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Android-Based Technology: Development of Alternative and Augmentative Mi-Says Communication Systems for Children with Intellectual Disabilities

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ABSTRACT

This study aims to develop an android-based alternative and augmentative communication system for children with intellectual disability and communication difficulties. This research method used a qualitative descriptive method to explore the information. The sample of this research is children with intellectual disabilities with complex communication needs. The result of this research is the development of an alternative and augmentative communication system using Android-based technology called "Mi-Says" in the form of an application that can be downloaded on a cell phone to help subjects communicate. The content contained in the "Mi-Says" application is adapted to the needs of the environment, especially in the school environment. Tailored content is especially good because it will be appropriate for subjects who have difficulty expressing their wants and needs to family, teachers, or friends in the school environment. The results of this study are expected that the alternative and augmentative communication system "Mi-Says" using Android-based technology can be useful for subjects who have complex communication needs in everyday life, especially to express their needs.

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1. INTRODUCTION

As social beings, communication is one of the main parts of life (Septiani, 2021). The communication process is the flow of sending and receiving messages from the communicator to the communicant (Damayanti & Purnamasari, 2019). Through the delivery, the needs will go well if there are no obstacles in communicating. Complex communication needs are also had by children with intellectual disability. Children with intellectual disabilities are children who have below-average intelligence and have problems with adaptive behavior, so they have difficulty completing tasks in everyday life (Maryanti, et al., 2021). Children with intellectual disability experience mental retardation so they have obstacles in complex communication skills such as verbal and non-verbal communication in conveying messages (Fransisca & Sunarto, 2021). Needs had by children with intellectual disability require efforts to assist their communication. One effort to help the communication process for children with intellectual disability is to develop alternative and augmentative communication systems.

Alternative and augmentative communication is a medium to help children communicate well even if they do not communicate verbally. There are several types of alternative and augmentative communication including without using technology (No Tech), low technology (Low Tech), and using high technology (High Tech) (Nurul & Tjasmini, 2019). Alternative and augmentative communication systems can use high technology (High Tech) to utilize technology in everyday life. Alternative and augmentative communication systems that use high technology are flexible so that they are easily accessible anywhere and anytime. Android is an operating system for Linux-based mobile devices which includes operating systems, middleware, and applications (Tahel & Ginting, 2019).

Several studies on the development of alternative and augmentative communication systems have been developed, augmentative and alternative communication systems based on real-time eye tracking (Ramadhani et al., 2020), development of augmentative and alternative communication systems on notation in music learning for children with autism. children (Erlani et al., 2022), augmentative and alternative communication as assistive technology in supporting children with cerebral palsy with complex communication needs (Riswari et al., 2022), application of the picture exchange communication system (PECS) method on the communication skills of children with the autism spectrum (Arfi & Ardianingsih, 2021), and the development of the main social communication cue system for students with multiple visual disabilities (Oktavianti et al., 2022). However, until now there has been no research discussing the development of communication systems and alternative uses of Android-based technology in children with intellectual disabilities.

This research aims to develop an alternative and augmentative communication called "Mi-Says" using Android-based technology to help children with intelligence communicate. This study uses a qualitative descriptive method to reveal in-depth information. This study used one sample, a child with intelligence who has complex communication needs. This research resulted in the development of an alternative and augmentative communication system with a high-tech type using an android-based technology called "Mi-Says" in the form of an application that can be downloaded via mobile phones to help children communicate. The application developed contains the content needed by the subject, especially when the subject is in a school environment. The final goal of this research is expected to help the subject communicate in their daily lives.

2. METHODS

The focus of this research is limited to the development of alternative and augmentative communication systems using android-based technology for children with intellectual disabilities. The subject of this study was a child who has intellectual disability and difficulties in communicating verbally. This study uses a mix of methods with qualitative descriptive data processing. The qualitative descriptive method is used to obtain objective data. We carried out several stages in this research **Figure 1.** reveals how the research process was carried out including the preparation of instruments, finding subjects, conducting assessments, analyzing assessment data, and developing alternative and augmentative communication systems using android-based technology called "Mi-Says".

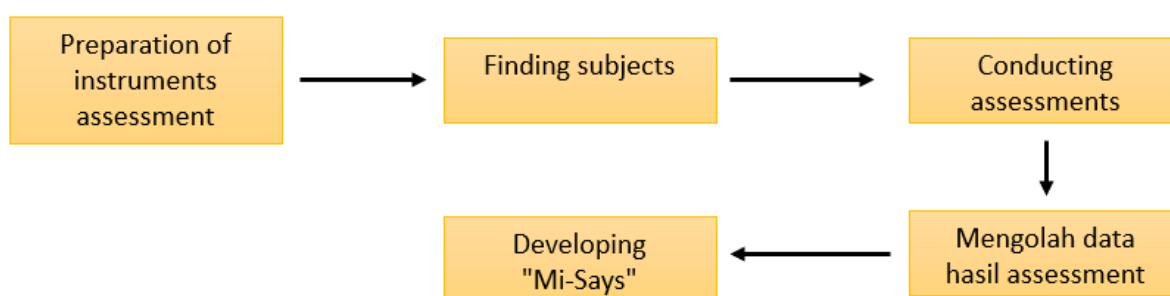


Figure 1. Research Procedure

To find out information about the communication barriers by the subject, we conducted a data collection technique through an assessment process. Data processing techniques using descriptive.

3. RESULTS AND DISCUSSION

3.1 Subject Demographic

This study involved a children with an intellectual disability as a research subject who has complex communication needs. Complex communication needs are also had by children with intellectual disability. Children with mental retardation experience mental retardation so they experience obstacles in complex communication skills such as verbal and non-verbal communication in conveying messages (Fransisca & Sunarto, 2021). The subject has communication difficulties, especially communicating verbally so the subject had difficulty expressing what he felt and wanted. The subject is currently 14 years old, and the subject is a student at SLBN X Kota Bandung.

3.2 Analysis of Research Data

The subject has obstacles in communicating verbally based on the results of the assessment that has been carried out. Complex communication needs by the subject often appear when in the school environment. The subject has not been able to express what he needs and wants so misunderstandings often arise between the teacher and the subject when communicating. Obstacles by the subject require assistance as a medium of communication. Based on the continuity of communication, the subject will carry out indirect communication because the communication flow is carried out with the help of third parties or communication media tools (Pohan & Fitria, 2021).

We develop alternative and augmentative communication systems with high-tech types using Android-based technology. The use of Android-based technology as a way of using technology in everyday life is unavoidable when technological developments in the era of globalization are growing rapidly (Myori, et al, 2019). The alternative and augmentative communication system is called "Mi-Says" which is inspired by the name of the subject. Content adapted from the results of the subject's needs including symbols and sounds. The purpose of developing this alternative and augmentative communication system is to assist the subject in expressing his wants and needs to other people around him. This alternative and augmentative communication system belongs to the high-tech type because it uses mobile phones as the medium. The procedure for using the "Mi-Says" alternative and augmentative communication system begins with downloading the application on the link. After downloading the "Mi-Says" application, it is ready to be used for communication. **Figure 2.** When the application is open, the main menu will appear and you need to press the start button.



Figure 2. The main menu of the "Mi-Says" alternative and augmentative communication system

The contents of "Mi-Says" application consist of two contents. Figure 3. Subjects can choose the content of my stuff or the content of menstruation according to their wants and needs. The design and content in the "Mi-Says" application are tailored to the needs of the subject. The importance of designing alternative and augmentative systems that are able to meet the needs of individuals with disabilities who have complex communication needs (Riswari, et al, 2022).



Figure 3. Content of alternative and augmentative communication system “Mi-Says”

My stuff content consists of items that are often used in the learning process including bags, shoes, pencils, pens, books, colored pencils, rulers, erasers, x-type, scout uniforms, sports uniforms, rice boxes, water bottles, watches, and glasses. Menstrual content consists of items that are commonly used during menstruation including sanitary pads, underwear, plastic, and trash cans. Menstruation content also contains pictures as a reminder that while menstruating it is forbidden to pray. Menstrual content is equipped with video tutorials for putting on sanitary napkins, removing sanitary napkins, washing sanitary napkins, inserting sanitary napkins into plastic, and disposing of sanitary napkins.

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Tutorial videos are added as a complement because often subjects forget the steps they need to do. The condition of subjects with intellectual disabilities with an IQ level below the average really needs attention as an effort to maintain the cleanliness of their reproductive organs. Children with intellectual disabilities who have an IQ below average will have an impact on maintaining their reproductive organs which are lacking so that they can pose a risk of disease in their reproductive organs (Nafikadani & Paramarta, 2020) **Figure 4.** Video on how to use the alternative and augmentative communication system “Mi-Says”



Figure 4. Video on how to use the alternative and augmentative communication system "Mi-Says"

The video on how to use the alternative and augmentative communication system "Mi-Says" has the advantages of being developed based on the needs and modalities of the subject, following science and technology, and besides being able to be used by the subject as a communicant "Mi-Says" can also be used by communicators. The use of alternative and augmentative communication systems "Mi-Says" also needs to be studied by parents because parents have an important role to play in supporting independent subjects using alternative and augmentative systems "Mi-Says" as a medium for communication (Rezkiyani & Aprilia, 2023).

4. CONCLUSION

Communication is a primary need for every human being, including children with intellectual disabilities who experience complex communication needs. This study aims to develop an alternative and augmentative communication system called "Mi-Says" by utilizing android-based technology to help children with intelligence needs communicate. The information disclosed in depth in this research is to produce the development of alternative and augmentative communication systems that are appropriate for the subject. This type of high tech uses an Android-based technology called "Mi-Says" in the form of this application that can help children with intelligence disability communicate. The application developed contains the content needed by the subject, especially when the subject is in a school environment. This alternative and augmentative communication system "Mi-Says" can help research subjects communicate in their daily lives.

5. ACKNOWLEDGMENT

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism

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