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Multimedia Based Sign Language Learning

Muhammad Rayhan Bustam[1]*, Raden Agustiawan[2], C N Albar[3], Raiswati Untsa Mega[4]
[1,4]Department of English Language, Universitas Komputer Indonesia, Indonesia
[2,3]Department of Information System, Universitas Komputer Indonesia, Indonesia
**Corresponding Author*: raisauntsa10@gmail.com

INTISARI

Memiliki anak tunarungu menjadi perhatian besar bagi orang tua dalam mengajarkan anaknya berkomunikasi. Namun, orang tua cenderung kesulitan memilih pendekatan yang tepat dalam mengajar anak tunarungu agar tidak merasa malas dan cepat bosan dalam belajar. Penelitian ini bertujuan untuk membuat aplikasi pembelajaran bahasa isyarat interaktif berbasis sistem bahasa isyarat BISINDO sebagai media pembelajaran alternatif bagi anak tunarungu untuk meningkatkan motivasi belajarnya. Aplikasi dibuat untuk membantu anak tunarungu dalam memahami bahasa isyarat, yang didukung software interaktif dengan fitur seperti video, animasi, hingga kuis trivia. Penelitian ini menggunakan metode deskriptif dengan observasi dan wawancara, serta metode prototype dalam pengembangan sistem. Hasil penelitian ini menunjukkan bahwa aplikasi dapat meningkatkan motivasi belajar bagi anak tunarungu dan memberikan instrumen pendukung bagi orang tua dalam mengajarkan anak berkomunikasi.

Kata kunci: *Bahasa Isyarat, Pembelajaran Bahasa, Pembelajaran Multimedia.*

ABSTRACT

Having children with hearing impairment is a great concern for parents in teaching their children to communicate. However, parents tend to have trouble choosing the right approach in teaching the children not to easily feel lazy and bored in learning. This research aims to create an interactive sign language learning application based on BISINDO sign language system as an alternative learning media for children with hearing impairment to increase their learning motivation. The application was made to help the children in understanding sign language, supported by an interactive software equipped with features such as videos, animations, to trivia quizzes. This research used descriptive methods with observation and interviews, as well as prototype methods in system development. The results of this study indicates that the application can increase learning motivation for children with hearing impairment and provide supporting instruments for parents in teaching children to communicate.

Keywords: *Language Learning, Multimedia Learning, Sign Language.*

INTRODUCTION

As social beings, humans cannot live alone and need other people in their lives. In carrying out their function as social beings, humans must have various skills to interact, communicate, both verbally and non-verbally. However, not everyone can perform verbal communication properly, such as Deaf people. Deafness (or hearing loss) has different definitions based on its contexts. In a medical context, deafness is a hearing loss that made a person difficult in understanding verbal language [1]. Deaf people have their way of communicating, namely by using sign language.

Sign language prioritizes manual communication, namely body language and lip movements in communication. Two sign languages in Indonesia can be used for deaf and/or hard-of-hearing people, namely *Bahasa Isyarat Indonesia* (BISINDO) and *Sistem Isyarat Bahasa Indonesia* (SIBI). However, BISINDO is easier to be understood by Indonesian because it is more compatible with the locals [2][3]. Also, having children with hearing impairment is certainly a greater concern for

parents to teach their children to communicate well. One of the obstacles faced by parents with deaf children is the difficulty in teaching sign language.

This research aims to create a sign language learning application for children with hearing impairments. This application was made to support the learning process of children with hearing impairment in understanding sign language, starting from recognizing letters, numbers, basic and greeting words, and others. Therefore, it can help parents teach their children not to get bored easily in the learning process because this application is made as interactive software.

There are several pieces of research regarding this topic. Andreas et al. have researched software design for learning Bahasa Indonesia designed for Deaf people [3]. However, the developed software used the SIBI system instead of BISINDO. Aran and Akarun also have researched this topic which presents an overview of recognition techniques, their application, and sign language analysis [4], but their research was focused on the overview and not designing software. On the other hand, Flórez-Aristizábal et al. have established a framework for designing tools to teach children with disabilities [5], but the research focused on establishing the framework without implementing it into a soft or hardware. Nasr has proposed an interactive paradigm for Deaf or Hard-of-Hearing pupils with various tools [6]. However, the research focused on establishing the interactive paradigm and not designing software in general. Garcia et al. also designed an E-tutor software for deaf people in learning Filipino [7]. The difference is that the created software aimed to learn Filipino and based on Android, while this research focused on creating software to learn Bahasa Indonesia.

Besides the difference between this research and the previous above, this research is also focused on creating an application used by children with hearing impairment in Indonesia. Since the system used for the application is BISINDO, the targeted subject is children with hearing impairment who want to learn and to communicate with Indonesian language.

Thus, this research can contribute in supporting the learning process of children with hearing impairment for understanding sign language and building confidence to communicate with people especially in Indonesia. Besides, it also can help parents teach the children not to get bored easily in the learning process because this application is made as interactive software, equipped with various supporting features such as videos, animations, to trivia quizzes. It is also hoped that the application can increase learning motivation for deaf children and allow parents to evaluate their child's learning process.

METHOD

This research used a descriptive qualitative method. A literature review was used to provide support and insights into this research. A prototype is a model, product release, or early sample built to test a process or concept [8][2]. In the creation of an application, a design prototype is needed to facilitate the application development process. The design process itself is carried out after obtaining user needs which are then analyzed and processed to describe the workflow that will be built based on the needs that have been analyzed. Therefore, the coding process can be adapted to the flow that has been designed [9]. The prototype was also used in developing the application and can be classified into five stages; Figure 1 is shown the prototype method.

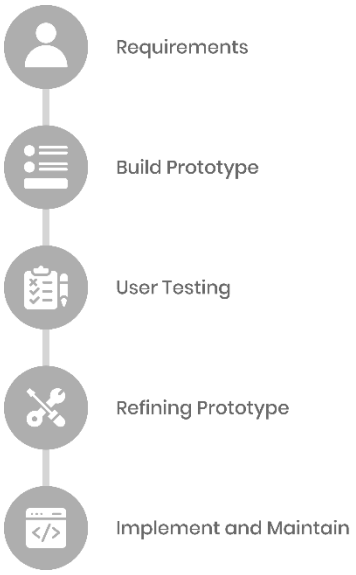

Figure 1. Prototype Method

As shown in in Figure 1, there are five stages used in developing the application. First stage is “requirements”; in this stage, it is mapped some of the requirements for creating the application. There are two main requirements mapped: BISINDO as the framework system of the application, and children with hearing impairment as targeted subject. Second stage is “build prototype”; in this stage, the prototype is built based on the

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requirements mapped. Third stage is "User Testing'; in this stage, the protoptype is tested by some children, not only children with hearing impairment but also some normal children. Forth stage is "Refining Prototype"; in this stage, some evaluations made after the "User Testing" stage are used to refine the prototype. Finally, fifth stage is "Implement and Maintain"; in this stage, the prototype which has already refined is implemented, and also maintained if there are some troubles when it is implemented.

The purpose of prototyping the design is to meet user needs regarding a clear picture of the system, final design, and application development guidelines [10]. An overview of applications that have been made is in the form of interactive learning applications for deaf children based on multimedia, which is intended to be an alternative media for learning sign language. The design would also refer to the psychology of colors in the design and perceive it.

The design of the application design that will be made is illustrated in several diagrams; Figure 2 is shown a use case diagram for the application to be built.

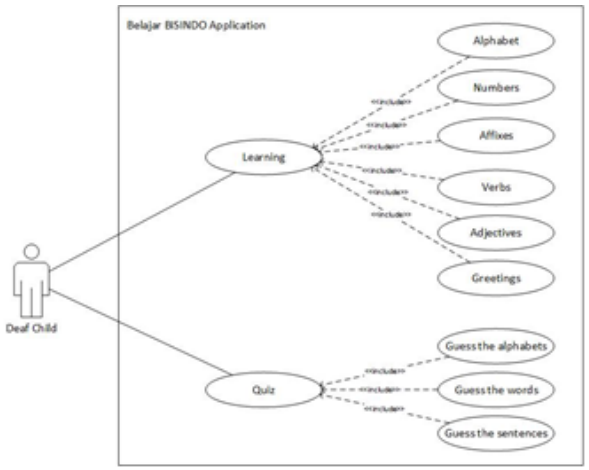

Figure 2. Use Case Diagram

An activity diagram was made to clarify the flow of each part of the use case. In the use case diagram in Figure 2, it can be seen that there is only one actor, namely Deaf Child, where the actor can carry out several activities such as accessing the learning menu and quizzes. In the learning menu activity, users can select several options to determine their learning options, such as learning alphabets, numbers, affixes, verbs, adjectives, and greeting words; Figure 3 shows the learning menu activity diagram.

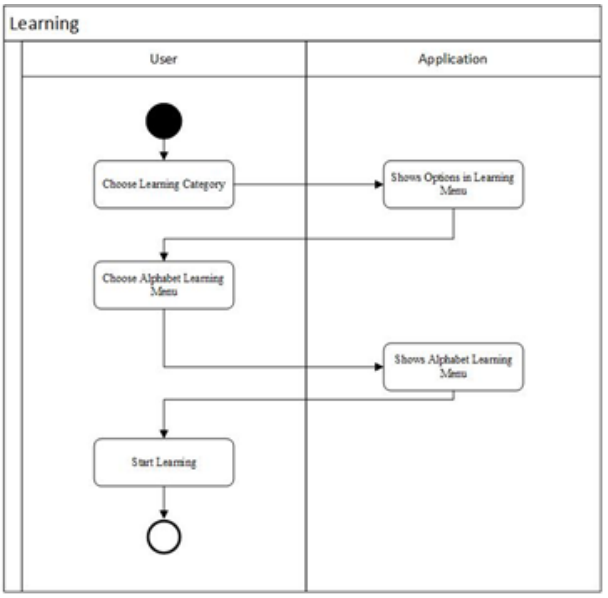

Figure 3. Learning Activity Diagram

In the quiz activity, users can choose several quiz options, such as guessing letters, words, or sentences. When the user selects one of the quiz menus, the user must complete each question to then see the final score, which parents can use the final score to see their child's learning progress. The activity diagram is shown in Figure 4.

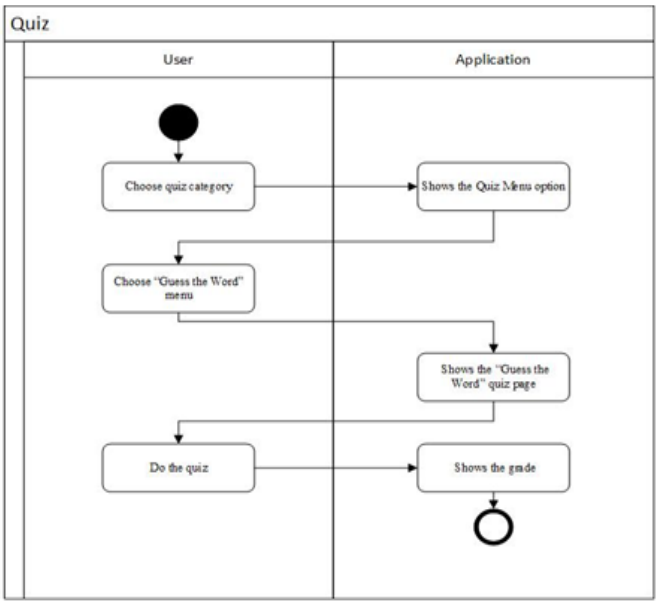

Figure 4. Quiz Activity Diagram

In accessing this application, users do not need an account so that anyone can use it.

RESULTS AND DISCUSSION

The results of this study are an interactive sign language learning application based on BISINDO sign language system as an alternative

learning media for children with hearing impairment to increase their learning motivation. In the application, there is a main menu. In the main menu, the user can select the start menu to start learning. Figure 5 shows the display of the main menu.

Figure 5. Display of Main Menu

In the main menu, there are several menus, namely *Mulai* (Start), *Keluar* (Exit), Settings which is marked by the gear icon, and Information which describes the application, such as current version, developer, and other information which is marked by the "i" icon. The word "*Belajar BISINDO"* is the Indonesian of *Learn BISINDO*. After selecting the *Mulai* menu, the user will be directed to the *Pilih Kategori* (Select Category) menu, shown in Figure 6.

Figure 6. Display of Select Category menu

The user can select between the Belajar (Learn) and Quiz menu or return to the previous page by selecting the upper-left arrow button on the Select Category page. If the user decides to select the Belajar menu, they are directed to the *Belajar* page. The page is shown in Figure 7.

Figure 7. Display of the *Belajar* (Learn) Page

In the *Belajar* menu, users can select one of the given options such as *Abjad* (Alphabets), *Angka* (Numbers), *Imbuhan* (Affixes), *Kata Kerja* (Verbs), *Kata Sifat* (Adjectives), and *Kata Sapaan* (Greetings). For example, if the user selects the *Abjad* menu, they will be directed to the learning page for *Abjad. T*he display is shown in Figure 8.

Figure 8. Display of *Abjad* (Alphabet) Learning Menu

Figure 9. Display of Quiz Menu

On the quiz page, users can select several menus, such as *Tebak Huruf* (Guess the Letters), *Tebak Kata* (Guess the Words), or *Tebak Kalimat* (Guess the Sentences). For example, if the user selects the *Tebak Kalimat* menu, they are directed to the *Tebak Kalimat* page (See Figure 10).

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Figure 10. Display of *Tebak Kalimat* (Guess the Sentence) Quiz Page

On the *Tebak Kalimat* quiz page, there are 15 multiple-choice questions. If the user has answered all the questions, a pop-up appears, and the user can see the quiz's final score. Based on the results, the *Belajar BISINDO* learning application is eligible to be an alternative learning medium that can increase learning motivation for deaf children. Besides, this application can make it easier for parents to monitor their child's learning development. This application is also expected to maximize learning output supported by Murdiyani's research, which states that E-Learning applications can improve learning outcomes [11]. The usage of "warm" colors on display, such as the combination of orange, yellow, and white, also acted to evoke emotional effects such as warmth, comfort, and satisfaction [12,13].

The use of some interactive features in this application is really promising to encourage the children's motivation to study more of the sign language. After being tested, almost 90% of the children with hearing impairment who have already tested the application want to keep the application with them. They really encourage to explore the application more, and they subsconciously try to imitate what they see in the application. In addition, the parents of the children are really satisfied with the application and the impact of the application for their children. It is proven by many good feedback given during the study. Thus, it can be said that this application quite succeed to reach the goal or the aims of this study.

CONCLUSION

This study concludes that an application design of BISINDO sign language learning for Indonesian deaf children has been made. It can be used as an alternative learning medium to increase learning motivation for deaf children and maximize their learning output. Hopefully, parents often face obstacles when teaching their child with hearing impairment to learn sign language can be resolved. Also, the design of this application can be used as a reference for making similar applications.

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