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Virtual Classroom Design for the Deaf Based on Cloud Computing

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Abstract

The development of information technology is growing rapidly, giving rise to various innovations that also change human behavior, especially in interaction and communication. Cloud Computing is a hot topic for today's technological developments. Persons with disabilities are people who have physical, mental, intellectual, or sensory limitations for a long period of time (Law No. 19 of 2011). Deaf and speech impaired people need signs or alarms that are visual in nature, either as picture symbols or in the form of lights. Currently, virtual classes have begun to be used as learning alternatives. Virtual class (virtual class) is a class based on the web, where teachers and students can interact anytime and anywhere without being limited by space and time. The purpose of making this design is so that the learning process for the deaf can run well. The method used is a collaborative Design Thinking method that collects many ideas from scientific disciplines to obtain a solution. Cloud computing can be used as a technological instrument that facilitates the construction of a good application for students with special needs. With the design thinking method, good applications can be produced and are able to produce a good learning process for students with special needs.

*Keywords**:** Cloud Computing, Virtual classroom, Deaf disabilities, Design Thinking*

Introduction

The development of information technology is growing rapidly, giving rise to various innovations that also change human behavior, especially in interaction and communication. Cloud Computing is a hot topic for today's technological developments. The National Institute of Standards and Technology, Information Technology Laboratory in Ahmad Rifai (2011) provides a definition that cloud computing is a model for providing convenient, on-demand network access by multiple users to share configured computing resources (e.g., network, servers, storage, applications, and services) that can be rapidly assigned and released with minimal management effort or service provider interaction. Looking at the current conditions in Indonesia, people with physical disabilities have not received adequate attention because socially this group is still neglected. Persons with disabilities are people who have physical, mental, intellectual, or sensory limitations for a long period of time (Law No. 19 of 2011). Deaf and speech impaired people need signs or alarms that are visual in nature, either as picture symbols or in the form of lights. Currently, virtual classes have begun to be used as learning alternatives class is a class based on the web, where teachers and students can interact anytime and anywhere without being limited by space and time. Just like in conventional classes, in learning that is carried out in virtual classes, students

and teachers can interact with each other, which means students enter virtual classes at the same time.

Method

In choosing the right design to be closer to the users themselves, in this case it is the visually impaired who have difficulty hearing, for that we use the Design Thinking method which is collaborated to collect many ideas from disciplines to obtain a solution. There are 5 processes in using Design Thinking to get innovative outputs.

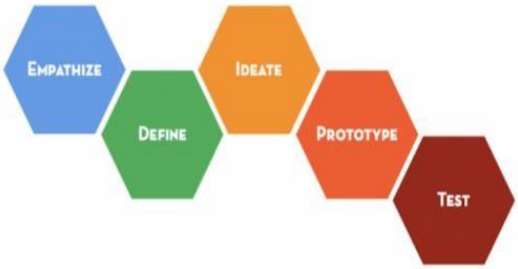

Figure 1. Research Flow

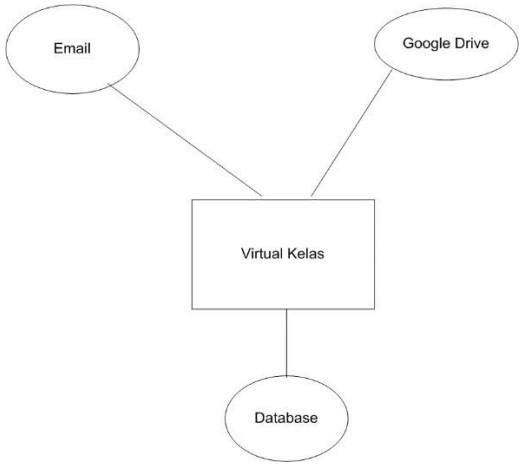

Figure 2. *Virtual Classroom (By utilizing Google drive and Email for cloud computing)*

a. Empathize

The design thinking approach method emphasizes the aspects that exist in user centered design where the focus of the thinking process is on human values as users and humanity itself . By doing research for one week on Special Education, to get the needs of users. In the learning process with disabilities, teachers with disabilities have difficulty understanding lessons, because of difficulties in hearing, although there are some who can understand lip language, but when the

teacher speaks too fast it is difficult to understand what is being conveyed. Deaf disabilities, can understand visuals and texts, and how to communicate using sign language.

b. Define

Deaf people have problems with hearing and pronouncing words. In daily communication, they usually use sign language, to understand what is conveyed by the deaf person, see the pronunciation of the mouth of the person speaking, which is known as lip language. However, the problem is that when the conversation is too fast, you will experience problems in understanding lip language. How to communicate using text can be a solution to communicate with disabled teachers.

c. Ideate

The way to communicate with hearing impaired people uses sign language a lot, to understand what is being conveyed, they often read lip language, meaning that the words that are spoken slowly can be understood by the hearing impaired. Support from friends around plays an important role in the learning process and increases confidence in communicating. The habit of pronouncing words can help the deaf in communicating around them.

By designing a class that is able to support the learning process, for that visual elements and support texts from friends around and teachers or lecturers who guide to become the right learning environment for the hearing impaired. The designs that will be made are 1. Can choose a class with a discussion system that uses text and video with Indonesian subtitles; 2. Can exchange opinions and information with classmates by using the email facility; 3. Learning resources such as books and friends can contribute to providing a summary; 4. Lecturers or teachers can be petrified when experiencing difficulties in learning

Figure 3. class based on the selected class

Figure 4. Video

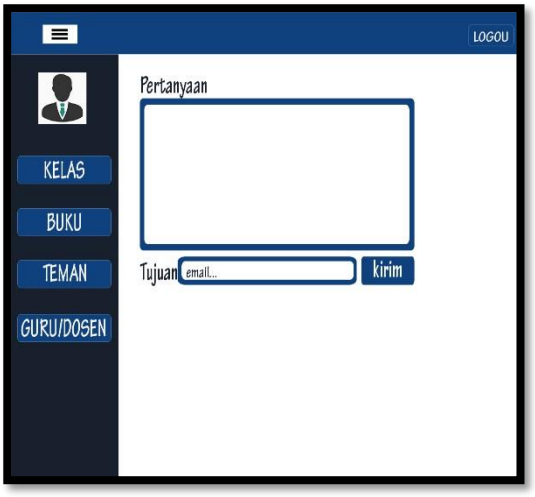

Figure 7. Teacher/Lecturer

Figure 5. Book

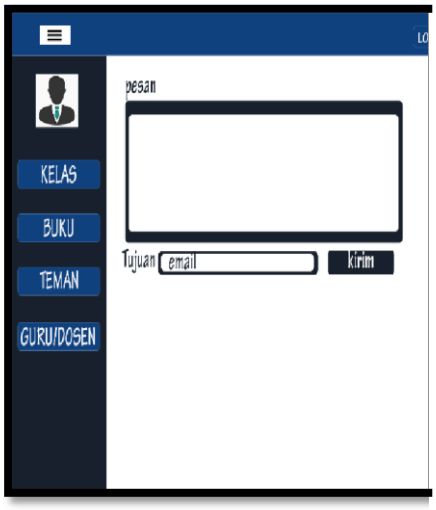

Figure 6. Friend

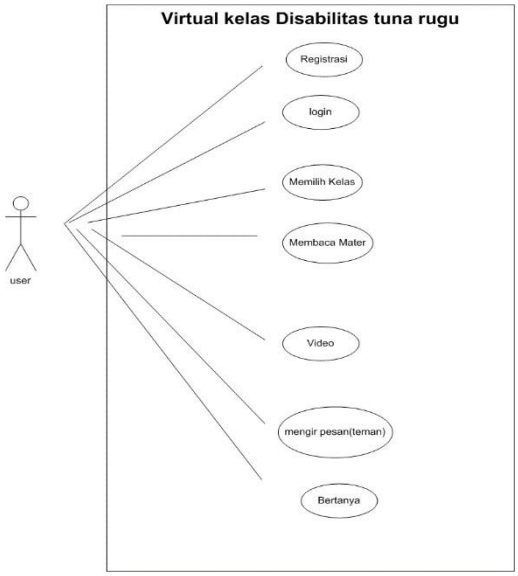

Figure 8. Use Case

Results and Discussion

By designing virtual classes for people with hearing impairments by utilizing cloud computing. Produce application designs that can help the deaf in learning, make it possible to learn by using videos that use Indonesian subtitles and text to read so that they do not have difficulty in learning. Classmates can share material with an email service that is provided specifically for communicating with each other and exchanging information. Lecturer service can be used to ask questions directly with the lecturer or teacher when experiencing difficulties. It is hoped that this design can be developed directly for the needs of other people with disabilities.

Conlusion

This study concludes that, the better the design of an application for the deaf, the better the students with special needs can understand the learning material and achieve the desired learning achievement. Cloud computing can be used as a technological instrument that facilitates the construction of a good application for students with special needs. With the design thinking method, good applications can be produced and are able to produce a good learning process for students with special needs.

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