the required data have been obtained, and then proceed with the design of the system that will be made.
- *System planning*
  This system planning is made to provide a general and clear description according to user needs with 3 stages, namely DFD, database design and interface design.
- *Program Creation*
  Program design is carried out based on the system design carried out in the previous process. The programming process is carried out using the PHP programming language and MySQL database management.
- *Testing*
  Testing or testing phase is the stage where experimental testing is carried out on each part of the system. This test is carried out with a black box model, namely the system testing process is carried out from the user login process to the system process report. Every process of testing must run well and nothing should fail.
- *Implementation*
  The implementation stage is the stage of carrying out the application process on each part of the system. The implementation of this program was tested on several teachers and students at SMK Pelita Bangsa before later being applied online.

3. Findings and Discussion

Results and discussion explain the results that have been carried out in the previous methodology, namely interviews, literature study, analysis, system design, programming and testing.

- *Interview*
  The interview stage was carried out to various sources, especially the principal of SMK Pelita Bangsa by coming directly to the location. Based on the results of the interview, it was found that the Pelita Bangsa Vocational High School still applies a conventional or traditional learning process which is considered limited in delivering material. This of course cannot be applied during the Covid-19 pandemic. In addition, data will be obtained which will be used for reference in building the E-Learning database, including student data, teacher data, grade data, lesson data, class data and schedule data.
- *Study literature*
  Literature study is carried out by collecting and analyzing various theoretical sources related to E-Learning, whose main focus is website-based, so that it gets guidance and limitations in its development.[2]

- *Analysis*
  a. Functional requirements analysis
     Analysis of functional requirements results that in E-Learning at SMK Pelita Bangsa there are three users, namely admin, teachers and students.
  b. Admin
     Admin has access rights to manage student, teacher, material, class and schedule data. Admin also gets reports on student learning outcomes. Admin can process all existing data on E-Learning.
  c. Teacher
     Teachers can input material and assignments. In addition, the teacher can input grades or get an automatic score if the quiz is a multiple choice. Teachers can make student reports as a form of evaluation
  d. Students
     Students will get schedules, materials and assignments / quizzes from the teacher. Students can download materials and answer or upload assignments. In addition, students also get the results of assignments or quizzes.
  e. Non-Functional requirements analysis
     Non-functional requirements are those needed in identifying what is needed so that E-Learning can run well. Some of these needs include an Intel Core i3 CPU, SSD 125, 500 GB HDD, 4 GB RAM, keyboard, mouse, server using XAMPP, Microsoft Windows 7, Google Chrome browser and Mozilla Firefox.

- *System planning*
  a. Context Diagram
     To design the system, it is necessary to make a DFD which consists of a Context Diagram and Level 0 DFD. Context diagram is an overview of a running system in which there are 3 users, namely admin, teacher and students. The context diagram can be seen in Figure 2 below:

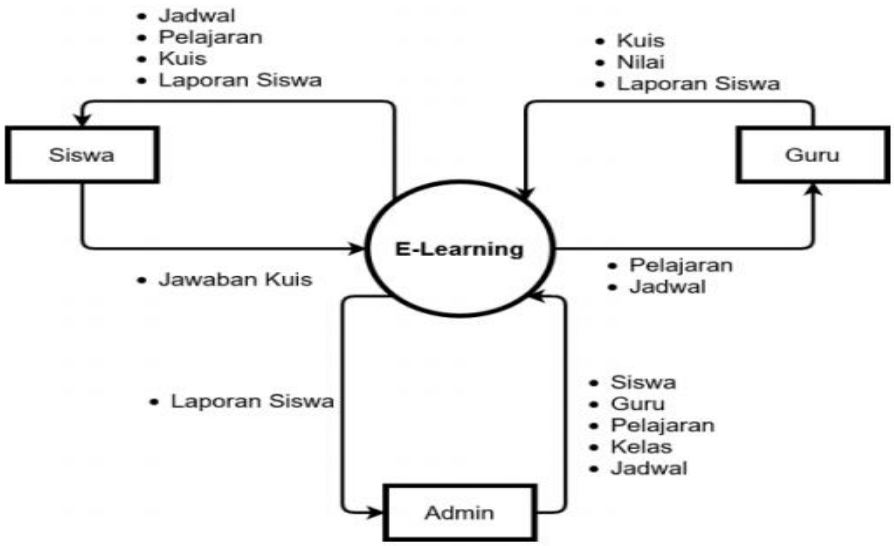

Figure 2. Context diagram

  b. Data Flow Diagram (DFD) Level 0
     DFD is a model of a system to describe the distribution of smaller systems. DFD level 0 can be seen in Figure 3 below:

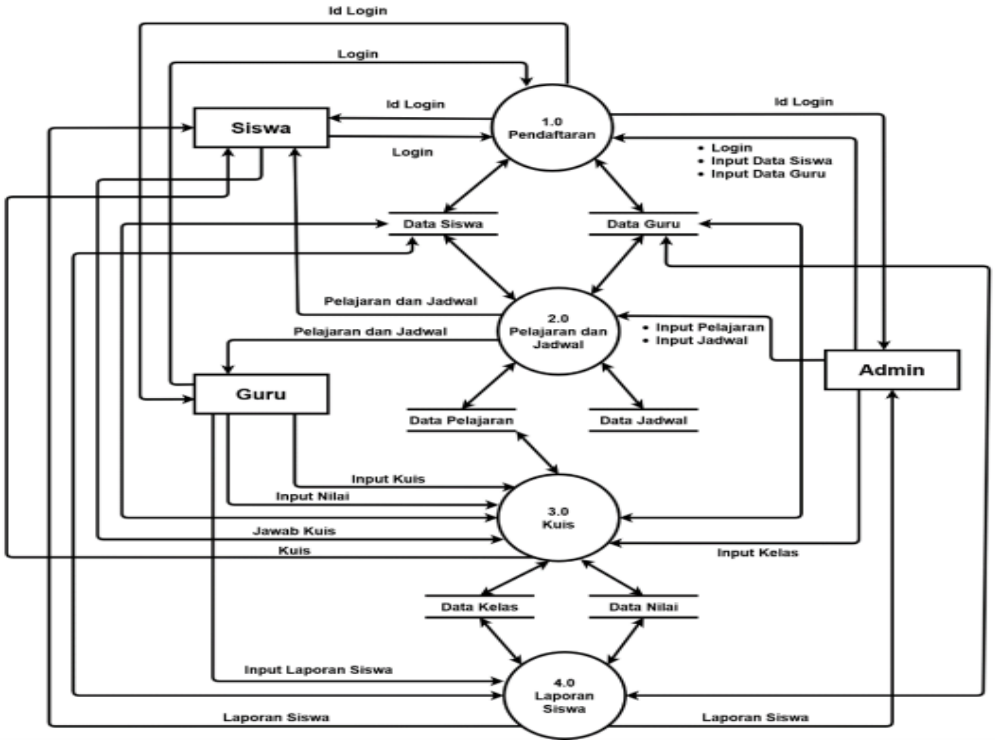

Figure 3. DFD Level 0

c. Entity Relationship Diagram (ERD)
ERD is used to describe the relationship between data objects that have a relationship with one another. In this E-Learning, there are seven entities, namely admin, teacher, students, material, assignments, grades and schedules. ERD from the E-Learning design at SMK Pelita Bangsa can be seen in Figure 4 below:

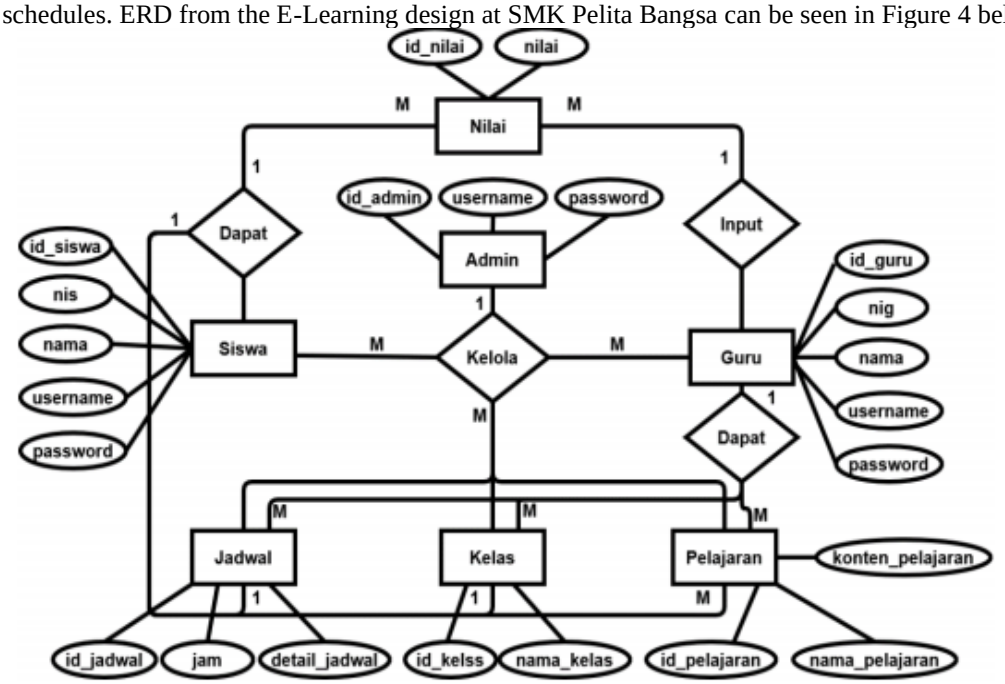

Figure 4. Entity Relationship Diagram

- *Program Creation*
The process of making the program is carried out after the design design has been completed. Programming is done with the PHP programming language and MySQL database. Some of the display results from E-Learning are as follows:

a. *Homepage*

This page display is the start page of the E-learning website of SMK Pelita Bangsa. This page contains a menu about, gallery, news, e-learning for teacher and student login, rpl and contacts. The main page can be seen in Figure 5 below:

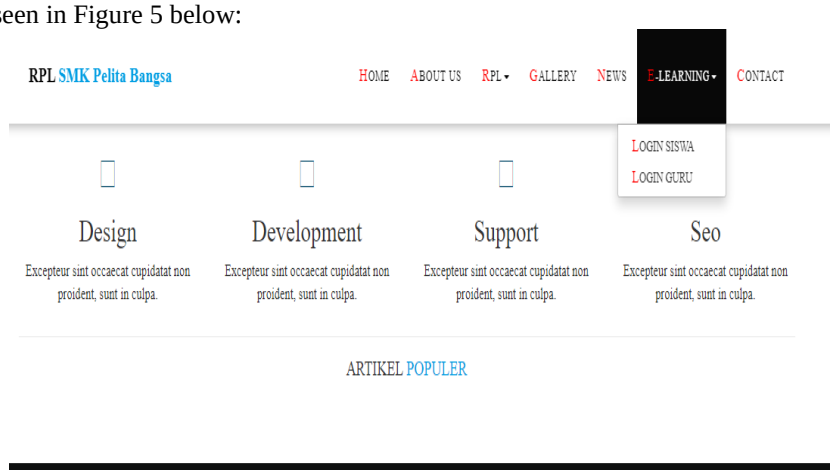

Figure 5. Home page

b. *Admin page*

The admin page display is the main page that can process all existing data on the E-Learning of SMK Pelita Bangsa. Some of the menus in the admin include the dashboard and main menu, namely student management, class management, subjects, materials, quiz management, student registration, teacher management, administrator management and module management. The admin page can be seen in Figure 6 below:

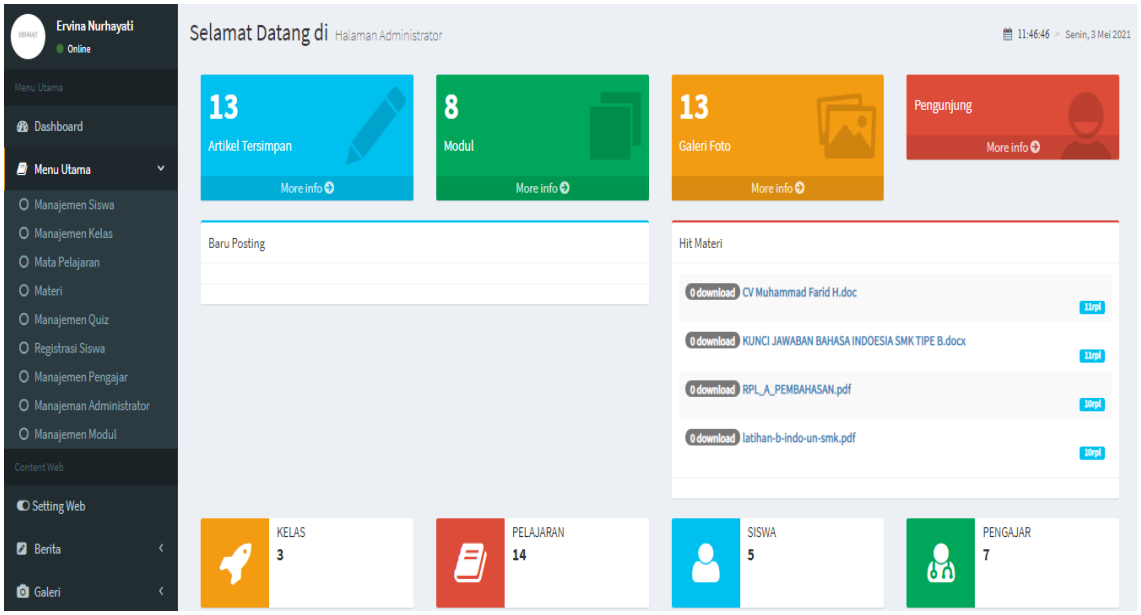

Figure 6. Admin page

c. *Teacher's page*

The teacher page display is the page that the teacher uses in the online learning process. Some of the menus on the teacher's menu are class management, subjects, materials and quiz management. The teacher page can be seen in Figure 7 below:

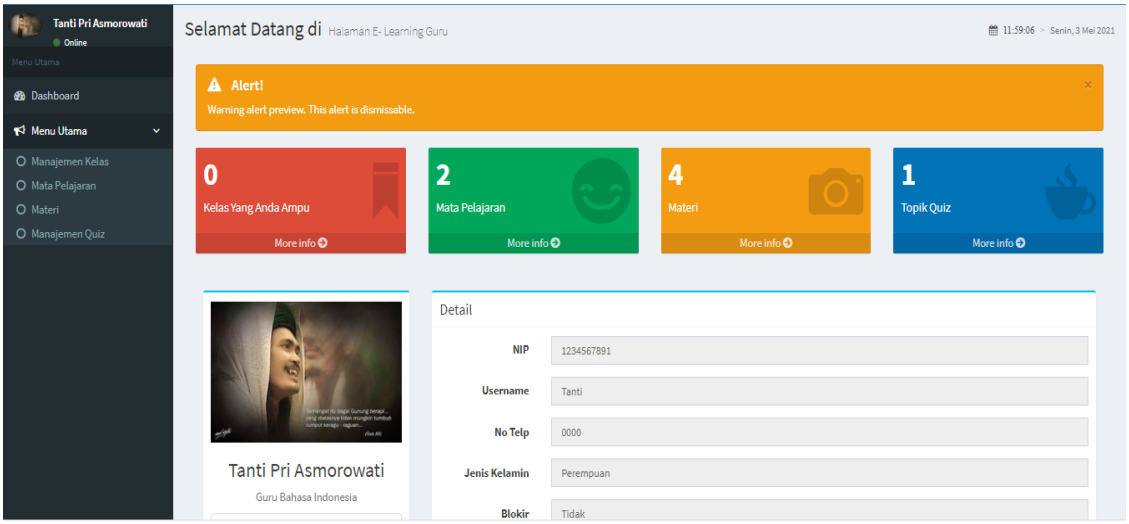

Figure 7. Teacher page

d. Students page

Student page views are the pages used for students in the online learning process. On this page there are several menus, namely classes, subjects, materials, assignments / quizzes, grades and accounts. The student page can be seen in Figure 8 below:

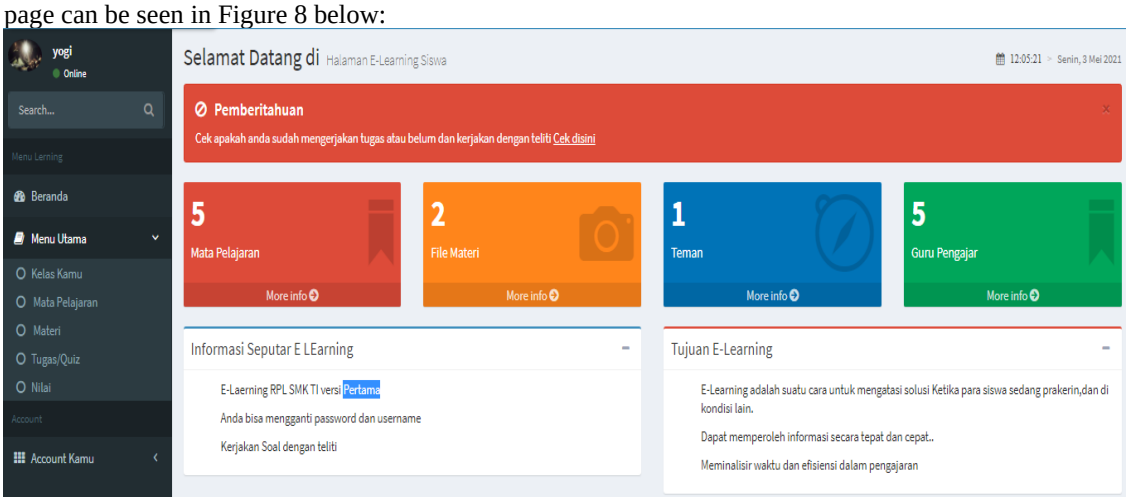

Figure 8. Student Pages

- *Testing*

  Testing on E-Learning is carried out using the blackbox method, namely testing is carried out in every part of the E-Learning system. Starting from the login process to the logout process. This test aims to determine whether the processes of each system are running well and according to plan. The result is that all processes in E-Learning can run well and according to plan starting from the admin, teachers and students.
- *Implementation*

  The implementation stage is the last stage of this research. The implementation of E-Learning is carried out at SMK Pelita Bangsa. At this stage the principal and researchers made an agreement that the hosting would be carried out by SMK Pelita Bangsa. Before being online, the application was tested first for E-Learning users, namely the admin, some teachers and students.

4. Conclusion and Suggestions

Conclusion

Based on the results and discussion in the previous chapter, it can be concluded as follows:

- E-Learning is made to provide solutions to the online learning process at SMK Pelita Bangsa which helps the learning process of teachers and students.
- This website-based e-Learning has several processes, including the teacher can add material and assign assignments; the teacher can give grades to students. Students can access and download material. In addition,

students can work on and upload assignments / quizzes. Admin can manage all data in E-Learning, including teacher data, student data, class data, lesson data and grade data.

- The programming language used in making E-Learning is the PHP programming language with the MySQL database.

Suggestion

Based on the results of the research conducted, the suggestions that can be given in the development of E-Learning include:

- E-Learning applications are expected to be available in the form of android for the convenience of students in accessing.
- E-Learning in the future is expected to have a video call menu to facilitate the online learning process.
- E-Learning in the future, it is hoped that there will be a video upload menu to make it easier for teachers to upload learning material videos.

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