



## Use of Alternative Communication Systems I-Talk to Improve Cerebral Palsy Communication Skills

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**Abstract:** The background of this study was students with Cerebral Palsy who had difficulty speaking. As a result of the stiffness of the muscles, the speech organs cause the messages conveyed verbally by the child to be difficult to understand the communicant. This study aims to develop a system of Alternative and Augmentative Communication (AAC) and to know its influence on subject communication skills. The research method used is a mixed-method with a sequential exploratory approach. The results of this study are an alternative I-Talk communication system and improvement of subject communication skills. Improved communication skills can be seen from the communication skills of the subject which at the beginning could not be understood at all by the communicant, after using I-Talk increased with the indicator being able to call parents, caregivers, and teachers. Furthermore, the subject can convey wishes when wants to drink, snack, eat, and others.

**Keywords:** Augmentative and Alternative Communication (AAC), I-Talk, Communication of Cerebral Palsy

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### INTRODUCTION

Students with Cerebral palsy is one part of students with motoric barriers. According to the origin of the word Cerebral palsy consists of two words, namely cerebral or cerebrum which means brain, and palsy which means stiffness. So Cerebral Palsy or abbreviated CP can be interpreted as "stiffness" caused by a disorder located in the brain. In line with this, Mussjafak (1995, pp. 36), explains that "Cerebral palsy is intended to explain the existence of movement abnormalities, attitudes or body shape, coordination disorders and sometimes accompanied by psychological and sensory disorders, which are caused by damage or resistance during brain development." Based on that statements, we can be understood that Cerebral Palsy is a term used to refer to individuals who experience movement disorders, attitudes or body shape, coordination which is sometimes accompanied by psychological and sensory disorders, various disorders are caused by damage in the brain.

One characteristic of some children with Cerebral Palsy is having difficulty in carrying out the communication process, especially in verbal communication skills. Whereas, Laili (2013, pp.164) argued "communication is the

most important component for each organism to carry on their life". Sundqvist (2010;165) Children with a disability resulting in severe speech impairment and difficulties to move their bodies are dependent on the assistance of people close to them.

From the results of observations made by researchers at YPAC Bandung SLB-D, there was a student with a mixed type of Cerebral Palsy (spastic and athetoid) who had difficulty communicating. At this time, students can carry out receptive communication, but it is difficult to convey what he needs or she wants (expressive communication). When subjects try to express their opinions, parents, caregivers, and families are confused when the child is not clear. Children are still having difficulty communicating using gestures because of their rigid bodies. When no one can understand the intent and purpose of the child when trying to talk, the child will be angry. She shows her emotions by crying, not responding to people around her, or even seizures. This case agrees with Ronski's statement (2005, pp. 176) "children who cannot speak face social and educational isolation as well as significant frustration because they are unable to communicate their necessities, desires, knowledge, and emotions to their parents,



siblings, extended family members, peers, and teachers.”

“For those individuals educational and clinical best practice dictates the use of an Augmentative or Alternative Communication system” (Miranda, 2001). Nughton (2009, pp. 43) argues

AAC technologies, including speech-generating devices, offer new communication opportunities for individuals with complex communication needs.” And Warrick (1998) argues “Augmentative communication is the way people communicate without speech. It is the way we use gestures, facial expressions, shopping lists, and written notes to help us transfer a message. The term augmentative communication describes the way people communicate when they cannot speak clearly enough to be understood by those around them, while alternative communication refers to methods of communication used to take the place of speech completely. Today the terms augmentative communication and AAC are used to encompass a wide range of adapted communication methods.

According to Glennen & Coste (1997), there are two types of Alternative and Augmentative Communication, namely with assistance and without assistance. Alternative and Augmentative Assisted Communication are external items used to assist a person in communicating (e.g., symbolic objects, communication boards, books, speech assisting devices, computers, cell phones, tablets). Unassisted Alternative and Augmentative Communication refers to communication techniques that do not require the use of external assistance. Fager, Russell, S., & Higginbotham (2012, pp. 53) explain “many use high-tech communication devices with speech output and augmentative and alternative communication (AAC) strategies such as eye gaze boards and communication books.”

Referring to the explanation above, in this study the researcher made an Alternative I-Talk communication system and saw its effectiveness in developing communication skills in Cerebral Palsy students who experienced communication barriers.

I-Talk is an alternative communication tool designed by researchers based on the initial assessment results on the subject. Alternative I-Talk communication system is a Low Tech AAC system. When using I-Talk, subjects who have obstacles in speech can communicate without having to talk. This tool is also designed by referring to the assessment results on the child's ability to make movements, visual abilities, auditory abilities, social abilities, emotions, and children's desires.

This system combines images and sound in its making, these two components will have their functions on the device. When going to communicate with I-Talk, the subject can call people around by pressing the button on the device that will emit a sound when pressed. Furthermore, when the communicant is already beside the subject, the subject can show an image as a symbol of what he needs, then the communicant can give what the subject needs or wants. For example, when the subject feels thirsty and wants to drink water, then he can call other people around him by pressing a button, when other people approach, the child can show a picture of a glass of water. After the child can show his needs, then the people around him can meet the needs of the subject, namely by giving water which is the child's need at that time. So, when using the AAC I-Talk system, the subject can call and convey needs and opinions without having to speak. People around her can meet the needs of the subject, namely by giving water which is the child's need at that time. So, when using the KAA I-Talk system, the subject can call and convey needs and opinions without having to speak.

## METHOD

The subjects in this study were students with Cerebral Palsy who had difficulty in expressive communication. This research was conducted in two places, namely the subject school in YPAC Bandung Special School and the subject's house in Cimahi, Bandung Regency. In this study, two methods are used, namely qualitative and quantitative methods or often called mixed methods. According to Creswell (2014: 5) “Mixed methods research is a research approach that combines or associates both qualitative and quantitative form.” The



research design used by researchers is sequential exploratory. In its implementation, this research consists of three stages.

### Phase I Research

At this stage, a preliminary study was carried out in the form of an assessment. Assessment activities carried out include direct observation activities conducted by researchers on the subject and conducting interviews with parents, caregivers, and teachers. In presenting data, researchers used a descriptive qualitative research approach. To assess whether the data obtained is valid or trustworthy, the researcher is a triangulation activity. The selected triangulation activities were technical triangulation and source triangulation.

### Phase II Research

In this second stage, the researcher developed the Augmentative and Alternative Communication (AAC) system which was named I-Talk. This communication system is designed based on the subject objective conditions that have been obtained from phase I research. The design of the tools that have been made is immediately realized and continued with the testing of tools on the subject and validation activities for AAC experts (AAC lecturers).

### Phase III Research

In the third phase of the research used the quantitative method researchers implemented an alternative communication system I-Talk that had passed the expert validation stage and the testing phase to determine the effect of the I-Talk alternative communication system on the communication skills of Cerebral Palsy students with communication barriers. The method used is an experimental quantitative

method. Experimental research in this study used the Single Subject Research (SSR) approach with the A-B-A design. The independent variable in this study is I-Talk and the dependent variable is the communication ability of Cerebral Palsy students. The data collection techniques carried out in this study are observation techniques measuring the communication skills of students before using I-Talk and after using I-Talk. Processing data in this study is using percentage measurements. To calculate the percentage of children's communication skill, according to Sunanto, *J et al.* (2006: 16) is:

$$\frac{\sum \text{Result score}}{\sum \text{Max Score}} \times 100 \%$$

The measurement activities in data processing carried out are as follows:

1. Calculate the percentage of communication skills performed as a measurement of the baseline-1 phase of the subject each session.
2. Calculating the percentage count of communication skills performed as a measurement of the intervention phase of the subject each session.
3. Calculate the percentage of communication skills carried out as baseline-2 from the subject each session.

Comparing the percentage of communication skills performed and the intervention of the subject each session.

## RESULT AND DISCUSSION

### Result of Phase I Research

This phase I study focuses on the discovery of the objective conditions of students which will be the main ingredient in the manufacture of I-Talk communication systems. The data obtained from assessment and interview activities are:

**Table 1.** Summary of Subject Data and Implications for System Design

Scope	Subject Potential	Subject Obstacles	Implications
Vision	Good vision function		A device that requires visual function and hearing function is needed
Hearing	Good hearing function		
Gross motor	Able to sit in a chair with support	Stiffness in the body makes the subject difficult to do mobility	A tool that does not require mobility is difficult for the subject
Fine motor	- Able to designate images or objects - Able to press a button	- Not able to hold small objects with one hand	• Design media by relying on images that can be designated by the subject



Balance		<ul style="list-style-type: none"> <li>- Not able to maintain balance when sitting</li> <li>- Subjects cannot hold objects too long</li> </ul>	<ul style="list-style-type: none"> <li>• Media with sizes that are not too small</li> <li>• Objects with buttons</li> <li>• Media that does not fall easily when held</li> <li>• Need a tool that helps the subject to express what he needs without having to talk</li> <li>• Need a tool that contains elements of the image symbols that can represent the things that the subject wants to say.</li> </ul>
Expressive Language	<ul style="list-style-type: none"> <li>• Understanding simple instructions like 'show'</li> <li>•</li> <li>• Understanding the symbol of drawing objects that are around it</li> </ul>	<ul style="list-style-type: none"> <li>• Stiffness in the muscles in the speech organ makes the subject difficult to express his thoughts</li> <li>• Stiffness in the four limbs makes the subject difficult to use gestures when communicating</li> <li>• Sometimes the subject can express what he wants to say with a very hard effort and a long time, but what is said cannot be understood by the other person.</li> </ul>	
Perceptive Language	<ul style="list-style-type: none"> <li>• Able to give a "YES" answer by nodding, and "no" by shaking her head</li> <li>• Follow simple instructions</li> </ul>	<ul style="list-style-type: none"> <li>• Stiffness in the muscles in the speech organ makes the subject difficult to express his thoughts</li> <li>• Stiffness in the four limbs makes the subject difficult to use gestures when communication</li> <li>• Sometimes the subject can express what he wants to say with a very hard effort and a long time, but what is said cannot be understood by the other person.</li> </ul>	
Cognitive	<ul style="list-style-type: none"> <li>• Understanding basic color concepts</li> <li>• Understanding image symbols of objects that are around</li> </ul>	<ul style="list-style-type: none"> <li>• Not able to read</li> <li>• Not able to count</li> <li>• Not able to write</li> </ul>	<ul style="list-style-type: none"> <li>• Presenting images/symbols based on objects that children know and are commonly used in everyday life.</li> </ul>
Social-Emotion	<ul style="list-style-type: none"> <li>• Able to express emotions</li> <li>• Allow the presence of other people nearby</li> </ul>	<ul style="list-style-type: none"> <li>• Often upset, angry, and crying when his wishes are not fulfilled</li> <li>• Cannot express his wants and needs</li> </ul>	<ul style="list-style-type: none"> <li>• Need a tool that can help subjects to communicate without having to talk.</li> </ul>

## Result of Phase II Research

### Design Tool

After the researcher made observations about the condition of the subject's objective, carried out interviews with parents, caregivers, and teachers for the design and use of AAC for the subject, researchers finally made an alternative communication tool called I-Talk. At the beginning of the design, I-Talk was an alternative communication tool that had a component of the call button and a drawing board symbol of desire/need. An explanation of the initial design of the I-Talk system is as follows:



Figure 1. First Design I-Talk

### Revised Tools

After validation with AAC experts, namely Special Education lecturers, and after discussing with parents, caregivers, and teachers there were changes to several components of I-Talk. The change is "replacing the symbol" YES "and" NO "with images of food or places frequented by the subject, in this case, the researcher changes the symbol" YA "with a fruit symbol and the symbol" NO "with the symbol returning to House."

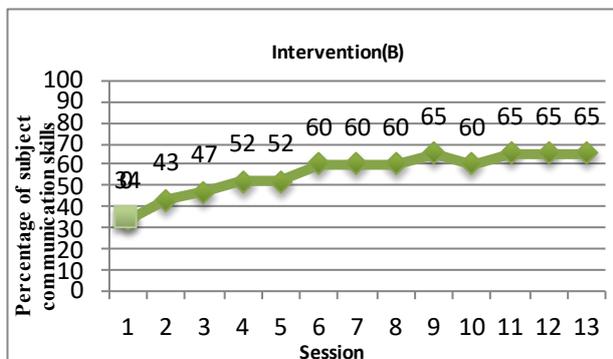


Figure 2. I-Talk Final

## Result of Phase III Research

In phase III research data was found on the ability of students before using the tool, during the intervention, and after using the tool. At baseline is a skill before using the tool, from session one to the third session, VR (subject) only gets a score of 0 or it can be interpreted that the subject's communication skills cannot be understood by the communicant. When presented in a graph then.

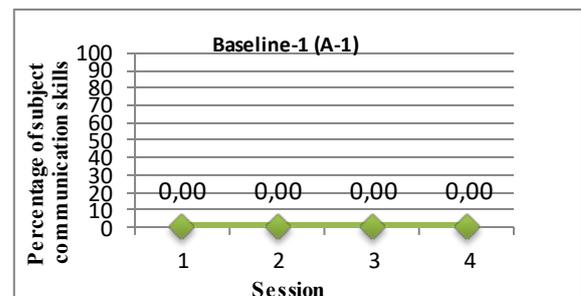


Figure 3. Communication Skills *baseline-1*

Then in VR Intervention got a percentage of 34%, in the second session there was an increase by getting a score of 10 with a percentage of 43%, in the third session there was an increase again by obtaining a score of 11 with a percentage of 47%, at the fourth and fifth session increased with the same score of 12 with a percentage of 52%, in the sixth to eighth session experienced an increase again by getting the same score, i.e. 14 with a percentage of 60%, in the ninth session experienced an increase again by getting a score of 15 with a percentage of 65%, in the tenth session it decreased by getting a score of 14 with a percentage of 60%, in the eleventh session to thirteen got a score of 15 with a percentage of 65%. The following graph of intervention data:



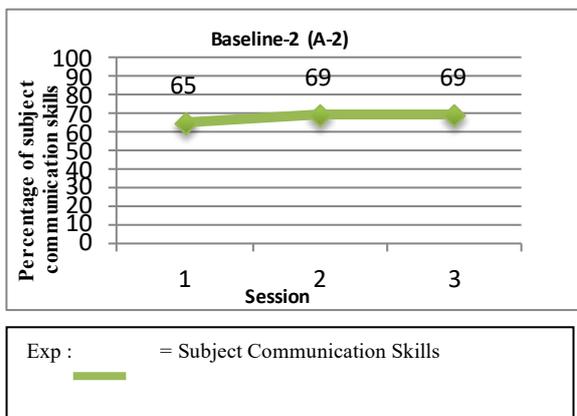
Figure 4. Intervention Stage Communication Skills (B)



Finally, in the Baseline II stage or subject communication skills after using the tool, the first session scored 15 with a percentage of 65%, and in the second and third sessions increased by getting the same score i.e., 16 with a percentage of 69%. The percentage results in the baseline phase 2 (A-2) can be presented in graphical form as follows:

**Figure 5.** Baseline-2 Stage Communication Skills (A-2)

**Data Analysis**



**Analysis results in conditions**

The results of the analysis in the conditions taken by the researcher include the length of the condition, estimation of direction trends, the trend of stability, trace data, stability and range levels, and changes in levels. A summary of the results of the analysis in the conditions can be seen in the following table:

**Table 2.** Summary of Analysis Results in Conditions

No	Condition	A-1	B	A-2
1.	Length of condition	3	16	3
2.	Estimated trend direction	→ (=)	↗ (+)	↗ (+)
3.	Stability tendency	Stabile (100%)	Variabile (37,5%)	Stabile (100%)
4.	Data trace		↗	↗

		(=)	(+)	(+)
5.	Stability and range levels	Stabile 0% - 0%	Variabile 34% - 65%	Stabile 65% - 69%
6.	Level change	0% - 0% (= 0)	34% - 65 (+31)	65% - 69 (+4)

**Data analysis between conditions**

**Table 3.** Summary of Visual Analysis Results Between Conditions

Compared Conditions	B/A-1 2:1	A-2/B 3:2		
1. Amended Variable Amount	1	1		
2. Changes in the Direction and Effect Tendencies	(+)	(=)	(+)	(+)
3. Change in Stability Trend	Stable Variables	to	Variable to Stable	
4. Change Level	(+) 34	(=) 0		
5. Percentage Overlap	0%	30%		

I-Talk is an alternative communication tool designed by researchers based on the initial assessment results on the subject. Alternative I-Talk communication system is a Low Tech AAC type system. When using I-Talk, subjects who have obstacles in speech can communicate without having to talk. This tool is also designed by referring to the level of the child's ability to move. There are 2 main components in I-Talk, namely a part of the tool that serves to call people around the subject such as parents, caregivers, or teachers and images as a symbol of the wishes and needs of the subject. After the system has been designed and made, the tools also go through the stages of testing and expert validation. After the tool has been deemed feasible and the shortcomings have



been minimized, finally, the tool is re-analyzed to whether it can affect the communication skills of the subject or not. Based on the results of data processing analysis that has been carried out and presented in the form of line and stem graphs using the Single Subject Research (SSR) approach with the design A1-B-A2, 19 sessions consisting of three sessions in the baseline-1 phase (A-1), thirteen sessions in the intervention phase (B) and three sessions in the baseline phase-2 (A-2). In the baseline-1 phase (A-1) the initial data collection is carried out until the data acquisition is stable, with an estimate of the horizontal direction tendency (=) with a change in the level of 0%. After the data is stable the researcher continues in the intervention phase (B). In the intervention phase, the estimation of the direction trend shows an increase (+) with a change in level + 34% which indicates that there is a change from baseline-1 (A-1) to the intervention phase (B) after being given an intervention using an I-Talk communication system. In the intervention phase, the child begins to show interest in the image symbols used on I-Talk. The researcher continued to teach various symbols ranging from symbols that the child had recognized to symbols that the child had not known until finally there was an increase in communication skills compared to the baseline phase-1 (A). After the data on the intervention (B) is considered sufficient to continue in the baseline phase-2 (A-2). The results of the analysis in conditions in the baseline phase-2 (A-2) show an estimation of the tendency of the direction to increase (+) with a change in level + 4%. The results of the analysis between conditions showed a change in the level of + 34% from the baseline phase-1 (A-1) to the intervention phase (B). This shows that there is an increase in the effect of using the I-Talk communication system on the communication skills of Cerebral Palsy V students who are the subject of research. Improved communication skills can be seen from an increase in the mean level at baseline 1 (A-1) by 0% or can be interpreted as subject communication skills that cannot be understood at all by the communicant, intervention phase (B) 56% or can be

interpreted calling parents, caregivers and teachers, besides, being able to respond to the communicant's questions, conveying wishes when they want to drink water, glass tea, milk, bread, noodles, snacks, fruit, defecation, urination, walking, watching TV, and baseline phase 2 (A-2) of 67% or can be interpreted as subject communication skills can call parents, caregivers and teachers, besides, able to respond to the communicant's questions, convey the desire when they want to drink water, glass tea, milk, bread, noodles, snacks, fruit, defecation, urinating, walking, watching TV, going home and listening to music. Based on the results of the analysis of the data obtained that there is an increase in capacity in subject communication after using an alternative communication system I-Talk. Thus, it can be said that the I-Talk alternative communication system can improve the communication skills of *Cerebral Palsy* students. Even though it is increasing, there are also skills to convey the needs that the subject has not been able to, namely conveying when you want to sleep, want to take a bath, want to go to school, and want to play in the park.

## CONCLUSION

The purpose of the research that has been carried out in general has been achieved, namely designing the I-Talk communication system and knowing its influence on the communication skills of Cerebral Palsy students. The I-Talk design is based on objective findings in the field and conceptual studies of materials related to the Augmentative and Alternative Communication (AAC) tool. Based on the abilities and obstacles that the subject has; researchers also designed an alternative communication system I-Talk aimed at improving the subject's communication skills. This system has a component of a call button that serves to call people around the subject when the subject needs help. Besides, there are 17 images on a buffer board that function when the communicant has approached, the subject can point to one of the images that are a symbol of his needs or desires. After the system is designed and undergoes several revisions and the tool is



ready to be used, then the next researcher conducts intervention activities using the I-Talk system. The results of this phase of the study are communication skills that were initially not understood at all by the communicant, then increased to the subject's communication skills were able to call parents, caregivers and teachers, besides, able to respond to the communicant's questions, conveying the desire to drink water, tea glasses, milk, bread, noodles, snacks, fruit, defecation, urination, walking, watching TV, going home and listening to music. Based on the results of data analysis obtained that there is an increase in the subject's communication skills after using an alternative communication system I-Talk. Thus, it can be said that the I-Talk alternative communication system can improve the communication skills of Cerebral Palsy students. Even though it is increasing, there are also skills to convey the needs that the subject has not been able to, namely conveying when you want to sleep, want to take a bath, want to go to school, and want to play in the park.

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