Android-Based Sign Language Learning and Evaluation Apps

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Abstract

Sign language is a combination of lip movements, gestures, expressions and eye gaze in order to convey messages appropriately. This language is used by the deaf and mute as a means of communication by combining forms of finger movements, orientations and gestures of the hands, arms, and body, to express their thoughts. This application uses pictures and questions to find out the information they convey. So this application was designed so that it can help the general public to receive information from the deaf and speech impaired by using Black Box testing to test for functional errors contained in the application.

Keywords *— Sign Language, Deaf, Speech Impaired, Application, Black Box*

1. INTRODUCTION

Sign language is a combination of lip movements, gestures, expressions and eye gaze in order to convey messages appropriately. This language is used by the deaf and mute as a means of communication by combining forms of finger movements, orientations and gestures of the hands, arms, and body, to express their thoughts. The types of sign language vary by country.

The existence of sign language learning applications will greatly help the communication of the hearing impaired and speech impaired to communicate with verbal language users who generally do not understand the meaning of sign language. In addition, sign language learning applications can also help the communication process for the common people for the hearing impaired and speech impaired.

In the process of learning sign language there are two ways to learn sign language movements, namely in the form of pictures and questions. In the picture, there is a picture that contains an explanation of how The Shape of the hand and its position. Meanwhile, in the form of images displayed to evaluate learning outcomes

2. LITERATURE REVIEW

2.1. Theoretical Basis

2.1.1. Application

According to Jogiyanto (2008) explains that application is use in a computer, instructions, or statements structured in such a way in such a way that the computer can process the input into outputs.

An explanation according to Syani & Werstantia, (2019) about applications is software that contains a listing or syntax which can be modified according to what is desired.

Understanding Harip Santoso (2010) which is in the form of a collection of files (Form, Class, Report) which have a purpose in carrying out the work by relating to each other.

2.1.2. Learning

In general, the notion of learning is an effort made to help a person or group of people in such a way with the intention that in addition to creating the learning process at the same time so that the learning process becomes more efficient and effective. The notion of learning can be interpreted as an activity carried out by the teacher in such a way, so that the behavior of students changes for the better.

2.1.3. Sign Language

According To Mardiyani, Atik. Et al, (2012): sign language is a method of communication for people who are deaf or deaf where the hands, body and facial expressions convey the structure of order and meaning, another term of gesture is that which prioritizes manual communication, body, and lip motion, rather than voice, to communicate.

2.1.4. Evaluation

This study is concerned with the evaluation of the results of content mastery services in developing student social relationships. Evaluation comes from the English name evaluation, which means assessment. Evaluation is a process of determining or considering the value or amount of something through careful assessment. In terms of evaluation is a or a process to determine the value of something. Evaluation is the process of collecting, analyzing, interpreting, and presenting information obtained through measurements or tests to provide some meaning based on value judgments. Evaluation can also be defined as the process of collecting information (data) to determine the effectiveness (traceability and achievement) of activities that have been implemented in an effort to make decisions.

2.1.5. Android

According to Safaat in (Ariyanto, 2018), " Android is a collection of software for the operating system which is a mobile device, and the main of mobile applications.

2.1.6. MySQL (My Structured Query Language)

According to MADCOMS (2011) mysql is a program that can be used as a database and is one of the software for database servers that is often widely used.

2.1.7. UML (Unified Modeling Language)

According to Rosa in Irmayani & Susyatih (2017) "UML is one of the language standards that is widely used in the industrial world to define requirements, make analysis and design, and describe architecture in object-oriented programming.

2.1.8. Use Case Diagram

Use case diagram is a model for working (attitude) an information system that will be designed. Use cases function as what behavior is in the information system and this function is used by whom.

2.1.9. Activity Diagram

Activity Diagram describes the main activities of the user in the created information system". It is concluded from the two explanations above that Activity The diagram is describing a technique for procedural logic, business processes and work activities flow in many cases.

2.1.10. Class Diagram

Class diagram, which is a description of the arrangement of the system against the class that will be designed or created and addressed to the system. Methods, attributes, operations are part of the class.

2.1.11. Sequence Diagram

Sequence diagram is a description of the attitude or behavior of an object in a use case with a message sent and received by an object. In the depiction of a sequence diagram, several things that must be understood in the involvement of an object that are associated with use cases and methods that have to do with classes in an organization are included in that object.

2.1.12. Black Box Testing

According to Pressman in (Khasanah, Kesuma, & Wijianto, 2018) "black box testing is a test that allows software engineers to get a set of input conditions that fully use all functional requirements for a program".

3. RESEARCH METHOD

3.1. Research Location

The research was conducted in the Laboratory of Dipa University Makassar, Jl. Pioneer of independence no.KM. 9, Tamalanrea Indah, Kec. Tamalanrea, Makassar City, South Sulawesi 90245.

3.2. Types Of Research

Activities and types of research conducted by the author are, among others:

1. Field Research.

This study was conducted by researching directly to the research site to see directly the conditions that occur in the field and take data about basic knowledge of Sign Language.

2. Library Research.

The research was conducted by collecting and studying data and theories related to learning design using Sign Language applications based on Android, especially on the issue of basic knowledge of Sign Language through journals and other related reference materials.

3.3. Data Collection Methods

The type of research used is:

1. Observation Method.

In this study, researchers collect data that will be the main object in making Android-based Sign Language Learning applications.

2. Interview Methods.

In this study, researchers conducted data collection with a question and answer process directly on students.

3.4. Research tools and materials.

3.4.1. Tools

Research tools used by researchers are :

1. Tools to design and analysis of the system used in this study are:
   a. Use Case Diagram
   b. Activity Diagram
   c. Class Diagram
   d. Sequence Diagram
2. The hardware used in this study, researchers used a Laptop unit with specifications, namely Intel(R) Core processor i7-9750h, 1 TB hard drive, and 8.00 GB RAM.
3. Software used: Windows 10 operating system, Java programming language, MySQL Database, Android Studio Integrated Development Environment (IDE), XAMPP Server, Microsoft Office 2010.

3.4.2. Research Materials

In this writing, the researcher collected data in the form of datalibrary in the form of vocabulary in KKBI and data obtained from students that will be used as a reference for Standardization and the basis for making Sign Language Learning Applications.

3.5. Test Method

Testing methodin the application testing process, researchers use black Box testing method which is a software testing method used to look for errors or failures in the application system that has been made without the need to know the internal structure of the code or program.

By using the Black Box method, researchers can find some of the categories in which the error occurred:

1. Function Error.
2. Program Limitation Error.
3. Data Structure Error.
4. Process Performance Error.
5. Install and stop errors.

Based on the concept of black box testing (functionality) testing there test steps as follows :

1. First will be created test case of each module of the application.
2. Trial data from the object of research on the input form.
3. If the results of the data trial have been successful and can produce information or output in accordance with expectations, it will be concluded that the application is free of functional errors (working properly).

4. RESEARCH RESULTS AND DISCUSSION

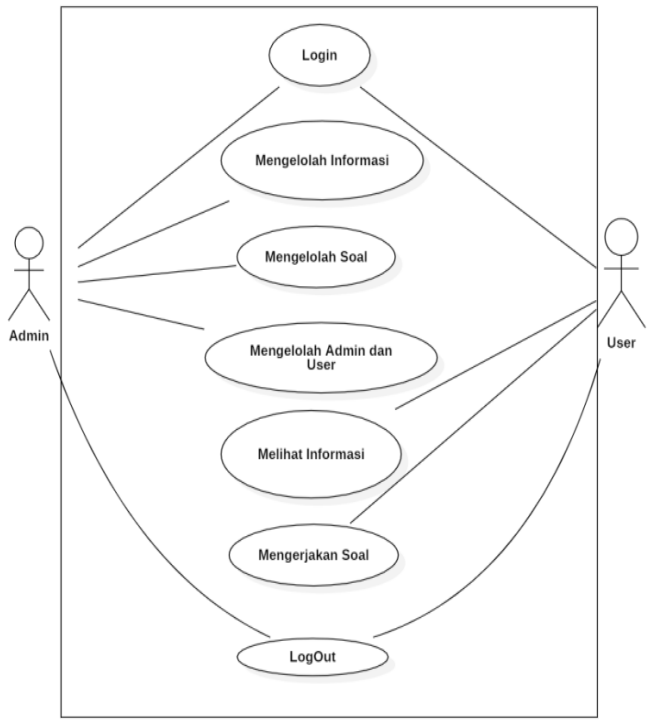
4.1. Simulation Design

Simulation design aims to design and design a good system. Basically, the simulation contains the operating steps in data processing and procedures that support the operation of the system in the simulation performed to achieve the objectives of the simulation.

In one of the problems in the community is the lack of understanding how to communicate with deaf and deaf people, the researchers used several system designs to facilitate communication with deaf and deaf people without barriers. There are several plans to achieve a system that will be used by users. UML (Unified Modeling Language), Database Design, Interface design. The following design simulation system.

4.1.1. Use Case Diagram

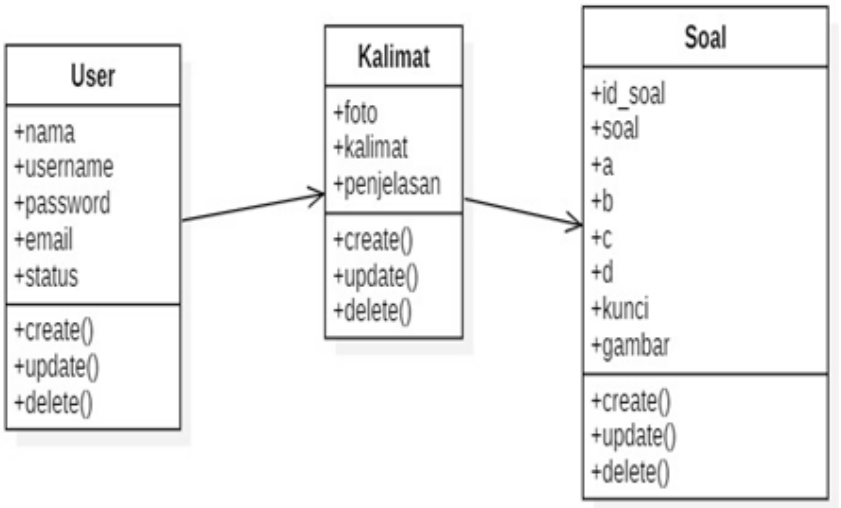
Use cases are designed to describe what the system does and Who actors interact with the system so that users can understand about the application to be created. As can be seen in Figure 1.



Picture 1. Use Case Diagram

4.1.2. Class Diagram

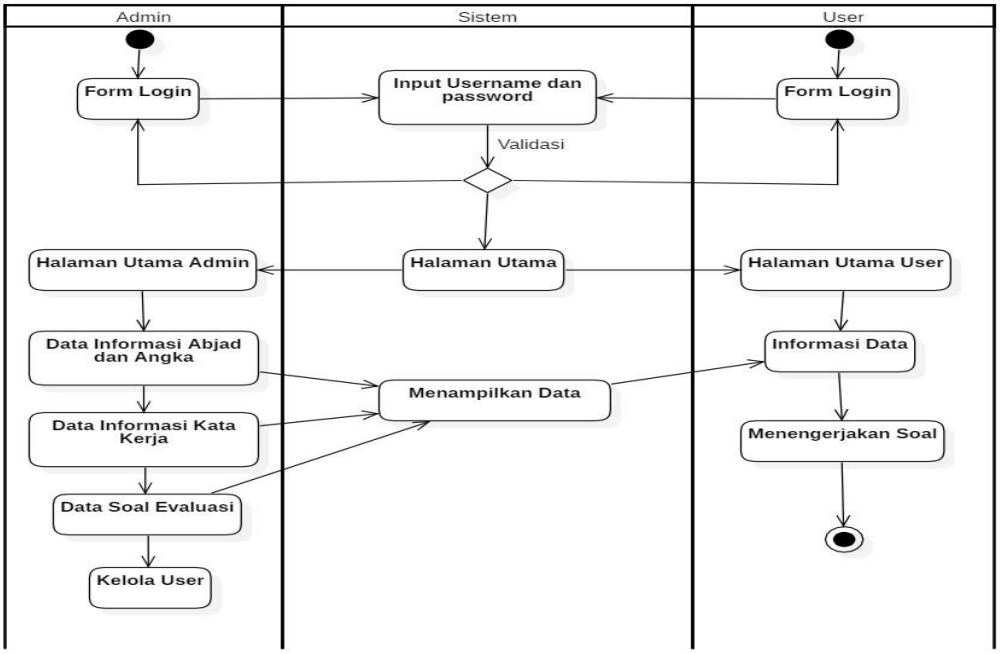
Class diagrams are made to determine the interaction between classes and what classes exist. As can be seen in Figure 2.



Picture 2. Class Diagram

4.1.3. Activity Diagram

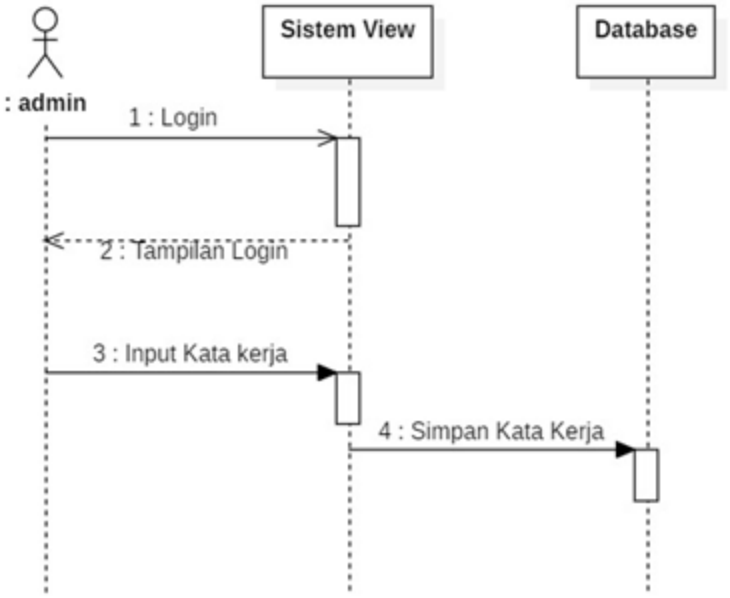
Activity diagrams are made to know the flow circuit and describe the activities that occur. As can be seen in the picture.



Picture 3. activity diagram

4.1.4. Sequence Diagram

Sequence diagrams are made to know how the operation is performed. As can be seen in the picture.

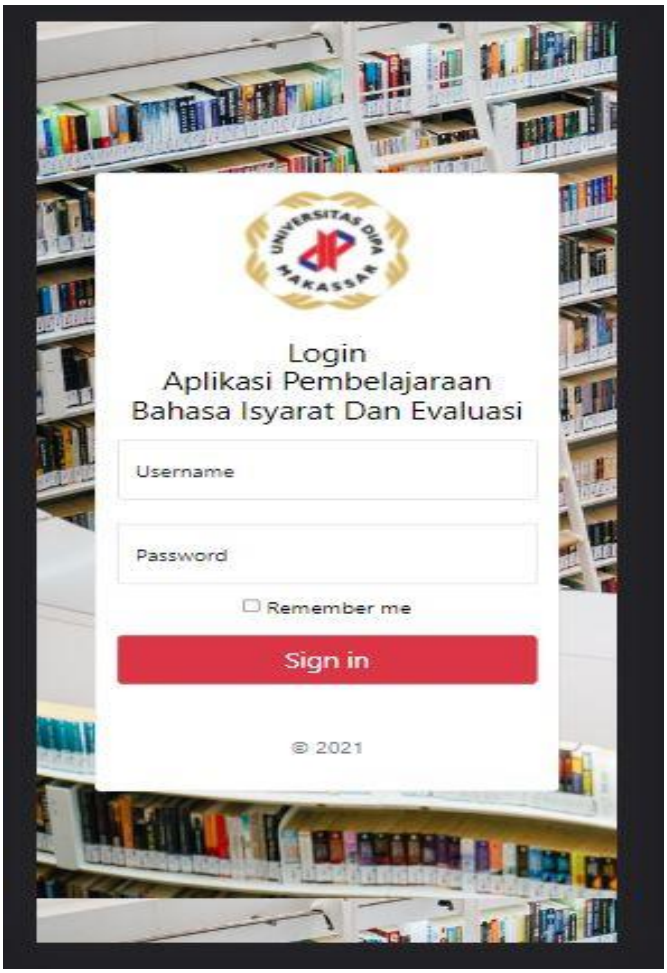


Picture 4. Sequence Diagram

4.2. Interface Design

4.2.1. Interface Login (Admin & User)

In the login interface, admins can login to be able to access sign language learning applications by entering a username and password. And in the login interface, users can login to be able to access sign language learning applications by entering a username and password.



Picture 5. Interface Login Admin & User

4.2.2. Interface Home Admin and User

In the home interface, displays the main page of the application when running in the form of Alphabet and numbers, verbs, evaluation questions, about us, settings, and log out. And in the home user interface, displays the main page of the application when run in the form of Alphabet and number menus, verbs, evaluation questions, about us, and log out.

Picture 6. Interface Home Admin and User

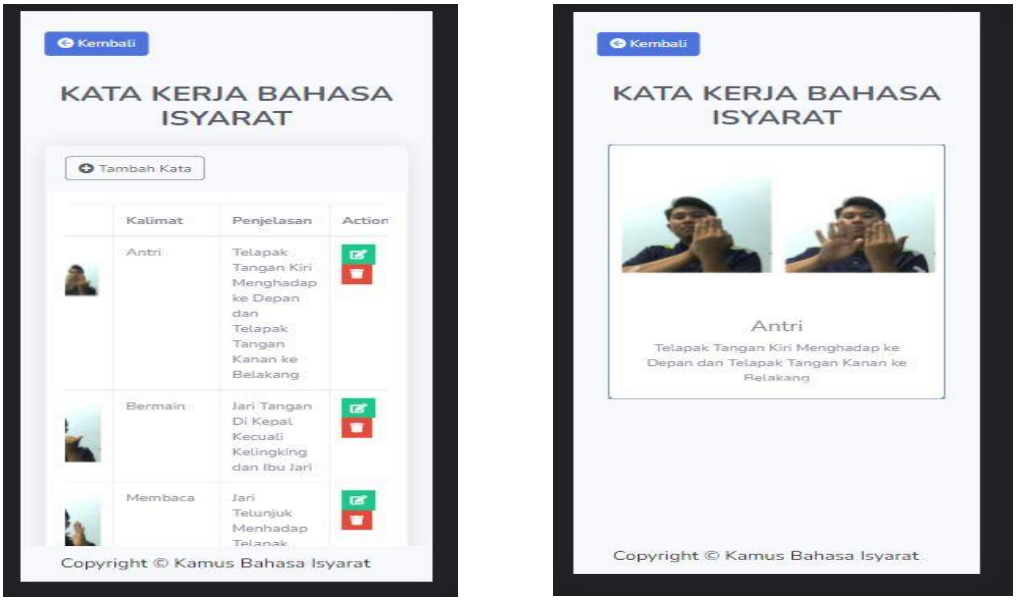
4.2.3. Interface Letters, Admin Numbers and Interface Letters, User Numbers.

In the interface of letters and numbers, displays the menu page of letters and numbers, in the form of letters of the alphabet from a-z and numbers from 0-9.

Picture 7. Alphabet Interface, Admin and User Numbers

4.2.4. Interface Verbs Admin and User.

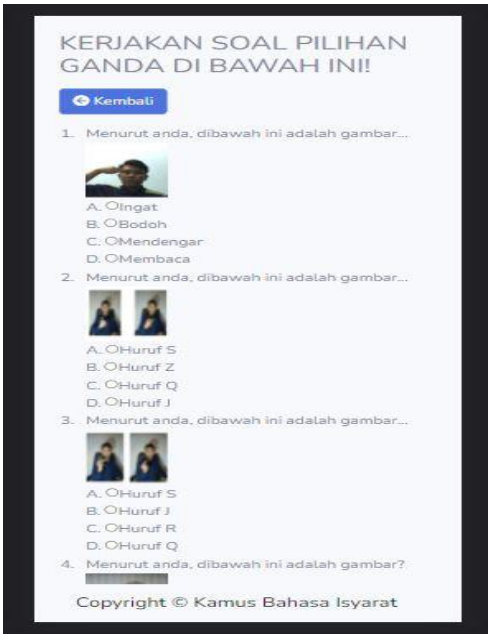
In the verb interface, displays a menu page of verbs in the form of 10 verbs contained in this menu and can be added via the Add word button. And on the verb User in the verb interface, displays the menu page of the verb in the form of 10 verbs contained in this menu and can be added.



Picture 8. Interface Verbs Admin and User

4.2.5. Display Interface Problem Evaluation Admin and User Interface Problem.

In the evaluation interface, displays the menu page of the evaluation which contains 10 Questions and answers and has an answer and reset button.



Picture 9. Admin and User Evaluation Problem Interface

4.2.6. Admin and User Interface Score

In the interfaces score, displays the menu page of the score which contains the correct answer, wrong, results, and the back button.

Picture 10. Interface Score Admin and User

5. CONCLUSION

Based on the conclusions that can be drawn about the design of Sign Language Learning Applications and Android-based evaluation has been done is as follows:

1) With the application of Sign Language Learning and Evaluation based on Android make people in doing Sign Language learning more efficient.
2) This application is made in such a way as to make it easier for people to learn sign language anywhere while they are using Android

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