

Online Learning Service Application Design Using Flutter and Laravel Framework

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Abstract

Bimbel Prisma is an elementary-high school level tutoring institution located at Jalan Pelopor Blok O8 RT.007 RW.011, Tegal Alur District, Kalideres Village, West Jakarta. Prisma Bimbel was founded because of the large number of requests from the community who wanted their children who occupy elementary to high school seats to improve their performance in school. The use of the Flutter framework as a Front-End Mobile Application and this application has a Video Conference using Flutter making application design easier with a collection of widgets that have been provided and can be customized as needed and have high performance which will make the application more comfortable to use. By using the Laravel framework, it makes backend design in the form of an Application Programming Interface (API) easier and saves time by using the Restful Controller feature and has strong security in protecting the backend so that user data privacy becomes more secure. With the online learning service application, it is able to improve the learning process for students by studying material or answering questions that can be accessed via the internet so that it helps improve the quality of education and is able to improve the performance process for staff and teachers without having to come to the office because it is online based but can be productive. in handling administrative services or learning activities.

I. INTRODUCTION

Online learning is the concept of learning that is carried out online or through the internet. Very advanced technology in the modern era and globalization makes various activities carried out efficiently and can be done using only gadgets. Technological developments in the field of education with the use of e-learning in learning activities in schools, colleges, courses and even online communities have started to use concepts like this. With the development of information technology, various concepts have been developed to replace face-to-face learning methods, one of which is the concept of online learning.

There are several obstacles to online learning carried out by the school which is considered less effective, such as the learning materials provided are less attractive so that students are not serious in carrying out learning activities. Interesting and fun learning media will be able to eliminate boredom in learning. Online learning requires variety to eliminate boredom (Widiyono, 2020) [1].

Online learning methods can focus on students by means of the teacher as a facilitator and providing learning media that presents learning content such as in the form of text, video, animation or multimedia. This online learning concept allows students to learn from anywhere. So that students are more enthusiastic and have the opportunity to learn with new, easy, useful, and fun learning concepts.

Seeing from the problems above, the author wants to make a mobile application that can provide a place to carry out learning activities that can be used via the Internet with smartphone media. The author uses the Flutter and Laravel frameworks. By using the Flutter framework in designing this mobile application, you can create android and ios applications with only one code base, while Laravel for making APIs for data exchange uses the JSON language.

The aims and objectives of my research are as follows:

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1. Providing android-based online applications that can carry out learning activities with interesting materials and questions or assignments
2. For the convenience of tutoring services and activities
3. Designing applications using Android-based Flutter framework for Front-End and Laravel for Back-End

II. RELATED WORKS

Smartphone is a device that is able to process more information than feature phones, apart from communicating, smartphones have many other interesting features such as internet access, social media, video calls, games, and navigation. Internet access has also become easier because of the growing mobile technology (Demirci et al., 2015) [2].

[3] (Mair, 2018) The purpose of the Operating System is as a controller in executing application programs. In addition, the operating system also functions as an interface or mediator between computer users and computer hardware. In general, it has three most basic goals, namely:

1. Efficiency, Allows the resources available on the device to be used efficiently
2. Ease, with the operating system, the device is easier to use.
3. The ability to evolve, the operating system can be structured and planned for effective development, testing and implementation of new functions, without disrupting existing services.

Mobile learning can be defined as a unique educational facility because learners can access materials, directions and applications without regard to location and time. This facility will increase attention to learning materials, and encourage learner motivation for lifelong learning (Holzinger et al., 2005) [4].

Dart is a programming language optimized for quickly developing applications on any platform. The goal is to offer the most productive programming language for multi-platform application development (Raharjo, 2021) [5].

Flutter is a cross-platform framework that targets high-performance mobile application development. Flutter was released publicly in 2016 by Google. Besides running on Android and iOS, Flutter also runs on Fuchsia. Flutter was chosen by Google as an application framework for the next generation of operating systems. Flutter uses a high-performance rendering engine to render each view component using its own. This provides an opportunity to build high-performance applications such as native applications (Tashildar et al., 2020) [6].

Laravel (Roberts, 2009) [7] is an MVP-based website development written in PHP designed to improve software quality by reducing initial development and maintenance costs, and to improve website application performance.

Video conferencing applications (Nurdiansyah et al., 2013) [8] can be used to interact effectively, communicate with friends, co-workers, students and other people in virtual meetings, as well as with advanced video and audio quality, provide access to file sharing, and several other collaborative services.

III. METHODS

Flutter Framework

Flutter is a software development kit and framework made by Google to create a mobile application for Android and iOS with a single code base and using the Dart programming language.

Flutter has a collection of widgets that are already provided to create components in the user interface such as buttons, text inputs, sliders, and others that can be customized according to the needs of the application.

Flutter renders each widget using its own rendering engine giving the possibility to build high-performance applications such as native Android or iOS applications.

By using the Flutter framework, it makes application design easier with a collection of widgets that have been provided and can be customized as needed and have a high performance that will make the application more comfortable for users to use.

Laravel Framework

Laravel provides tools for building fullstack applications, which handle requests, routing, controllers, services, models, and views.

Laravel is an open source framework for creating PHP-based web applications that have a Restful Controller feature that has a complete set of functions that can create, read, update and delete so that it helps save time in backend creation because there is no need to create these functions and define each of these functions at the same time. routes.

Laravel provides an Authentication interface for the API. Authentication is used to protect the page to make the web accessible only to certain people who have been granted access rights.

By using the Laravel framework, it makes backend design easier and saves time by using the Restful Controller feature and has strong security in protecting the backend so that user data privacy becomes more secure.

IV. RESULTS

Bimbel Prisma is an elementary-high school level tutoring institution located at Jalan Pelopor Blok O8 RT.007 RW.011, Tegal Alur District, Kalideres Village, West Jakarta.

Prisma Bimbel was founded because of the large number of requests from the community who wanted their children who occupy elementary to high school seats to improve their performance in school.

The first time it started its activities as a Tutoring Institute in 2012. Until now, Prisma Bimbel is still operating and continues to try to develop itself, among others by the selection process for teaching staff, testing the latest methods, improving the quality of the learning environment, and various other efforts to make the learning environment better. all Bimbel Prisma students get the best service.

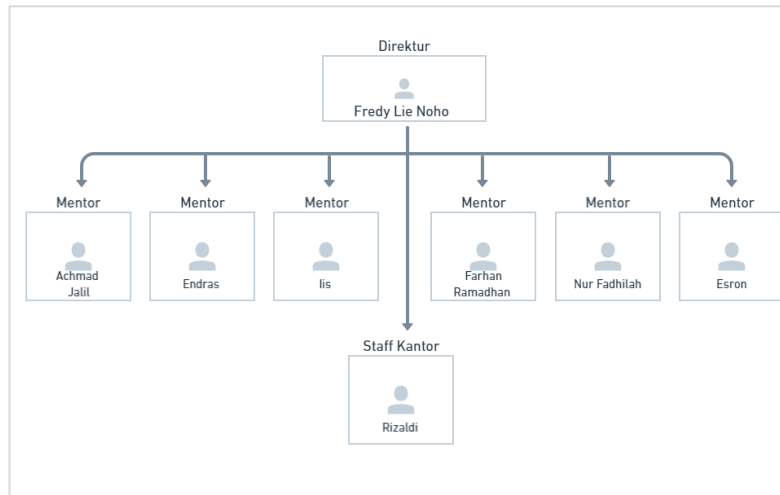


Fig. 1 Organization structure

At the Prisma Bimbel Institute there is a need for an application system that can be used for students to be able to carry out learning activities at their respective students' homes as a solution during the COVID-19 pandemic which makes face-to-face learning activities impossible. How to make tutoring available during the COVID-19 pandemic is to create an Android-based online learning application using Flutter and Laravel so that students can access materials and conduct Video Conferences with mentors at the Prisma Bimbel Institute with the application.

TABLE I
 Requirement Elicitation

1	Terdapat Halaman Registrasi dan Login
2	Desain UI yang menarik
3	Terdapat Foto di Profil
4	Terdapat Fitur Video Conference dengan Murid
5	Terdapat Pemutaran Video di materi
6	Terdapat Notifikasi
7	Terdapat Fitur Chat
8	Terdapat Fitur Kuis

There are 8 needs from the online learning service application program, the needs are obtained from the distribution of RE to 20 people consisting of several teachers at Prisma Bimbel and several students at Prisma Bimbel.

This online learning service application consists of a front-end and a back-end. Front-end is more intended for general users such as prospective students, students and teachers. The back-end is intended for specialized users such as admins and mentors.

The following is a picture of the front-end view of the online learning service application:

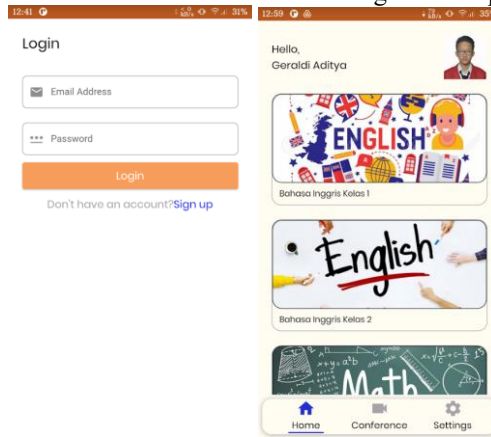


Fig. 2 Android-based front-end view, login view and home view

The following is a picture of the back-end view of the online learning service application:

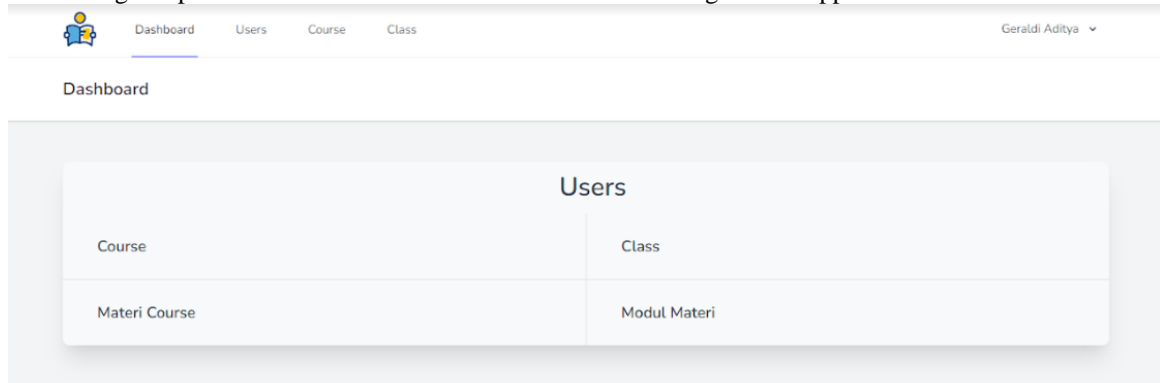


Fig. 3 Website-based back-end display dashboard view

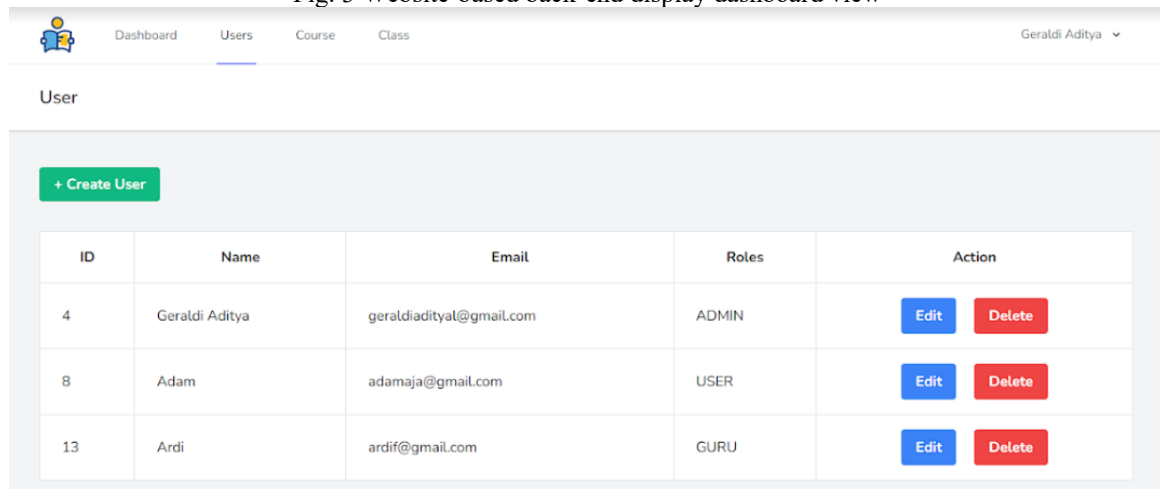


Fig. 4 Web-based back-end display user view

V. DISCUSSION

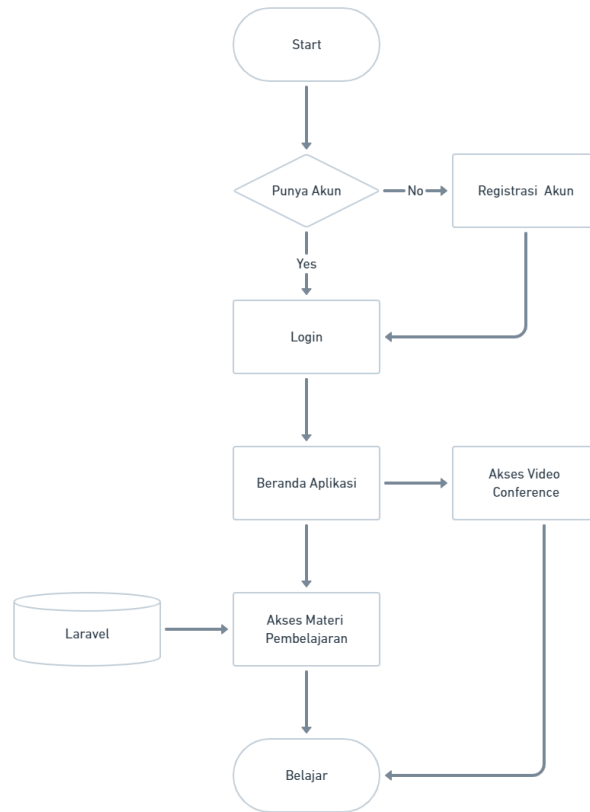
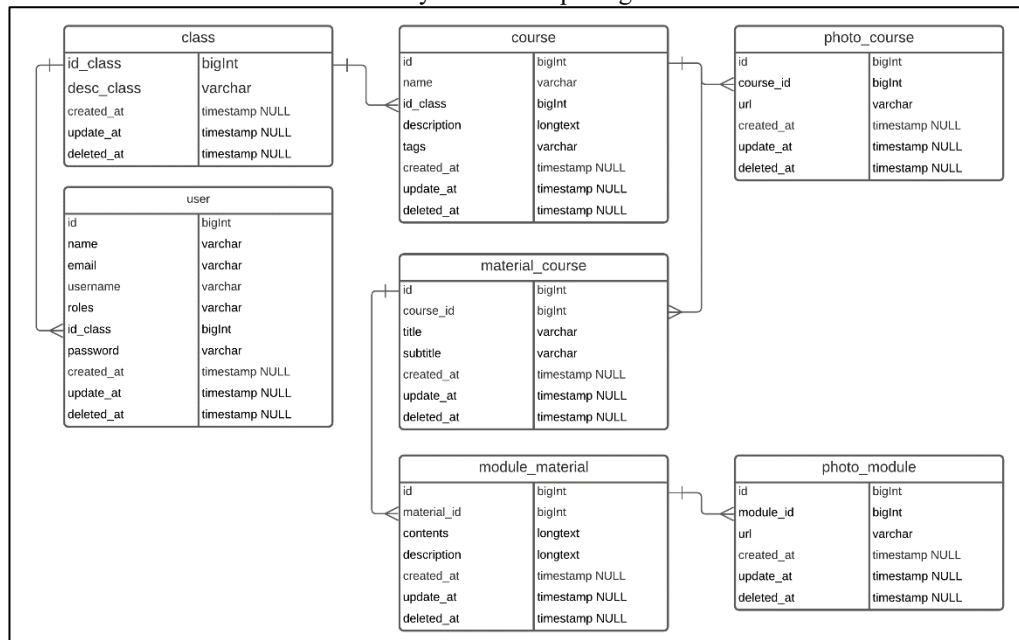


Fig. 5 Online Learning Flowchart

When the user uses the application, they will be asked "do you already have an account or not?" If not, you must register first. After registration the user can login. After logging in, the application homepage will appear on the homepage, there are two options, you can view the material or choose the video conference menu.

TABLE II
Entity Relationship Diagram



This online learning service application uses 7 tables consisting of user, class, course, material_course, module_material, photo_course and photo_module tables. Where the 7 tables are related to each other as in the ERD table above.

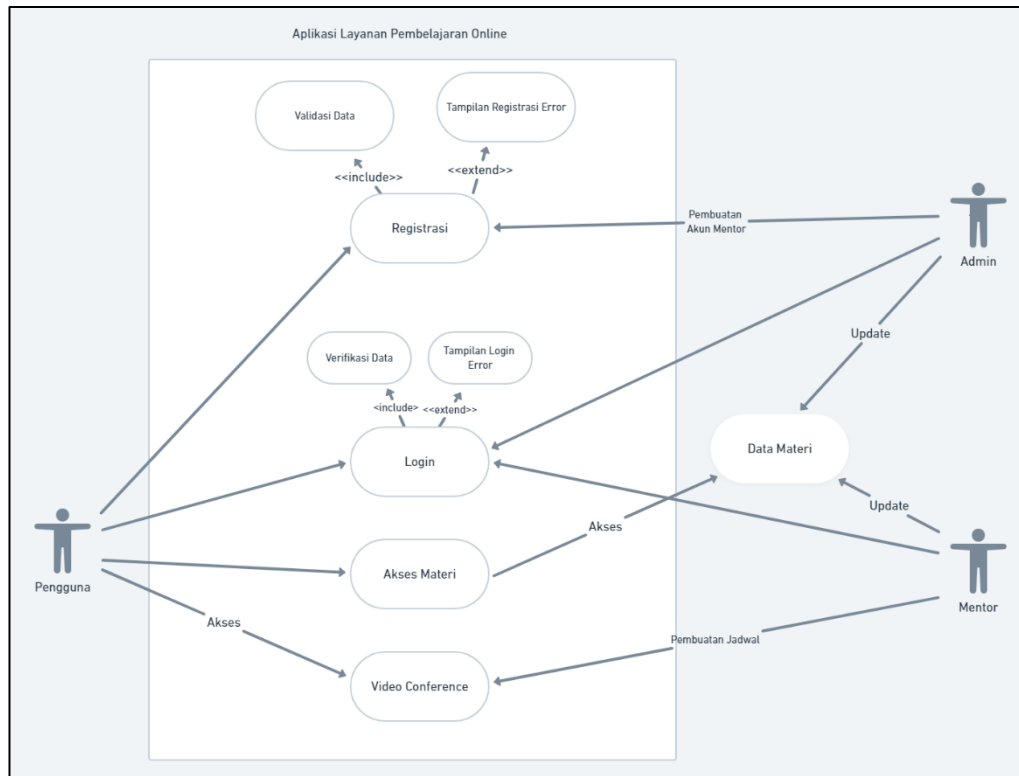


Fig. 6 Use Case Application

There are 3 types of use cases for the online learning service application, User, Admin and Mentor. Each actor has a different role in the system. The difference in these roles can be seen in the Application Use Case image above.

VI. CONCLUSIONS

Online learning is the concept of learning that is carried out online or through the internet. Very advanced technology in the modern era and globalization makes various activities carried out efficiently and can be done using only gadgets. Technological developments in the field of education with the use of e-learning in learning activities in schools, colleges, courses and even online communities have started to use concepts like this.

With the online learning service application, it is able to improve the learning process for students by studying material or answering questions that can be accessed via the internet so that it helps improve the quality of education and is able to improve the performance process for staff and teachers without having to come to the office because it is online based but can be productive. in handling administrative services or learning activities.

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