



# The effectiveness of technology for programming learning with Android Based In UIN SU's Computer Science Study Program

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## Keywords

Technology Effectiveness,  
Programming Learning,  
Android-Based,  
Third keywords.

**Abstract.** The popularity of Android devices and the availability of various educational applications will provide many benefits, this is because android supports various multi-media formats, allowing the integration of audio, video, and animation to improve the understanding of concepts and learning content on Android applications can be updated easily. As many as 99% of students and lecturers of UINSU's computer science faculty own android smartphones. Programming material is a complex learning material and difficult for students to understand in both theory and attraction transfer courses. Therefore, interesting learning media is needed to make it easier for students to understand the content of the learning material. The results of this research are the development process, feasibility and implementation results of android application-based programming learning.

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## 1. INTRODUCTION

The disadvantage of learning media with Microsoft PowerPoint or practice with presentation methods is that the learning carried out requires large, expensive and not simple supporting tools, namely LCDs and projectors, it makes it difficult for students to learn independently. The use of learning media by lecturers does not attract student learning interest. Based on the results of the distribution of questionnaires conducted by researchers to 45 3rd semester students, the computer science study program of the State Islamic University of North Sumatra (UIN SU) Medan on August 2, 2023, found that as many as 73% of students need interesting learning media to improve their learning outcomes, the rest are about learning methods and lecturer factors.

Added to the results of the study there was an increase in the average score in the experimental class that had been given learning using android-based electronic media. In addition, from the study, it was found that android application-based learning media was needed by students with a percentage of 93.6%. Based on the distribution of questionnaires, it was found that a percentage of 99% of students have Android smartphones. But unfortunately, those who use android smartphones to study only as many as 11% of students and the rest use android smartphones to socialize and play. Need to know the improvement of cognitive learning outcomes of UINSU students, Faculty of Computer Science, Medan, in programming learning supported by android application-based learning media.

And how effective it is to improve students' cognitive learning outcomes. The location determined in this study is at UINSU which is located Jl. Lap Golf, Kp. Tengah, Kec. Pancur Batu, Deli Serdang Regency 20353, North Sumatra – Indonesia. The time is for three months from July 2021 to August 2023. Learning is a process, an activity and an outcome or goal. Learning is not just remembering, but broader than that, namely experiencing. Then the effective learning process is a learning process that is under guidance that stimulates and guides without pressure and coercion[(Septiono & Kartiko, n.d.)]. Learning outcomes are patterns of actions, values, understandings, attitudes, appreciations, abilities, and skills that are complex or not simple and can change or are not static received by students if they satisfy their needs and are useful and meaningful to them(Limbong & Tarigan, 2023).

For example, in the android application developed there is material in the form of videos that can increase the understanding of students[(Arofian, 2022)(Nuriyanto et al., 2022)]. Three characteristics of media are clues as to why media are used and what media can do that teachers may not be able (or less efficient) to do [(Batubara et al., 2023)]. Learning will attract more students' attention so that it can foster learning motivation, one of which is android-based(Juanda & Hendriyani, 2022).

Android is one of the most information systems in the world(Rikshandi et al., 2023). Application components are an important part of an Android. Each component has a different

function, and each component is interconnected(Alasi & Ndruru, 2023). One of the dynamic storage usage on android with SQLite Database. SQLite is an ACID-compliant relational database management system and has a relatively small code library size, written in C. SQLite on Android is included in the Android runtime.

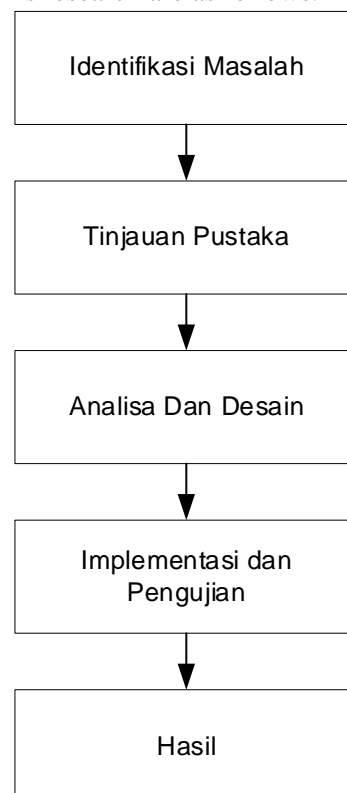
In android development can be done with Android-Studio. Android studio is an integrated development environment- Integrated Development Environment (IDE) for android application development, based on IntelliJ IDEA. In addition to being a powerful IntelliJ code editor and developer tool, android studio offers more features to increase your productivity when building android apps.

In increasing the use of applications, programmers build them with Unified Modeling Language (UML). Some literature mentions that UML provides nine types of diagrams, others mention eight because there are several diagrams combined(PARWASIH, 2022), e.g. communication diagrams, sequence diagrams and timing diagrams combined into interaction diagrams. With the aim of providing ready-to-use models, expressive visual modeling languages to develop systems and be able to exchange models easily and generally understood. And provide a modeling language that is free from various programming languages and engineering processes so as to unify the best practices contained in modeling[(Waluyo et al., 2022)(Alasi & others, 2022)

In addition to using UML in designing applications to be right on target, problem solving techniques with flowcharts are carried out. A flowchart is a symbolic representation of an algorithm or procedure(Sitanggang, 2022), using a flowchart will make it easier for users to check forgotten parts in problem analysis, besides that flowcharts are also useful as a facility to communicate between programmers working in a project team(Risky et al., 2022)](Koto et al., 2022)

## 2. METHODS

The effectiveness of learning technology is utilizing technology for learning. The research methods carried out in completing this research are as follows:



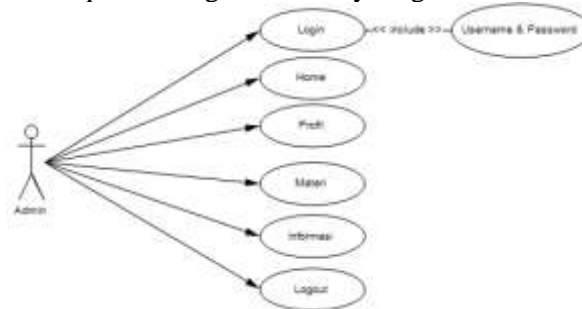
**Figure 1.** Research Methods

The steps in the research to completion are as follows:

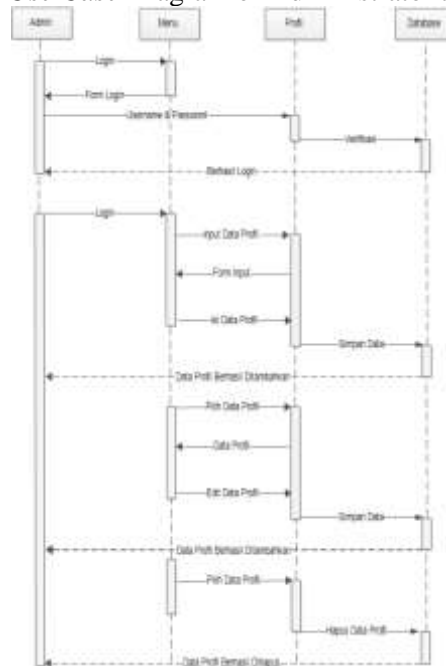
1. Identifikasi masalah, i.e. determine the existing problem.
2. Tinjauan pustaka, i.e. collection of data, information and references.
3. Analisa dan desain, i.e. Analysis of new application needs. application design using UML (*Unified Modeling Language*) and *interface design* from application testing.
4. Implementasi dan pengujian, i.e. the implementation and testing of applications that have been built consist of flowcharts of programs from application testing
5. Hasil, namely the results of research and suggestions to support application development.

### 3. RESULTS AND DISCUSSION

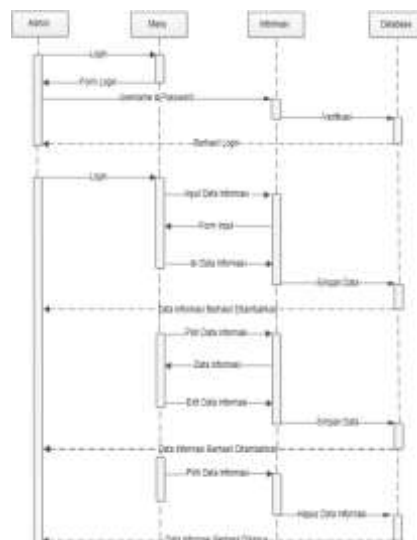
The application design process to be built using the Unified Modeling Language (UML) model consists of: use case diagram, sequence diagram, activity diagram and class diagram.



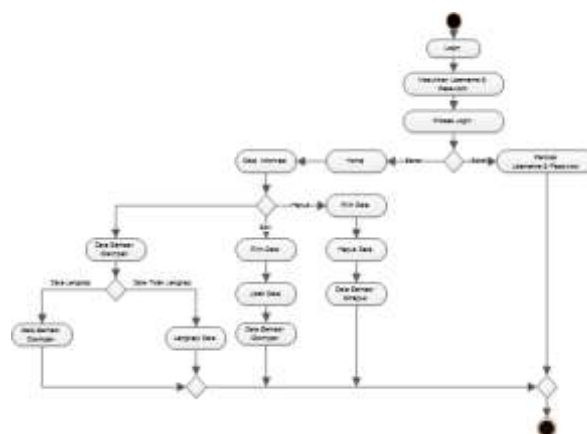
**Figure 2.** Use Case Diagram of Administrator and Student



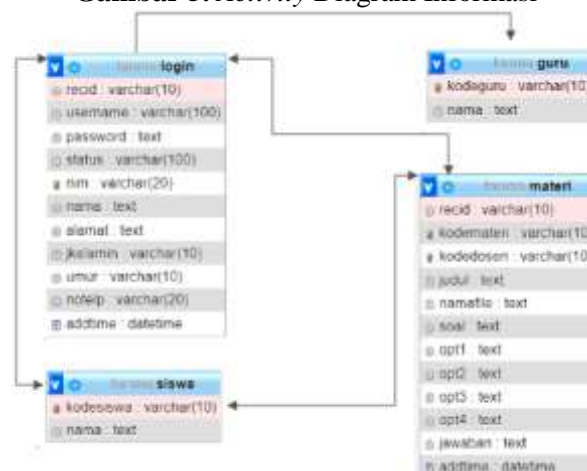
**Gambar 3.** Sequence Diagram Profil



**Figure 4.** Sequence Diagram Information



**Gambar 5.** Activity Diagram Informasi



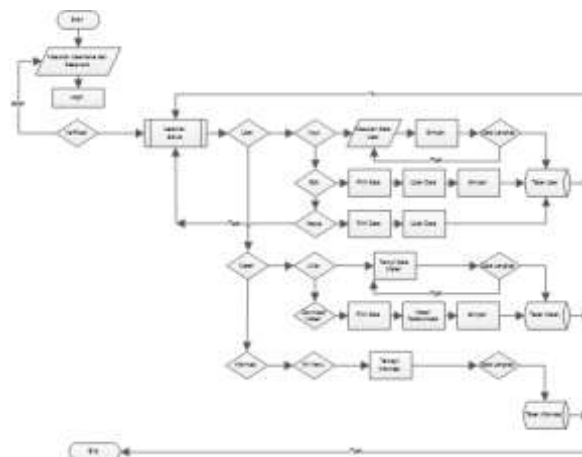
**Gambar 6.** Class Diagram

In the process of testing activities and application implementation, the author uses the required hardware and software. Here are the devices used in testing and implementing applications, namely:



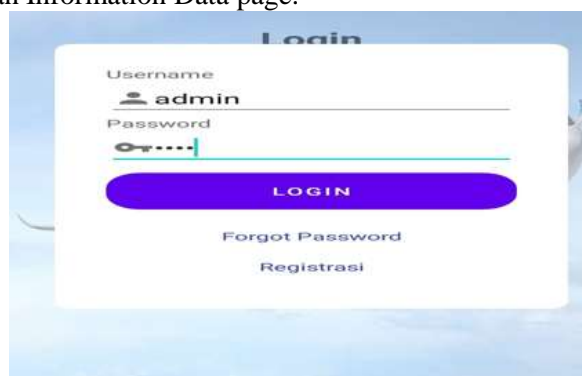
**Gambar 7.** Spesifikasi Smartphone

*Flowchart* illustrates the flow of functions contained in the Learning Media application that has been built



**Gambar 8.** Flowchart Program Aplikasi Pembelajaran

The admin page view consists of a *login page*, a *Dashboard page*, a *User Data page*, a *Material Data page*, and an *Information Data page*.



**Figure 9.** Login Page



Figure 10. Dashboard Page



Figure 11. User Page Display

#### 4. CONCLUSION

The conclusion of the research activities that have been carried out regarding the design of learning media-based development applications, namely learning media applications that have been built can help students obtain information and learning easily and quickly through *Android smartphones*, then learning media applications that have been built can help admins in conveying information about assignments from lecturers and discussions via smartphones Android so that learning media applications that are built can replace the process of delivering information and can help teachers in teaching easily and become information technology-based through Android smartphones.

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