

# App Crafting for An Educational Institution

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**Abstract:** *In the modern world, internet tools like Google Classroom, Gmail, Google Forms, WhatsApp, and others have become more and more important for teacher-student communication and information exchange. We created an app that works with all platforms, including tablets, computers, and mobile phones, to meet the various needs of educational institutions. All devices are easily supported by the Android app for websites optimized for mobile and tablets. This app satisfies all of the standards of the school by offering extensive information on attendance, exam schedules, lecture notes, cost data, event notifications, and online assessments. The newest technologies, such as Flutter and Dart with Firebase integration, were used in the development of this application. We also developed a desktop-friendly web application. Both the app and this website are linked to the same*

**Keywords:** App for college management, android, flutter, dart

## I. INTRODUCTION

In several industries, including education, the use of mobile applications has grown in popularity recently. In order to facilitate academic activities for both staff and students in an effective manner, this initiative attempted to design an Android application that would simplify college administration. With the app, students may examine results, interact with their teachers, keep track of college-related events, and maintain their academic records. Moreover, it offered a platform where instructors could keep an eye on attendance, handle costs, and publish significant notifications. There was less paperwork and waiting time to access faculty and student records thanks to the system that took the place of traditional paper records. Our goal was to create an intuitive interface that would allow teachers and students to easily utilize the Android app that expedited academic activities and streamlined college administration.

Building native-looking Android and iOS applications from the same code base was accomplished with the help of Flutter, an open-source mobile SDK Green Intelligent Systems & Applications 3(2), 2023, 69–85 70. Before its formal introduction in December 2018, Flutter was in beta testing since Google first announced it in 2015. Flutter had been the subject of increasing attention ever since. Widget utilization served as the main inspiration for Flutter. By mixing and matching several widgets, developers may create the whole user interface. A button, menu, stylistic feature (such a font or color scheme), a layout aspect (like padding), and many other definitions were defined by each of these widgets. Additionally, Flutter gave developers access to views in the reactive manner. To prevent problems with performance resulting from utilizing. With a large selection of pre-built widgets and an easy way to construct custom widgets, Flutter enabled developers to create highly personalized and dynamic user interfaces.

The current state of information technology development is one of extremely rapid advancement. The community's demands for processing simplicity across all professions are growing. Due to its many advantages over manual processes, such as speed, accuracy, and efficiency, information technology is currently employed extensively for data processing. Mobile technology is one area of technology that is now advancing quickly, particularly for Android devices.

Android is a whole platform, including the operating system, apps, market for applications, developer tools, support from vendors in the mobile sector, and community support for open systems. Linux was updated to create the Android mobile operating system [1]. Applications, middleware, and operating systems are all part of Android. No one brand of cell phone is associated with Android. Android has developed fairly quickly since its November 5, 2007 initial release and up until 2016. The most recent version of Android is Marshmallow 6.0; rumors of the arrival of Nougat, the most recent version, have also surfaced. Up until June 2011, there were over 500,000 active Android-powered devices, growing by 4.4% each week [3]. Electronic-based learning resources are another feature of the academic system (E-

Learning). Within the e-learning facility, instructors and students can view the daily lecture schedule, lessons being taken, and the process of achieving learning objectives. Additionally, instructors can facilitate online learning by giving assignments and materials via the academic system. Universities have utilized this system to support. College students are becoming increasingly reliant on mobile technologies. Many undergraduate students carry their own digital gadgets to college, with a preference for tiny, portable ones like smartphones and tablets, according to the findings of the ECAR research study on students. The significance of mobile devices, such as tablets (45 percent), smart phones (37 percent), and e-book readers (31 percent), is clearly increasing, even if students still rank laptops (85 percent) as the most crucial tools for their academic performance. Students are expressing a growing desire to have access to instructional information via mobile devices. According to reports, the percentage of students using their smartphones and tablets for academic reasons has increased to 67% in just a year.

## **II. LITERATURE SURVEY**

Breeze, an Android-based college management system, provided a one-stop shop for all administrative duties. It made data more easily accessible to all parties involved in the educational institution. Direct access to the needed data was made possible via the app for administrators, law enforcement, teachers, students, and guardians. Physical documentation, which was frequently error-prone and time-consuming, was no longer necessary thanks to this program. The creation of a college management system running on Android was a big step forward for the education sector. It improved institutional management effectiveness and expedited the administrative procedure. A suggested application aimed to function as a consolidated platform for all event notices, encompassing both online and offline noticeboards situated across the college. By giving only one example.

Reducing the quantity of paperwork and labor needed for manual processing was the application's primary objective. The Indian educational system has changed along with the advancement of technology. With the help of this application, institutions could move forward more swiftly, realizing their goals, and realizing their vision. [3]. It was suggested to employ a robust program for a data management system with an intuitive user interface. Reducing the quantity of paperwork and labor needed for manual processing was the application's primary objective. The Indian educational system has changed along with the advancement of technology. With the help of this application, institutions could move forward more swiftly, realizing their goals, and realizing their vision.

A straightforward interface for the upkeep of college information was offered by the College Management Android Application (CMAA). One of the following should have been a registered user: the administrator, the professor, or the student. A wide range of student information, academic reports, college information, course information, curriculum, and other resource-related information were all handled by the student information system. It also included information about the professors, the batch execution process, the students' complete personal information, and the many academic notifications that the college administration updated for the staff and students [7]. The mobile app might be used for tracking student attendance as well as sharing documents, assignments, lab instructions, notices, e-books, and images and information about upcoming events. Student and instructor records were kept up to date via the College Administration and Management System (CAMS). This program gave users access to their login information.

### **2.1. Academic Information System**

Academic Information System is a technology for managing, disseminating computer-based academic information (Academic Information Systems) used to store data and manipulate academic information in an educational institution that presents information on every actor involved in the system.

### **2.2. Academic Information System Based on Mobile**

Web-Information on student grades, course and lecturer lists, and a KRS filling system are all included in the mobile web-based educational information system. Students will find this system very helpful as it is specifically made for mobile devices and can be accessed at any time and place. The academic web-based academic information system actively supports the mobility of students who are engaged

in a lot of activities. One way to think of academic information systems based on the mobile web is as a mobile device application of educational information systems. The general definition of mobile devices is compact, portable electronic

equipment that can be used anywhere and is capable of messaging and phone calls. Mobile devices may display material from the system information and retrieve information from the internet network. They can also store a sufficient amount of data. Communication can take the form of text exchanges or image exchanges.

Many differences will be observed when comparing educational information systems to mobile-based educational information systems. These variations encompass each device's convenience as well as its features and functionalities. Some of these variations include media type, processing and memory capabilities, supported apps, input (keyboard, touch-screen, voice input, etc.), output (size and screen resolution capability, etc.).

When comparing the features and functions of the two systems, the educational web-based information system exclusively offers information to students, whereas the educational information system as a whole has multiple levels with distinct menus based on each level's access rights.

The two systems differ most fundamentally in how they access the data via hardware and software. The web-based information system, for example, typically shows a display specifically designed for high-resolution desktop computers, which is highly incompatible with mobile devices, which have far smaller resolutions. This greatly disturbs user comfort.

### **2.3. Management Information System (MIS)**

Management information systems (MIS) are sometimes referred to as management alert systems or management alerting systems since they notify users (general management) of potential issues or possibilities. A management reporting system is another word for a MIS. The term "system" is derived from the Latin "systema," and the Greek word "system" refers to a unit made up of joined parts that allow information, materials, or energy to move more easily. When describing an entity that interacts, this term is frequently utilized. An assortment, set, or variables that are arranged, interacting, and depending upon one another can also be referred to as the system. A management information system, or MIS, is used to handle data for organizational management. The organization's data functions similarly like blood in the human body. An organization cannot survive without a healthy flow of information [14]. MIS serves as an organization's decision support system in addition to serving as management control. Even though computers were not commonly utilized at the time, the idea of MIS was developed because enterprises needed to analyze a variety of data rapidly, accurately, and thoughtfully. But in the absence of a network, the idea remains theoretical.

## **III. APPLICATION FOR COLLEGE EVENTS**

An independent solution for paper-based work was offered by the College Management System program that was already in place. It saved on labor costs and was overseen and managed by the administrator. As needed by instructors or pupils, it consistently supplied accurate information.

Utilizing the information kept in the university database server, the college administration was able to make insightful choices. Thus, having a college management system like Breeze that is based on Android was recommended. The necessary data would be directly obtained by all the administrators, law enforcement, teachers, students, and guardians. The traditional method involved teachers dictating notes to pupils, who then took notes in their notebooks, and staff members using bulletin boards to disseminate any information. For both teachers and pupils, this strategy required a lot of time. It took some time for everyone to get any important notices from upper management, such as the board or principle.

Students may have had some problems as a result of this. An independent solution for tasks using paper was offered by the College Management System's suggested app. It used less labor and was overseen and managed by the administrator. It always gave teachers and students the correct information they needed. Using the information kept in the university database server, the college administration could make informed decisions.

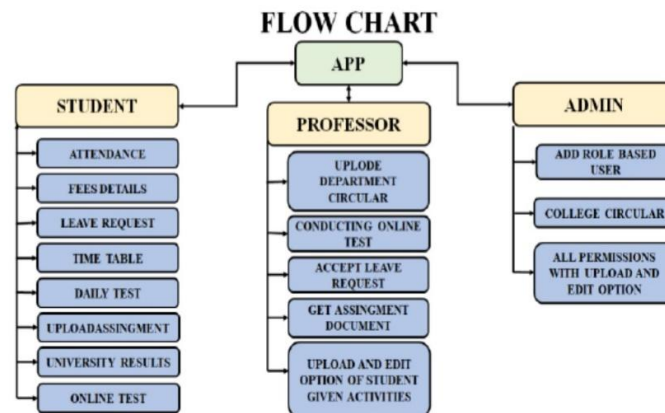
Consequently, it was advised to have an Android-Based College Management system, such as the Pillai HOC application. The necessary data would be directly obtained by all the administrators, law enforcement, teachers, students, and guardians. When compared to the current Android-based or web-based applications, the proposed app was far superior in terms of features, technology, user-friendliness of web pages, and search engine ranking. It also met the needs of parents, students, and the general public.

**App User Role Management**

**3.1 Student:** Role students benefit from efficiency and convenience as they may quickly and readily obtain necessary information and services via a mobile application. Students can view their department's timetable, notice board updates, and attendance and fee details with only a few taps on their mobile devices. Additionally, the app lets students ask faculty members for permission to take time off, which speeds up the procedure and does away with the need for paper documents. The software also helps students prepare for tests on time because it provides them with the questions for tomorrow's test. The software allows students to turn in assignments as well, guaranteeing timely and easy submissions. Additionally, the software gives students the flexibility to take online tests from the comfort of their own devices, all while upholding academic integrity. Finally, the app gives users access to the university website, which gives them access to more resources and data. Additionally, the app allows students to ask faculty members for permission to take time off, which speeds up the process and does away with the need for paper documentation. Since students may access tomorrow's test questions through the app.

**3.2 Professor:** Teachers can monitor and control their pupils' academic development with the help of these useful tools—education software applications. Professors can manage their department's schedule, notice board updates, and attendance and fee information more effectively with these apps. To maintain correct and current records, professors have the ability to upload and modify attendance and fee data. In addition, they have the ability to oversee and rapidly handle leave requests. Teachers can verify that their pupils are ready for tests by adding practice questions. With the help of the app, instructors can see what their students have completed and provide specific feedback and encouragement based on their progress. Professors can also administer exams online, which streamlines the process and gives students prompt feedback. With the use of these apps, student information can be accessed more easily and efficiently, making instruction more interesting. Lastly, instructors can use the app to give their students online assessments, which simplifies the process of giving tests and evaluating students' progress. Exams can be graded more quickly when they are administered online, giving instructors the opportunity to give students rapid feedback and give students timely information about their performance. All things considered, instructors can gain a lot from these educational software programs, such as increased productivity, accuracy, and access to student data. Professors can more effectively handle their teaching duties and give students a more interesting and encouraging learning environment by utilizing technology.

**3.3 Admin:** One of the main duties of an admin is to make sure that only authorized users may use the application in order to protect its security and privacy. In order to make sure that users receive critical information precisely and on time, the administrator is essential in the posting and modification of college circulars. The Admin effectively oversees the functionality of the app since they have unique access to all pages and content control choices. The Admin can also add or remove users, manage access, and improve the app's security and privacy features



**IV. APP AND WEB MODULES FRONT-END**

**4.1.Login page**



Figure 1. Log in page of the website.

It looks like a login page made with the Flutter framework with Firebase authentication based on the code you provide. With just two text fields for the user to enter their email address and password and a button to submit the login form, the page had a straightforward user interface. The password and email given by the user were checked for validity when they clicked the "LOGIN" button, and if they were, an attempt was made to authenticate the user using Firebase authentication. The user was taken to the "home page" page if the authentication process was successful. The user accounts and authentication procedure were overseen by the Firebase authentication system, which also contained the user data. Upon first registration, the Firebase authentication system retained the user's email address, password, and distinct user ID. It may be possible to identify the user and obtain their login data using this ID.

Furthermore, Firebase authentication gave developers the ability to keep an eye on user activity and access logs, allowing them to identify who logged in when. The developer's implementation method determined the specifics of these logs and monitoring tools.

**4.2 Home screen:**

Mobile and Web app home screen with several functionalities. Here is a brief summary of what the home screen provides,

**4.2.1. App bar.**

The user's name and roll number are displayed in a customized toolbar on the app bar, measuring 100 pixels in height. Located at the top of the screen is the app bar.

**4.2.2. Navigation drawer.**

A drawer widget with several menu items may be found in the end Drawer attribute.

**4.2.3. Body.**

There is 8 pixels of padding around the home screen's body on all sides. A column with many widgets is present in the body.

**4.2.4. Grid view.**

Eight items are displayed in a grid layout in the column. The cross-axis count in the grid view is fixed.

**4.2.5. Attendance**

Teachers can record attendance and students can examine their attendance sheet thanks to the conditional statement in the attendance widget. depicts the home screen of the website.

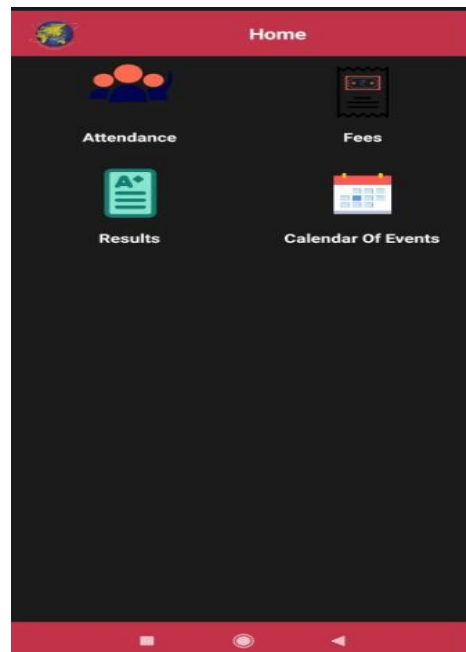


Figure 2. Website home screen

## V. CONCLUSION

The educational institution's contact with its students has greatly improved with the development of a comprehensive app and website that is powered by Firebase and integrates the newest technologies. Students can access important data like attendance records, exam schedules, lecture notes, fee details, notification events, and online examinations via this app and website. Only approved individuals affiliated with the institute have access to the platforms, which can be accessed from a variety of devices such as laptops, tablets, and mobile phones. The significance of using technology to improve communication and information sharing in the education sector is highlighted by this initiative. With a syntax akin to other well-known programming languages like Java and JavaScript, the app and website have been created with ease of use in mind.

The creation of our educational institution's website and app has yielded several advantages, especially in the areas of communication and information sharing. We have effectively moved our communication channels to online platforms, responding to the evolving needs of educators and students in the current digital era, through the usage of numerous platforms like Google Classroom, Gmail, Google Forms, WhatsApp, and more. Students may easily access extensive information with the help of this user-friendly app that was created especially for Android devices, such as tablets and mobile phones. The functionality and connection of our website and app have been considerably enhanced by the incorporation of Firebase technology. Our development team has made sure that our product is compatible with a wide range of devices and operating systems by using the programming languages Flutter and Dart, giving users a seamless experience. When the website and app are linked to the same Firebase server, real-time data synchronization takes place, facilitating effective information management.

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