Integration of Academic Mobile Applications at University

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Abstract. The development of android smartphones also plays a role in the world of education, such as the presence of android-based learning media, android-based educational information systems, and much more. If a few years ago, the academic information system was limited in the form of a website, now the academic information system has also begun to be developed on Android-based mobile devices. This is quite reasonable considering there is a myriad of advantages possessed by Android-based applications. By using an Android-based academic information system, application users can dig up information anywhere and anytime such as: Independent Lecture Schedule, Online SPP Payment (no need to queue) to fill KRS (Study Plan Card), see KHS (Study Result Card), Trusteeship, Discussions, value announcements and much more, all that can be done via a smartphone. It's effortless, like "University Information and Communication Center in the Grip. The main advantage of developing the University Mobile Application is in terms of mobility. The application on an Android smartphone can be used anywhere and anytime. Thanks to these characteristics, Mobile Application University is the right answer to overcome obstacles in web-based or desktop-based academic information systems. With the Android-based educational information system application, information system users can access information directly from an Android smartphone. Aside from the mobility side, the development of an Android-based academic information system is also becoming increasingly optimal thanks to the smartphone's distinctive features such as the notification feature. With the notification feature, the information will be more quickly distributed to application users. Of course, the use of an Android-based academic information system application is more effective when compared to using a web-based educational information system that must wait for users to access the web.

1. Introduction

The development of information technology is currently experiencing very rapid progress. The needs of the community for ease of processing in all fields of work are increasing. Currently information technology has been widely used for data processing because it has many advantages including speed, accuracy, and efficiency compared to manual systems. Technological developments that are currently experiencing rapid progress are mobile technology, especially for Android smartphones.

Android is a complete platform from the operating system, applications, developing tools (developer tools), application market, mobile industry vendor support and support from the open system community. Android is an operating system for cellular phones modified from Linux [1]. Android includes operating systems, middleware and applications. Android is not tied to a cell phone brand. Android provides an open platform for developers to create their own applications that can be used by various mobile devices[2].
Also since it was first released on November 5, 2007 to 2016, Android has experienced quite rapid development. The latest version of Android is Marshmallow 6.0, even news has spread that Android has released the latest version, Nougat. Until June 2011 more than 500,000 Android-based gadgets have been activated and increased by 4.4% every week [3].

The academic system also has electronic-based learning facilities (E-Learning). In the e-learning facility, students and lecturers can see the schedule of lectures every day, lessons being taken, the process of learning outcomes, and students and lecturers can communicate with each other in learning; lecturers can conduct online learning such as the provision of material and assignments through the academic system. This system has been used by universities to support learning systems based on Information Technology[4]. Academic Information System at the University is an application or system designed and created to manage data related to educational information, including student data, lecturer data, recorded learning outcomes, curriculum, and class schedules.

2. Literature Review

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[5].

2.2. Academic Information System Based on Mobile Web

The mobile web-based educational information system is an information system designed to provide data related to educational information provided to students, which includes information on student grades, course list information, lecturer list information, and a KRS filling system. This system is specially designed for mobile devices so it can be accessed anywhere and anytime, this is very useful for students because the academic web-based academic information system[6] actively supports the mobility of students who have a dense activity[7].

Academic information systems based on the mobile web can be said to be a replication of educational information systems that are applied to mobile devices. Mobile devices themselves are generally defined as devices that have a small physical size, can be operated anywhere, mobile devices can provide voice communication services and message communication can be in the form of exchanging text or in the form of images, mobile devices can access information from the internet network and display content from the system information, mobile devices can also store data in large enough quantities[8].

When compared to mobile-based educational information systems and educational information systems, there will be many differences found. These differences include features, functions, and even convenience for each device. Some of these differences include output (i.e., size and screen resolution capability, etc.), input (i.e., keyboard, touch-screen, voice input), media type, processing and memory skills, and supported applications[9].

The difference between the two systems in terms of the features and functions of the application is that the educational web-based information system only provides information for students while the educational information system, in general, has several levels that have different menus depending on the access rights of each level[10].

The most fundamental difference of the two systems is seen from the hardware/software to access the system, and the web-based information system generally displays a display explicitly made for desktop devices that have high resolution, this is very incompatible with mobile devices that have far resolution smaller so that it is very disturbing user comfort[11].
2.3. Management Information System (MIS)

Management information systems (MIS) are sometimes called management alert systems (management alerting systems) because these systems provide warnings to users (general management) of problems or opportunities. Another term for a MIS is a management reporting system [12].

The system comes from Latin (systema), and Greek (system) is a un
it consisting of components or elements that are linked together to facilitate the flow of information, material, or energy. This term is often used to describe an entity that interacts. The system can also be defined as a collection or set of elements or variables that are organized, interacting, and interdependent[13].

MIS is an information system that functions to manage information for organizational management. Data in the organization acts like blood in the human body. Healthy information flow is needed by an organization to stay alive[14]. Within the organization, MIS functions both for management control and as a decision support system. The concept of MIS has been born since before computers were widely used, but all kinds of information in organizations must be processed carefully, quickly, and reliably. However, without a network, the concept is only limited to theory. Nowadays with advances in technology and the widespread use of computers as primary needs, the idea of MIS can be applied in an organization[15]

3. Methodology

In this study, the authors took several steps to get excellent research results. This research method consists of several stages, namely, literature study, problem formulation, system development, system testing, and concluding. A literature study is a review of relevant library resources used to collect information data needed in research.

Literature study begins with collecting library resources in the form of books or literature, journals, theses. Also, researchers also use internet assistance in finding sources related to research. After the references are collected, the writer examines the available causes; then the writer can find a problem that can be raised as a topic for the basis of this research. After the library is collected, it is continued with an understanding of the contents of the library sources, which then becomes the basis for analyzing problems.

The problem formulation phase aims to clarify the problem so that it will facilitate further discussion. Also, the formulation of the problem also becomes important because this becomes the basis and the final goal of the research. From the results of the literature study, researchers found a problem that can be formulated as follows, How to design and build a mobile application based on Android educational information systems?

Next is the stages of system development, in developing an application requires an approach and system development that will determine the process of completion of software engineering. The system approach method used in the research is the approach with Object-Oriented, which uses Object-Oriented Analysis which is visualized with UML, namely the Usecase Diagram and Data Flow Diagrams. Software engineering methods provide techniques for building software. It deals with a broad set of tasks that involve a needs analysis, program construction, design, testing, and maintenance[16].

The waterfall model approach is used by researchers to build applications. The waterfall method provides a schematic or sequential approach to the software's life cycle, starting with analysis, design, coding, testing, and maintenance[17]. This means the focus can be on each phase done optimally because there is no parallel artistry. The waterfall method looks like in Figure 1.
Furthermore, the testing stage is carried out to obtain a software that is suitable for use. A software that has been tested must have specific quality standards for testing conducted in this study using Blackbox testing and testing to the user. Blackbox testing focuses on the functional requirements of the software. In Blackbox testing, specific knowledge of application code or internal structure and programming knowledge are generally not required. This testing allows developers to obtain a set of input conditions that meet the functional requirements of a program [18].

The last stage in this research is concluding, drawing conclusions based on literature studies, and discussion of problems. The obtained findings are the results of the analysis of the survey. The conclusions drawn from this research are about how to design and build an academic information system based on Android and how to implement the results of the design of the mobile application so that it can help users in obtaining information[19].

4. Proposed System Implementation

Implementation of interface design is a transformation of the interface design of mobile academic information systems. The opening appearance of the mobile educational information system is shown in the following figure.

Testing the user interface and application compatibility are presented graphically in the following figure.
Tests carried out on several android versions, including Froyo, Gingerbread, Honeycomb, and Ice Cream. Test results from experiments that have been carried out on several versions of the Android operating system and are summarized as follows[20]:

- Testing the user interface for each operating system is visible, and nothing is cut both in landscape and portrait.
- Compatibility testing for Android version Froyo, Gingerbread, Honeycomb. Animation feature cannot. However, for the Android version, the Ice Cream and Jellybean animation feature can run.

5. Results

The Academic Management Information System has been successfully developed and can be accessed in the form of a mobile application on the Android platform. The use of an integrated mobile academic system can be located anywhere; the implementation of the system is carried out in stages through trials, outreach, and training in the use of the system. The purpose of the system can work well with the availability of infrastructure and support from stakeholders and adequate expert human resources. This research needs to be continued to develop mobile application systems on other smartphone platforms. Product usage surveys also need to be carried out on a broader scale to determine user responses to products that have been developed.

| Name          | Version     | Score | Result | Test | Rating |
|---------------|-------------|-------|--------|------|--------|
| John Doe      | Froyo       | 8.5   | Passed | 1500 | A      |
| Jane Smith    | Gingerbread | 7.2   | Passed | 1200 | B      |
| Alice Johnson | Honeycomb   | 6.8   | Passed | 1000 | C      |
| Bob Brown     | Ice Cream   | 9.0   | Passed | 1800 | A      |

6. Conclusion and Future Scope

The mobile academic information system contains information aimed at the student level, and the mobile educational information system is a web-based information system that is accessed through an application that can run on the Android platform. jQuery Mobile display will automatically adjust the screen of the mobile device.
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