

# Implementation of Edunesia Learning Media Platform Based on Mobile Ionic Typescript

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**Abstract**— In the era of the Internet of Things as it is today, especially in the world of education, where information can be accessed quickly, can be accessed from anywhere and anytime, it will be very helpful in the learning process and interaction between teachers and students. One method that we can apply is the existence of an application that can bridge the learning process between students and teachers, so that distance and time are no longer an obstacle, especially during this COVID-19 pandemic, such as when there is a communication PSBB between teachers and students at school. Some use Whatsapp Groups, the use of Whatsapp groups is considered less well organized, both from the material presented or the tasks given. This also supports the Industrial Revolution 4.0 where we try to prepare from an early age so that the learning process and interaction between students and teachers, apart from face-to-face, can also get used to doing distance learning. With the resources and limitations of schools, it is not an easy and cheap job to make such an application. For this reason, we dream of presenting an educational platform that can automatically initiate applications that can support today's digital learning processes or methods. Schools will be able and able to make their respective school applications easily and quickly. To answer this problem, the author tries to solve it by presenting an educational platform that can be used to create school applications independently. Edunesia platform produces applications needed for learning media or material delivery, while the applications produced by this platform include Web Admin (content manager), Teacher Android Mobile Application , and Student Android Mobile Apps. The resulting application is complete with features that support learning activities from home, such as learning videos, student and teacher consultations, Online Classrooms (Video Conference).

**Keywords**— Learning, Platform, Applications, Edunesia

## I. INTRODUCTION

Software development in Indonesia is growing very rapidly, especially mobile-based. Along with the development of Information and Communication Technology, globally it brings a great influence for changes in almost all fields. The role of Information Systems in the company is very important. Especially to support the company to be more advanced and growing. Small, medium, and large scale companies, develop mobile-based software for easy access where users can access without being limited by time and location, and without having to open a PC (Personal Computer) or Notebook.

The mobile-based Ionic Typescript framework is a framework for software that can run on different mobile operating systems such as Android, IOS, and Windows Phone [4].

Android is an operating system on mobile phones that is open and based on the Linux operating system. Android can be used by anyone who wants to use it on their device. Android provides an open platform for developers to create their applications that will be used for various mobile devices.

In the era of the Internet of Things as it is today, especially in the world of education, where information should be accessed quickly, can be accessed from anywhere and anytime, of course, it will be very helpful in the learning process and interaction between teachers and students. One method that we can apply is the existence of an application that can bridge the learning process between students and teachers, so that distance and time are no longer an obstacle, especially during this COVID-19 pandemic, as has been going on when there was PSBB communication between teachers. and there are students in schools who use Whatsapp Groups, the use of Whatsapp Groups is considered less well organized, both from the material presented or the assignments are given. This also supports the Industrial Revolution 4.0 where we try to prepare from an early age so that the learning process and interaction between students and teachers, apart from face-to-face, can also get used to doing distance learning. With the resources and limitations of schools, it is not an easy and cheap job to make such an application. For this reason, the author dreams of being able to present an educational platform that can initiate automatically produce applications that can support today's digital learning processes or methods [6]. Schools will be able and able to make their respective school applications easily and quickly. To answer this problem, the author tries to solve it by presenting an educational platform that can be used to create school applications independently. The platform produces applications needed for learning media or material delivery, while the applications produced by this platform include Web Admin (content manager), Teacher Android Mobile Apps, and Student Android Mobile Apps. The resulting application is complete with features that support learning activities from home, such as learning videos, student and teacher consultations, Online Classrooms (Video Conference). With this platform, it is easier for educational institutions (SD, SMP,

SMA) to make Mobile Apps applications independently with only 3 easy steps and as needed, so that they can produce a special application according to the school's profile and can be distributed to teachers and students, thus facilitating Learning Delivery process. With the Teacher's Mobile Apps Application made with the EDUNESIA Platform, Lecturers can create Materials according to the Curriculum and can classify the Materials per menu according to the Department or according to the Class the teacher is teaching, In addition, many features can be used to deliver material on this application such as, The Add Video Material feature, which allows teachers to also upload material in the form of videos, the Chat Interaction feature between Teachers and Students and the Online Classroom Feature (video conference) so that teachers and students can study together like in class at the same time.

## II. RELATED RESEARCH

### A. State Of The Art

State of the art are some reviews of previous research related to this research, to be a reference and consideration in conducting research. There are several previous articles related to the discussion of research conducted by the author, namely:

1. Hazira Fakhurrozi Amir, Asrul Huda, Hasan Maksum (2020). "Development of Mobile Learning for Simulation and Digital Communications". [20]
2. Arsad Bahri, Zakia Asrifah Ramly, Miftah Saddatin Nur (2020). "Android-Based Mobile Learning Supported the Independent Learning of Senior High School Students in Covid-19 Pandemic".[21]
3. M. Taufiq, A. V. Amalia, P. Parmin, A. Leviana (2016). "DESIGN OF SCIENCE MOBILE LEARNING OF ECLIPSE PHENOMENA WITH CONSERVATION INSIGHT ANDROID-BASED APP INVENTOR 2".[22]
4. Zanaton H. Iksan, Sumaiyah Mohd Saufian (2017). "Mobile Learning: Innovation in Teaching and Learning Using Telegram".[23]

### B. Android SDK

A software development tool that allows developers to create applications for the android platform. The Android SDK includes sample projects with source code, software development tools, emulators and libraries needed to build Android applications. Applications are written using the Java programming language and run on Dalvik, a special machine designed to run on top of the Linux kernel.

The Android Software Development Kit (SDK) includes everything a developer needs to get started with developing, testing, and debugging Android apps. Included in the SDK include:

1. Android API (Application Programming Interface), the core of the SDK is the Android API libraries that provide full access to development into the Android system. These are the same libraries that Google uses to build native Android apps.
2. Development Tools, used to enable developers to convert

Android source code into executable Android applications. The SDK includes several tools for developers to compile and debug applications.

Android Virtual Machine Manager and Emulator, Android Emulator is an interactive Android device stimulation that provides several alternative skins. The emulator runs on an Android virtual device that simulates the Android hardware configuration. By using this emulator, the developers will be able to see how their app will look and work on a real android device.

### C. PHP

PHP itself stands for "Hypertext Preprocessor", which is a high-level scripting language installed in HTML documents. Most of the syntax in PHP is similar to C, Java, and Perl, but in PHP there are some more specific functions. While the main purpose of using this language is to enable dynamic web designers and can work automatically.

### D. Typescript

Typescript is a JavaScript-based programming language that adds strong-typing features & classic OOP programming concepts (classes, interfaces). In the documentation, TypeScript is referred to as a super-set of JavaScript, meaning that all JavaScript code is TypeScript code as well. This programming language offers classes, modules, and interfaces that make it easier for developers to develop complex applications. This is what distinguishes it from javascript.

Typescript advantages and features:

Typescript offers classes, modules, and interfaces that allow developers to develop complex applications more easily.

Among its advantages and features include:

1. Support Class and Module
2. Static Type-checking
3. Support ES6 Features
4. Clear Library API Definition
5. Build-in Support for JavaScript Packaging
6. Syntax Similarity to Backend
7. Supersets of JavaScript.

### E. Framework Ionic

Ionic is an HTML5-based mobile application framework that can be used to develop mobile applications with web technologies such as HTML, CSS, and Javascript. By using Ionic, web developers can create cross-platform applications such as those for Android and iOS. By using Ionic, web developers don't need to learn Java, Objective C, or C# programming languages to create mobile applications because they can simply use their knowledge in web programming languages. Ionic has advantages including being open source and also using the latest web technologies. Ionic also uses Angular JS for its logic implementation. By using Angular JS applications built using Ionic will be able to run very fast as well as native applications. For the design of the application interface, this is made easy on Ionic with the help of its ID called Ionic Lab. This is different from other frameworks such

as jQuery Mobile where we have to manually code to create the interface of the application. Because Ionic is just a framework, to convert our code into an Android or iOS application we need to use additional tools such as Cordova / Phonegap [7].

#### F. MySQL

MySQL is an implementation of the relational database management system (RDBMS) which is distributed free of charge [2]. Each user can freely use MySQL, but with limitations, the software cannot be made a commercial derivative product. MySQL is a derivative of one of the main concepts in existing databases; SQL (Structured Query Language) [3]. SQL is a database operation concept, especially for selecting or selecting and entering data, which allows data operations to be done easily automatically. The reliability of a database system (DBMS) can be seen from the way the optimizer works in processing SQL commands made by users and application programs that use it. As a database server, MySQL supports both transactional database operations and non-transactional database operations. In the non-transactional mode of operation, MySQL can be said to be superior in terms of performance compared to other competitor database server software. However, in non-transactional mode there is no guarantee of the reliability of the stored data, therefore non-transactional mode is only suitable for types of applications that do not require data reliability such as web-based blogging (WordPress) applications, CMS, and the like. For system requirements aimed at business, it is highly recommended to use transactional database mode, it's just that as a consequence MySQL's performance in transactional mode is not as fast as that in non-transactional mode.

MySQL Privileges :

1. Portability. MySQL can run stably on various operating systems such as Windows, Linux, FreeBSD, Mac Os X Server, Solaris, Amiga, and many more.
2. Open source software (open source). MySQL is distributed as open-source so it can be used free of charge.
3. Multi-user. MySQL can be used by several users at the same time without experiencing problems or conflicts.
4. Performance tuning, MySQL has amazing speed in handling simple queries, in other words, it can process more SQL per unit time.
5. Various data types. MySQL has a very rich variety of data types, such as signed/unsigned integer, float, double, char, text, date, timestamp, and others.
6. Commands and Functions. MySQL has full operators and functions that support the Select and Where commands in the command (query).
7. Security. MySQL has several layers of security such as an encrypted password.
8. Scalability and Restrictions. MySQL is capable of handling large-scale databases, with more than 50 million records and 60 thousand tables, and 5 billion rows. In addition, the index limit that can be accommodated in up to 32 indexes in each table.

9. Connectivity. MySQL can connect with clients using TCP / IP protocols, Unix sockets (UNIX), or named pipes (NT).
10. Localization. MySQL can detect error messages on clients in more than twenty languages. However, Indonesian is not included in it.
11. Interface. MySQL has an interface for various applications and programming languages using the API (Application Programming Interface) function.
12. Clients and Equipment. MySQL is equipped with various tools that can be used for database administration, and each tool includes an online guide.
13. Table structure. MySQL has a table structure that is more flexible in handling ALTER TABLE, compared to other databases such as PostgreSQL or Oracle.

### III. PURPOSED MODEL

The platform will initiate a Demo Application automatically and produce several complete applications with 1 example of learning material so that it can be reviewed by the school agency including a Web base application as an Application Dashboard wherein this application the school can independently input learning materials, determine the material intended for appropriate classes and majors and assigns assignees to competent teaching staff (Teachers) to teach the material. Mobile Apps Application for Teaching Staff (Teachers) wherein this application there is a material that has been inputted through the Web dashboard application, also equipped with features for interaction between teachers and students such as chat, calls, and is also equipped with an open class feature where teachers can open class on the material taught through video conferencing media. Mobile Apps for Students wherein this application there is material that has been divided by class and major and is also equipped with a feature to store learning materials that are popular or have not been studied, interaction features between students and teachers such as chat, chatbots to get information about schools, call teachers, and is also equipped with a shared learning feature where students can listen to the material taught by the teacher through video conference media. The development method used in this research is the classic Systems Development Life Cycle method which is commonly called the waterfall method. SDLC (Systems Development Life Cycle).

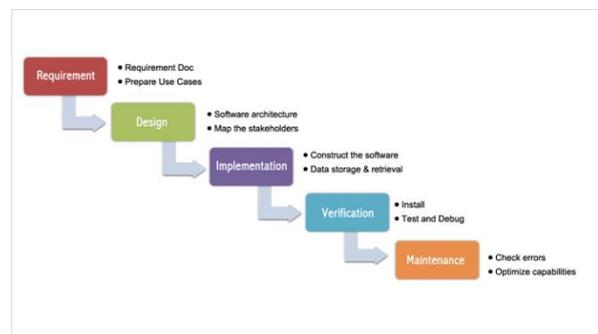


Figure 1. SDLC.

#### IV. RESULT IN ANALYSIS AND DISCUSSION

From the analysis method that has been implemented, it can be seen the results of the analysis for the educational media platform that has been adapted to the needs and circumstances. Here is a further explanation.

1. Input Needs Analysis  
Data input to this system is carried out by users (teachers and students), where a trial process will be carried out.
2. Process Requirements Analysis  
Process needs from edunesia, among others:
  - a. Teacher and Student login access into the application.
  - b. Using the application as a learning tool such as materials, assignments and others.
  - c. Consultation with teachers via chat media
3. Output Needs Analysis  
The resulting information, namely: generating applications that can be used by teachers and students so that they can interact in online media



Figure 2. Subtema Pages

##### A. Trial Of Material Pages

In the trial, this page displays the material in each class according to the choices of students, with this menu students can access the material provided by the teacher. Here is the display result :

Code :

```
<div class="login-background">
  <div class="logo-container">
    
  </div>
</div>
<ion-content no-scroll padding class="login">
  <ion-grid text-center>
    <ion-row>
      <ion-col>
        <form id="formLogin" #form="ngForm">
          <ion-input required type="text" class="justify-input"
            [(ngModel)]="credentials.Username" name="Username" placeholder="User">/ion-input>
          <ion-input required type="password"
            [(ngModel)]="credentials.Password" name="Password"
            placeholder="Password">/ion-input>
          <button ion-button btn-kombit small class="login-button"
            type="button" (click)="signIn()">Login</button>
        </form>
      </ion-col>
    </ion-row>
  </ion-grid>
</ion-content>
<ion-footer no-shadow>
  <ion-toolbar text-center>
    <p class="margin-top-0">Don't have an account?
      <a (click)="signup()"> Sign up</a>
    </p>
  </ion-toolbar>
</ion-footer>
```

##### B. Trial Of Lesson Schedule

On the trial of this lesson schedule page, a calendar-like display will appear where students choose the date and the lesson schedule will be displayed according to the selected day. Here is the display result :

Code :

```
<ion-header class="custom-background">
  <ion-navbar>
    <button ion-button menuToggle>
      <ion-icon name="menu">/ion-icon>
    </button>
    <ion-item class="top-searchbar">
      <ion-input type="text" placeholder="search" [(ngModel)]="filterText"
        (input)="filterItems()">/ion-input>
      <ion-icon name="search" item-end>/ion-icon>
    </ion-item>
    <button *ngIf="notificationEnabled" ion-button class="notification-
      button" (click)="toNotificationPage()">
      <ion-icon name="notifications">/ion-icon>
      <ion-badge class="notification-badge"
        *ngIf="unreadNotification">/ion-badge>
    </button>
  </ion-navbar>

  <div class="location-indicator" *ngIf="locationEnabled"
    (click)="locationIndicatorClicked()">
    <span>{{locationIndicatorText}}</span>
  </div>
</ion-header>

<ion-content padding>

  <ion-row *ngIf="sliderEnabled" class="random-images-slides">
    <div class="spinner-container" *ngIf="isSearchingSlider">
      <div class="spinner-background">
        <ion-spinner>/ion-spinner>
      </div>
    </div>
    <ion-slides *ngIf="sliderProduct.length" pager="true" autoplay="4000"
      loop="true" (ionSlideTap)="slidesClicked()"
      (ionSlideAutoplayStop)="slideAutoPlayStopped()">
      <ion-slide *ngFor="let item of sliderProduct">
        
        <div class="slider-text">
          <ion-label no-margin no-padding class="text-
            product">{{item.productName}}</ion-label>
          <ion-label no-margin no-padding>{{item.companyName}}</ion-label>
        </div>
        <ion-badge *ngIf="isPromoted" class="slider-badge">Promoted</ion-
          badge>
      </ion-slide>
    </ion-slides>
  </ion-row>
```

```
</ion-content>
```



Figure 4. Lesson Schedule

### C. Trial Of Lesson Schedule

In the Trial, this class Chat page displays private conversations between teachers and students, so this menu is very good for discussions between teachers and students if there are results or material that students do not understand, ask the intended teacher directly. Here is the display result :

Code :

```
<ion-col>
<ion-list>
<div class="spinner-container" *ngIf="isSearching">
<ion-spinner></ion-spinner>
<div class="spinner-background">
<ion-spinner></ion-spinner>
</div>
</div>
<div text-center *ngIf="!listChatNotification.length &&
!isSearching">Notification Empty</div>
<ion-item *ngFor="let item of listNotification">
```



Figure 6. Class Chat

## V. CONCLUSIONS

After observing the results of the research trials, this study concludes that teachers and students can access the Edunesia application as a learning medium, students can see materials, assignments, and quizzes that have been given by the teacher, students, and teachers can communicate privately. through the class chat feature. By using the Ionic Framework, the edunesia learning media application has been successfully designed.

The research that has been done is still not perfect, so some further development is needed to get maximum results. Some suggestions for development that can be done include the need for further analysis regarding other modules that can be developed so that students and teachers can interact more easily, Adding a chatbot feature related to school information.

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