DESIGN AND DEVELOPMENT OF VIRTUAL TEACHER APPLICATIONS AS A MEDIA TO SUPPORT SIGN LANGUAGES LEARNING WITH ANIMATION MEDIA

Riyan Aisanjaya[1], Hanhan Maulana[2]
[1,2]Teknik Informatika - Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
E-mail : rianaisanjaya@gmail.com[1], hanhan@email.unikom.ac.id[2]

ABSTRACT

The research that conducted at SLB Cicendo in Bandung, which is about Development of Virtual Teacher Applications as a Media to Support Sign Languages Learning with Animation Media which aims to provide supporting media for teachers to help explain and simulate sign language materials, and to provide learning media for students to help learn sign language material when they are outside the school environment. The research methodology that carried out consisted of 4 (four) stages, those are problem identification, data collection (interviews, observations, questionnaires, and literature studies), data analysis, software development using the Luther Sutopo Multimedia Development Life Cycle method, and also Application Testing. The application that was built contains material and simulations using sign language animation. Based on the results of testing on the application that has been built, it can be concluded that the virtual teacher virtual multimedia application of sign language can be a teacher's support media and simulate sign language material, besides that the teacher virtual multimedia application of sign language can assist students in learning sign language material when they are already outside the school environment, so students can recall sign language materials that have been delivered at school.

Keywords: Animation, Application, Sign Languange, Virtual Teacher, Multimedia.

1. INTRODUCTION

Exceptional children are said to have special needs if something is lacking or even deeper in themselves. Exceptional children are children with special characteristics that are not the same as children in general. Those belonging to exceptional children can be grouped according to disorders or abnormalities such as motor / physical, cognitive, speech and language, vision, hearing, and social emotions. Exceptional children need methods such as special materials, equipment and services so that they can achieve optimal development, because they might learn at different speeds and different ways. Although they have different abilities and potential than children in general, they must be treated with equal opportunities.

Frieda Mangunsong say, exceptional children are children who deviate from the average normal child in terms of sensory abilities, social, physical and neuromascular behavior, mental characteristics, communication skills, social and emotional behavior, as well as a combination of two or more things above to the extent that he needs modification of the tasks that are in school, learning methods and other related services, which are aimed at maximizing potential or capacity to the maximum [1].

Based on the results of interviews with the Cicendo State SLB Learning and Development section in Bandung City, Mrs. Rini Rinjani, M.Pd. states that sign language is the language mother of deaf children, although they are taught to communicate verbally, still the sign language can not be released. Therefore there are several problems found. First, there is no supporting media for teachers in delivering and simulating sign language materials that will be delivered to SLB Cicendo students, the impact of learning material is not maximally understood by students. Second, there is no learning media that can help students learn sign language when they are not in the school environment.

Learning media in general can be interpreted as teaching and learning aids or anything that can be used to stimulate the abilities or abilities, feelings, attention, and thoughts of the learners that encourage the learning process. Based on previous research [2-3], states that interactive learning media will greatly help the process of learning sign language at school.

From the problems that have been explained, it takes an auxiliary media for teachers, and students with hearing impairments at SLB Cicendo in Bandung City. First, the teacher can convey and simulate the material that he wants to convey easily. Secondly so that students can learn sign language in accordance with the material that has been delivered at school even though it is not in the school environment, an auxiliary media that is "Virtual Teacher Application as a Media to Support Sign Language Learning with Animation Media".

2. CONTENT OF RESEARCH

2.1 Deaf

Deafness is a term used to indicate the state of hearing loss experienced by someone. In general, deafness can be categorized as hearing loss and deafness, as has been revealed by Hallahan and Kauffman that, Deaf is a term that indicates hearing difficulties including mild to severe hearing difficulties, is classified into deafness and hearing loss. Deaf people are someone who loses his listening ability so that it can hinder the process of receiving language information through hearing, whether using or not using hearing aids, while someone who is unheard is a person who generally uses hearing aids, with enough leftover hearing to allow successful reception language information through hearing [3].

2.2 Sign Language

In Kamus Besar Bahasa Indonesia (KBBI), it is stated that sign language is a language that does not sound like human speech or writing on its symbolic system. Sign language itself is divided into two categories, namely SIBI and Bisindo. Bisindo originates from the language of the deaf person, which is then used in communication in general. The current sign language system in Indonesia is Sistem Isyarat Bahasa Indonesia (SIBI) similar to American sign language (ASL - American Sign Language) [3].

2.3 SIBI Dictionary

Sistem Bahasa Isyarat Indonesia (SIBI) is one of the media that can help in communicating among deaf people in the wider community. Its form is a systematic order that explains the finger, hand, and various gestures that symbolize Indonesian vocabulary.

2.4. Instructional Media

Instructional media is a system that consists of various kinds of components that are connected to each other. The components include: objectives, material, methods and evaluation. Learning is a process in creating conducive conditions for interaction to occur in communicating teaching and learning between teachers, students, and other components to achieve goals in learning [4].

2.5 Multimedia

Interactive multimedia is a multimedia that is equipped with a controller that can be operated by the user. In interactive multimedia, users can choose what they want for the next process. [5].

2.6 Simulation

Simulation is a system used in deciphering or solving problems in real life that is full of uncertainty by not or using a particular model or method and emphasizing the use of computers to get a solution [6].

2.7 Animation

The development in the world of computer animation is now growing, since the emergence of three-dimensional animation (3D Animation) which has a length, width, and height so that the movement of objects is almost as real as [7].

2.8 Object Oriented Design Analysis

Object-oriented design or OOD changes a conceptual model that can be generated into object-oriented analysis taking into account constraints fixed by the chosen architecture and any constraints - technology and environment - non-functional, such as programming languages, development environments, run-time platforms, responses time, or throughput transactions [8].

2.8.1 UML

UML functions to bridge in communicating aspects that exist in the system through graphic elements that can be combined so that it becomes a diagram. Modeling using UML is a visual and object-oriented model because it uses UML modeling which only focuses on defining static structures and dynamic system models rather than those with traditional development goals [9].

2.8.1 Use Case

Use case diagrams describe a system interaction that is the user, internal system, and external system. In other words, an interaction between one or more actors with the system to be built [9].

2.8.2 Activity Diagram

Activity diagram describes an activity or workflow from business processes that exist in the software. Activity diagrams provide analysis to model processes in a system. Activity diagrams can be used as workflow models, decision logic contained in individual methods, or individual use cases [9].

2.8.3 Class Diagram

Class diagrams can be described as various types of objects in a system and various static relationships that exist. Class diagrams also show operations and properties of a boundary and class found in relationships between objects [9].

2.8.4 Sequence diagram

Sequence diagrams can be said as behavior objects in use cases that can be described as the life time of objects and messages sent and received between objects [9].

2.9 System Testing Method

System testing methods are used to determine the effectiveness of a software (software) used, besides being able to provide the opportunity for users to check and operate reports generated through software. System testing methods use Black Box and User Acceptance Testing.

2.9.1 Black Box Testing

Black box testing also known as behavioral testing is a software testing method where the internal structure, design, and implementation of the tested part cannot be known by the examiner. In black box testing, the testing carried out is testing functionality and non-functionality.

2.9.2 User Acceptance Testing

The UAT test performed on the application to know the user's responses and appraisal to the app, then calculates by using the likert scale where the data is analyzed by calculating the average answer based on the scoring of answers from the respondents, then summed up.

3. RESEARCH METHOD

The research methodology is used as a guideline in conducting research so that the results achieved do not deviate from the objectives carried out, and can be used to solve a problem. In this study the methodology used has stages that can be seen in Figure 1.

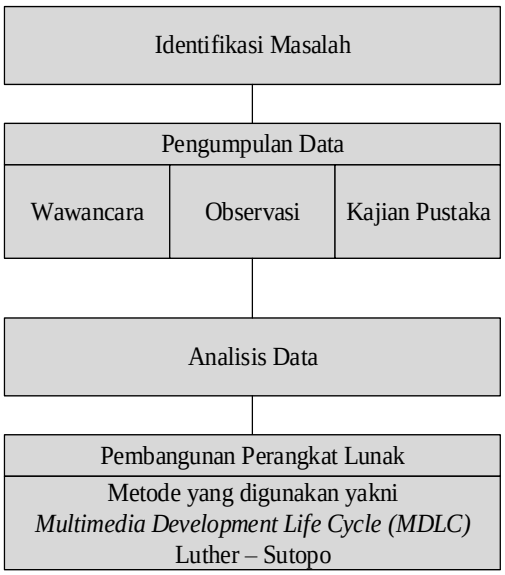

Figure 1. Research Method

3.1 Identification of Problems

Problem identification is the stage to find problems that occur in the research location, namely SLB Cicendo Bandung City. So that from the existing problems will be determined what applications are needed by SLB Cicendo Bandung City.

3.2 Method of Collecting Data

Data collection techniques in this study used the interview method by asking questions directly with Mrs. Rini Rinjani Indriyani, M.Pd. as part of Learning & Assessment of SLB Cicendo Bandung City, observation collect data about the sign language learning system taught in schools according to the learning modules taught by the teacher to SLB Cicendo students, interviews, and literature studies from previous researchers.

3.3 Data analysis

Data analysis was obtained from the problems obtained from the data identification stage and from the data collection stage to build multimedia applications that have the purpose of helping SLB Cicendo Bandung City in teaching students to learn sign language that is compatible with Sistem Isyarat Bahasa Indonesia (SIBI)

3.4 Software Development

The method of software development used is the application development method Multimedia Development Life Cycle, Luther - Sutopo. The device development method takes the process systematically and sequentially, each process is carried out one by one, if the next process will be carried out then the previous process must be completed first. MDLC is used if the user's needs are very clear and have clear rules, because each process is done in stages. The series of software development method processes carried out can be seen in Figure 2.

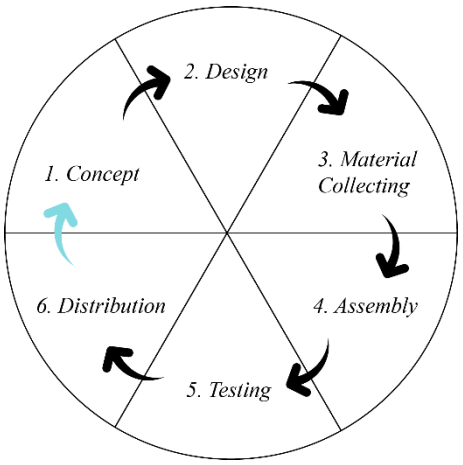

Figure 2. Luther-Sutopo Multimedia Application Development Method

3.5 Testing

The testing phase is the testing phase of the application that has been built. Tests that will be carried out for learning media applications aim to test applications that are built and observe whether or not there are deficiencies in the application. System testing methods use the Black Box and User Acceptance Testing.

4. Result and Discussion

4.1 Problem Analysis

The first problem is the teacher / workforce needs supporting media so that the delivery of material to be delivered by the teacher / workforce accordingly with the needs of a student at the SLB Cincendo Bandung City. This is because teachers / workers in SLB Cicendo sometimes forget the material to be delivered, while deaf students at SLB Cicendo need special guidance so that material delivery can be well received.

The next problem is the absence of learning media that can help students learn in sign language when they are outside the school environment. This is because sign language that is taught in schools is still poorly understood, so students need learning media that is in accordance with the material taught in school.

4.2 Architectural Analysis

Architectural analysis on the system built can be seen in Figure 3.

Figure 3. System Architecture

Applications that will be built are mobile based, this application serves as an auxiliary medium for teachers / laborers in delivering the material to be delivered and helps SLB Cicendo students in understanding the material that has been delivered by the teacher / staff at school. In using this app the user uses the smartphone as a tool for running multimedia language animation of gestures.

4.3 System Modeling

4.3.1 Non-Functional Analysis

Analysis of non-functional requirements can be described as a system requirement that will focus on the behavior contained in the system, including user needs, hardware, software, as an analysis of the needs and disadvantages that must be fulfilled in the system design applied.

4.3.2 Functional Analysis

Analysis of functional requirements is a process of describing the activities needed by a system so that the system built runs well and in accordance with needs. System modeling is modeled with use case diagrams and class diagrams.

4.3.2.1 Use Case Diagram

The interaction between one or more of the systems to be built can be seen in Figure 4.

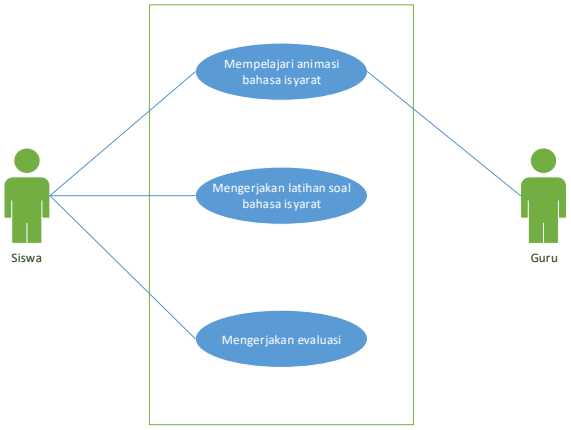

Figure 4. Use Case Diagram

4.3.2.2 Definition of Actors

Here are the actors in the system to be built can be seen in Table 1.

Table 1. Definition of Actors

No	Actor	Description
1	Teacher	Is a user of the application to be built, namely the teacher at SLB Cicendo, who will use the multimedia application of sign language simulation using the Dictionary of Sistem Isyarat Bahasa Indonesia (SIBI) as a medium to help deliver the material to be delivered.
2	Student	It is a user of the application to be built, namely students at SLB Cicendo who will use the multimedia application of sign language simulation using the Sistem Isyarat Bahasa Indonesia (SIBI) as a learning medium in learning material while outside the school environment.

4.3.2.3 Use Case Definition

Here is the definition of use case in the system to be built can be seen in Table 2.

Tabel 2. Definisi Use Case

No	Use Case	Description
1	Learn the sign language	Is the process of learning language signals using animated media.
2	Doing problem training	The process to display the training phase of the question regarding the damage code
3	Work on evaluations	The process to display the evaluation question stage

4.4 Design and Implementation

4.4.1 Interface Design

The design is part of the software development methodology carried out after the requirements gathering stage to provide a detailed description of system design [10]. The following is the main menu interface design shown in Figure 5.

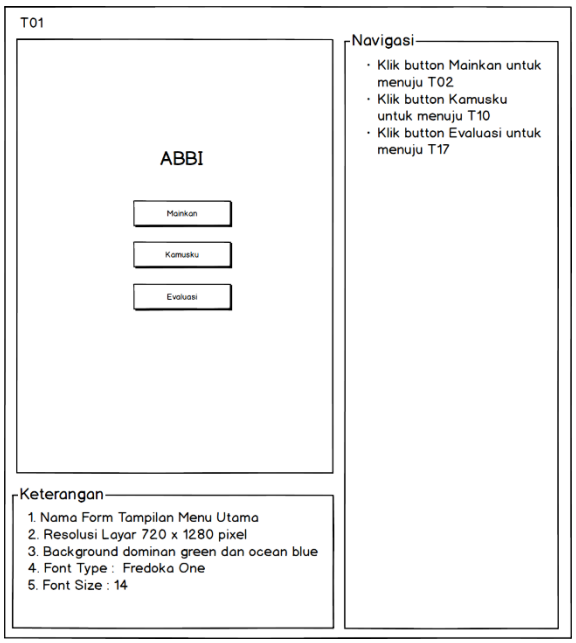

Figure 5. Main Menu Interface

Following is the design of select class interfaces can be seen in Figure 6.

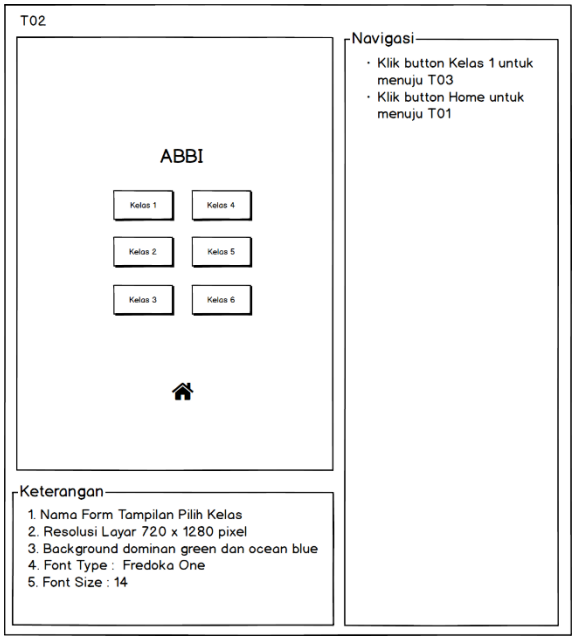

Figure 6. Class Select Interface

The following is the design of the interface select material can be seen in Figure 7.

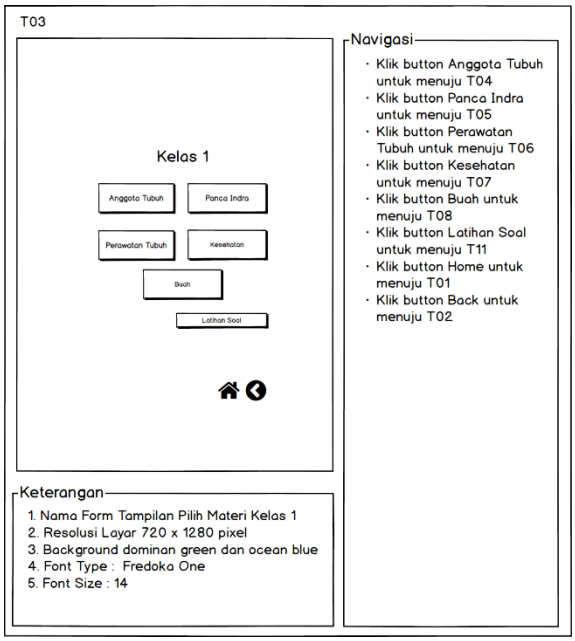

Figure 7. Select Material Interface

4.4.2 Menu Structure Planning

The following is the design of the menu structure can be seen in Figure 9.

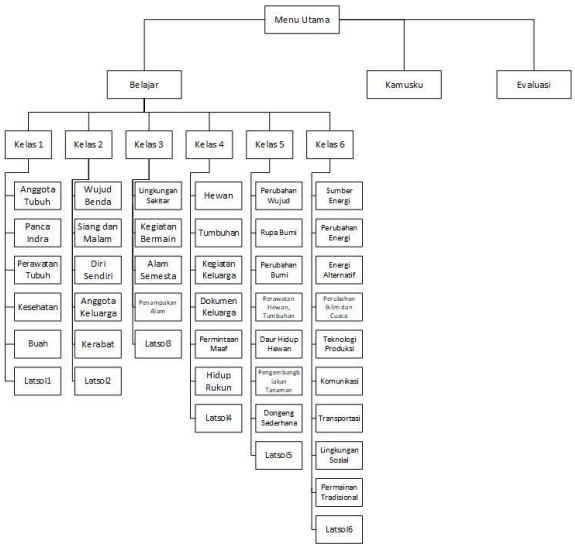

Figure 8. Menu Structure Planning

4.4.2 Semantic Planning

Here is a semantic design can be seen in Figure 9.

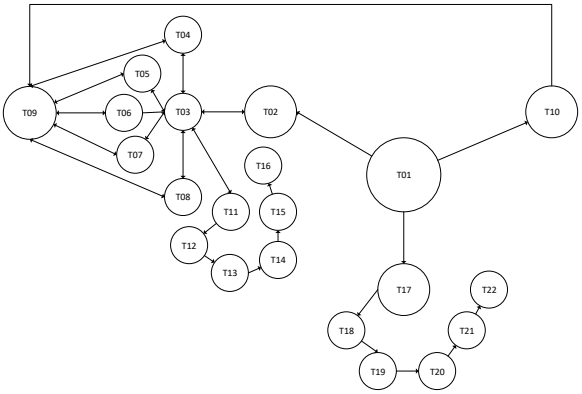

Figure 9. Semantic Planning

4.5 Testing and Test Results

4.5.1 Black Box Testing

Blackbox testing focuses on the functional requirements of the software being built. The stages of a functional test carried out include blackbox testing scenarios, cases, and test results.

4.5.1.1 Black Box Test Results

The results of the blackbox testing that has been done can be drawn from the conclusion that the system that was built has been running as expected. All that has been done in this test is expected to represent the testing of other functions in the system built.

4.5.2 User Acceptance Testing Test

User acceptance testing test is an objective test in which this test is carried out directly at SLB Cicendo, which aims to determine the extent to which the quality of the system in the learning application is built. User acceptance testing testing is done by research to respondents or prospective application users to find out the user's assessment of the application.

4.5.2.1 User Acceptance Testing Test Results

Based on the results of user acceptance testing conducted by the observation questionnaire, it can be concluded that the virtual teacher multimedia application as a learning medium for sign language can help and make it easier for teachers and students to understand sign language material by utilizing interactive multimedia.

5. CONCLUSION

Based on the results of testing obtained from the research conducted in the preparation of this final assignment and referring to the objectives of the research that has been made, it can be concluded that:

a. This virtual language sign language teacher multimedia application can be a media support teacher and simulate sign language material .
b. This multimedia language sign language teacher application can help students learn sign language material when it is outside the school environment, so students can recall sign language materials that have been delivered at school.

Based on all the results achieved in the preparation of this thesis. The suggestions that can be used as a reference for the development of virtual applications as virtual media learning sign language with animated media in the future:

a. It is expected that this learning media can be developed, so that students can learn the composition of sentences using sign language properly.
b. It is hoped that this learning media can be developed, so that the animations in this application can be added by the way users record direct movements on the models in the ABBI application and then store them into an internal database, and develop them online so they can be used anytime and anywhere.

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