

## **Language Acquisition on Early Deaf Children with Cochlear Implants in Inclusion Kindergarten**

**Yulvia Sani\*, Ossy Firstanti Wardany**

Department of Special Education, University of Muhammadiyah Lampung, Bandar Lampung, Indonesia

\*E-mail: [yulviasani@yahoo.co.id](mailto:yulviasani@yahoo.co.id)

**Abstract:** Deaf children have problems in language acquisition due to hearing loss. Early use of cochlear implants can help deaf children listen and learn language and speech. This study aims to determine how language acquisition in early deaf students uses cochlear implants in an inclusive kindergarten in Bandar Lampung. This research is qualitative descriptive research. The methods of collecting data use interviews, observations, and documentation. The results showed that maximizing and familiarizing the hearing function can improve language acquisition. The use of cochlear implants accompanied by oral methods and rhythm sound awareness exercises assists in acquiring phonological, morphological, and semantic (linguistic awareness). Schools use the principle of learning by doing and integrating programs at home so that the process is more natural. In addition, it takes time for children to get accustomed to hearing and repeating what they hear. So it can conclude that using cochlear implants accompanied by the proper method can help the language acquisition of early deaf children.

**Keywords:** cochlear implant; language acquisition; deafness, hearing aid; early childhood; inclusive kindergarten

### **INTRODUCTION**

Deafness is a term used for individuals who have problems in hearing function. Hearing problems cause deaf children to have limitations in language skills, both receptive and expressive. Language problems in deaf children are caused by problems with their hearing function, which impacts the acquisition of language as a provision in communicating.

Language acquisition is the process of language mastery that children naturally learn the first language or mother tongue. (Dardjowidjojo, 2005). Language acquisition generally comes from hearing and imitating what is heard. According to Rapisa (2020), the hearing function will affect the sound sense so that speech instruments can mimic hearing. Children's language skills are directly proportional to their ability to acquire vocabulary from the environment (Salamah, 2015). Therefore, hearing function problems will affect deaf children in capturing sounds and imitating what they hear so that the language acquisition process is hampered.

The problem of language acquisition has an impact on deaf children's communication skills. From birth, deaf children are limited in developing spontaneous verbal communication. Deaf children's verbal ability lags behind children who can hear (Wuryanti, 2019). The existence of language acquisition problems in the deaf has other impacts on their development. Some of the accompanying effects experienced by the deaf include language and speaking skills problems and problems in their academic, emotional, and social functions. (Heward, 2013; Rapisa, 2020). Therefore, addressing the issue of language acquisition in deaf children is very important to prevent other accompanying problems.

The importance of language as a means of communicating and interacting has resulted in essential language intervention from an early age for deaf people. Husni (2008) said four things affect the development of deaf children's language: the period of hearing resistance, the

length of deafness, the factors of the tools used, and the support of interventions from the family.

The third factor mentioned by Husni emphasized that a device is needed that helps the deaf to be able to hear. However, these tools may not be practical if the fourth factor, namely intervention support, is not provided.

There are several tools that deaf people can use to help them hear, namely hearing aids and cochlear implants. (Heward, 2013). Many parents of deaf children are currently starting to maximize their children's hearing function by installing cochlear implants at an early age. Cochlear implants are different from hearing aids in that they can be inserted and removed into the ear. A cochlear implant is a surgical implant device designed so that deaf children can listen to it (Gargiulo, 2012). The implant is surgically placed under the skin behind the ear (Heward, 2013). Husni (2008) mentions cochlear implants as an electronic device that takes over the function of damaged/unformed cochlear hair cells by providing direct stimulation to existing nerve fibers.

Cochlear implants generally have four essential parts: microphones, external speech processors, transmitters, and electrodes. (Husni, 2008). Heward (2013) explains that the microphone functions to pick up sound from the environment. An external speech processor is in charge of selecting and adjusting the sound picked up by the microphone. The transmitters and stimulators receive signals from the sound processor and convert them into electrical impulses. At the same time, the electrodes collect notions from the stimulator to be sent directly to the brain via the auditory nerve. Simply put, a cochlear implant is an electronic device that serves as a replacement for a malfunctioning cochlea.

Research has found that the earlier deaf children use cochlear implants, the more their language development is similar to that of children with normal hearing (Svirsky et al., 2004). Installation of cochlear implants in the age range of 1 to 3 years accompanied by early intervention has a positive effect on language acquisition and verbal ability of deaf children (Nicholas & Geers, 2007; Kulkarni et al., 2018; Robbins et al. 2004).

Rapisa (2020) mentions several things are important factors that affect the success of cochlear implants. The element, namely the length of time since implantation, the earlier, the better. Second, the number of implants; the degree of hearing loss. And then, the age at which hearing loss occurs, the number of languages when hearing is lost. Last are the cognitive abilities that children have, and the amount and type of therapy after implantation is done. So that, the installation of a cochlear implant does not automatically result in a child being able to speak and speak. Other things affect the child's current state and the intervention after installation, such as auditory verbal therapy and auditory skills training after cochlear implant placement (MacIver-Lux, 2009).

Early cochlear implantation with follow-up intervention has been positively correlated with deaf children's language skills. Researchers are interested in knowing how language acquisition is experienced by deaf children who use cochlear implants. Researchers then found an Inclusion Kindergarten in Bandar Lampung were two deaf students used cochlear implants early on. Preliminary observations showed that both deaf children had fairly good oral language skills. Based on this, the researchers intend to know the intervention and language acquisition process in both deaf students after installing cochlear implants. Against this background, the research aims to determine how language acquisition in early deaf students uses cochlear implants at an inclusion kindergarten in Bandar Lampung.

## **METHOD**

This research is descriptive qualitative research. Rukajat (2018) states that descriptive qualitative research describes natural, realistic phenomena and makes a systematic, factual, and actual picture of the facts, nature, and relationships of the phenomena being investigated.

It follows the aim of the study, which was to describe how deaf children acquire language after using a cochlear implant. The research is called inclusive kindergarten, which is located in Bandar Lampung, Lampung. There are two deaf students at the school who have cochlear implants. The study was conducted from February to March 2021.

Data collection is done by triangulation of data in the form of triangulation of techniques and data sources. Data collection techniques used interviews, observations, and documentation. The respondents in this study were parents, teachers, school principals, students, and the head of the inclusive center at the school. Interviews with parents related to children's language development and interventions given by parents at home. Interviews with the school related to the Human Resources (HR), the facilities provided, principles, and intervention programs related to language acquisition given to deaf children. For students, interviews were conducted to determine students' language skills. Students' observation technique was carried out to assess current linguistic awareness, vocabulary, and listening skills. In addition, data collection in related documentation such as PPI, sound and rhythm perception development programs, learning activities, and other programs.

Data analysis is done by adapting the interactive model Miles and Huberman (in Sugiyono, 2016) after data collection, data reduction, data presentation, and conclusions. The data analysis was conducted descriptively to answer the question, "How is language acquisition in early deaf students who use cochlear implants at an inclusion kindergarten in Bandar Lampung?"

## **RESULT AND DISCUSSION**

### **Result(s)**

#### ***Profile of Deaf Students in Inclusion Kindergarten***

Based on the research data analysis results, the two subjects studied were aged six years (starting now referred to as student X) and six years five months (from now on referred to as student Y). Both are female. Student X comes from a family that works in health, and student Y comes from a family that works in the elementary school children's education area. Students X and Y were decided by their parents to use cochlear implants two after consulting with several experts regarding hearing loss. Both subjects had no residual hearing before using the cochlear implant. That's why their parents decided to put cochlear implants in their children. Student X started speech therapy at a developmental clinic in Bandar Lampung 10 months after the cochlear implant. Parents admit that building their children's vocabulary is pretty challenging because they do not know how to communicate with children. However, at the age of 2 years and ten months, student X began to babble, but the tone and intonation of the voice produced were not clear. Student X finally joined one of the inclusive kindergartens in Bandar Lampung at three years and eight months. This decision was taken by the parents of student X so that their children could interact with their peers and start imitating sounds. However, at that time, she didn't understand what other people were saying.

Furthermore, interviews with student Y's parents obtained information that students do not have residual hearing. Parents said that their child often had tantrums at the age of one and a half years, so that he cried in a booming shrill voice and threw his body on the floor. Her parents were perplexed at that time. They then took student Y to the paediatrician and referred her to an otolaryngologist. After that, they also meet a psychologist. The parents then decided to use a cochlear implant for student Y after getting a recommendation from the doctor. Student Y's age at that time was two years and six months, not yet producing any sound, not babbling, and so on. After having a cochlear implant, parents independently introduce sounds (animal sounds, objects, and water sounds). However, all of that is not fully effective because it is only through the computer. When student Y was 3.5 years old, her parents sent her to an inclusive kindergarten in Bandar Lampung. Her speech-language ability at that time was still

in the form of saying words that had no meaning. However, at that time, the child already had pretty good emotional control.

Students X and Y did not know sign language before entering the inclusive kindergarten. The reason is that parents can only communicate verbally. Students X and Y are now maximizing their hearing function and concentrating on the sounds they hear. Now, they are in the inclusion class with their friends. Their communication skills are almost no different from hearing people—their mastery of language develops according to age. The ability to pronounce words is excellent, the sentence structure they produce in verbal communicating is magnificent. Not only that, they follow the habit of hearing people speak. They can distinguish the intonation and sound produced by the interlocutor. Both children can also respond when called from behind or from the side, which means they can access sounds from a distance. They can interact and socialize with their classmates. They can initiate, chime in, maintain and end communication in class. These two deaf students went through a lot and got used to it until they reached the verbal stage with the help of a cochlear implant.

### ***Learning Principles and Teacher Intervention Models in Inclusion Kindergarten***

This inclusive kindergarten has a unit that handles children with special needs called the inclusion centre. The inclusion centre acts as a unit that takes care of the needs of students with special needs starting with the assessment process, program formulation, and taking care of the needs of other learning processes. Based on observations, the problem with early childhood deaf children is the inability to communicate, which has a broad impact on language skills, writing, social adjustment, and student achievement. On this basis, the assessment process and program formulation must be carried out appropriately for the deaf. Students X and Y are assessed by the inclusion centre to consider the services to be provided. After the assessment, students X and Y join the transition class. This transitional class aims to prepare deaf children to catch up with their first language acquisition as early as possible. So, that children's language acquisition is still limited. The arrangement of the learning process in this transitional class is one on one. So, when they first entered, students X and Y had not joined the classical classroom with other regular friends. The oral method is a communication principle that teachers apply in this inclusive kindergarten in helping the acquisition of language for students X and Y.

The acquisition of deaf language skills in this inclusive kindergarten emphasizes the habituation of hearing function assisted by cochlear implants. Hearing function training in the transition class for deaf students is carried out by introducing sounds in the environment using loudspeakers. The voices presented are the voices of the families' member of students X and Y, which are recorded, and students are asked to guess. The teacher also uses the sound of animals, water, and objects (iron, glass, hitting a table, and so on). After knowing the quality of their hearing function, the teacher will adjust the volume of the loudspeaker used.

Meanwhile, training the origin of the source of sound or sound is done with play therapy. Like playing the tambourine, the tambourine is played behind the student. If the student raises his hand, it means that the student hears the sound made by the tambourine. In addition, students are trained to turn fast when they are called. At first, the teacher used loudspeakers but gradually lowered the volume to a human speaking voice level. The teachers in this inclusive kindergarten do not introduce sign language to students X and Y. They only teach verbal communication to help their language acquisition. The teacher mentioned that appropriate learning methods and principles are needed to enrich the vocabulary of students X and Y as a supporter of oral speaking.

Based on the interviews and observations with teachers, we obtained information that the principle of learning used in this inclusive kindergarten is learning by doing (learning by doing). The school believes that 'learning by doing' will be stored in students' long-term

memory, because all sensory and other body parts are involved in the learning process. This is very visible when the teacher plays word cards with students. The teacher introduces the objects in the classroom first through real objects. Then students are asked to match real objects with objects on the card. After this stage, students are asked to say the names of the objects that have been said by the teacher first. In order to be more firmly embedded in students' memories, the teacher will ask students to paste the pictures they learn with real objects in the school environment. When students learn the word tree, they will walk out of the room carrying the card and stick it on the actual tree.

Language acquisition carried out through oral and 'learning by doing' methods is intended so that deaf students have receptive language skills (reading speech, reading, listening, and listening) and expressive language (speaking and writing vocabulary). Teachers only use this method for deaf students with cochlear implants.

### ***Language Acquisition in Deaf Children at an Early Age***

Based on the results of research data analysis, language acquisition is divided into three parts, phoneme acquisition, morpheme acquisition, and semantic acquisition. Phoneme acquisition is related to awareness of the initial/final sound in words and identification of the number of sounds heard in words). Morpheme acquisition is about the identification of the sound length of words and identification of words through sound fusion. The semantic acquisition is related to understanding the meaning of words through the fusion of word sounds and identification of word meanings.

Based on the results of observations and interviews, phoneme acquisition is made by introducing letters globally and introducing vocabulary widely around students. Students will imitate the names of these objects and distinguish the sounds of the letters in words. After that, students will be accompanied to write the letters. If the student can say the word from the noun being asked, the teacher will break the word into letters and then ask the child to imitate the pronunciation of the letters. So, starting with a word that the child knows, the word becomes a word that is understood.

The acquisition of morphemes and semantics is carried out gradually by the teacher to students X and Y. Starting from sound recognition, then identifying noun vocabulary by showing, pasting, taking, and so on. Then continue to use simple conversations in everyday life. The teacher stimulates with the question, "when we eat we use?" Then, given the answer choice "plate or soap," they removed several alternative steps later. In acquiring phonemes, morphemes, and semantics, this inclusive kindergarten also provides a home program that parents must carry out to students. To familiarize students with verbal and increase their vocabulary.

**Table 1. Number and Percentage of Noun Vocabulary in Students X and Y**

Student	Number of Functional Vocabulary					TOTAL
	BD	BT	K	LV	CR	
<b>X</b>	22	13	25	12	18	90
<b>Percentage (%)</b>	88 %	86,66%	71,42%	80%	90%	81,81%
<b>Y</b>	24	13	32	14	17	100
<b>Percentage (%)</b>	96%	86,66%	91,42%	93,33%	85%	90,90%

Description: BD: Bedroom, BT: Bathroom, K: Kitchen, LR: Living Room, CR: Classroom

To know the understanding and vocabulary of students X and Y, we used 110 nouns in the observation instrument. The details of the noun vocabulary asked are as follows, the noun vocabulary in the bedroom (BD) has 25 nouns, the bathroom (BT) has 15 words, the kitchen has 35 words, the living room has 15 words, and the classroom has 20 words. The number of

vocabularies owned by students X and Y is shown in table 1. Student X offers higher vocabularies than student Y.

### ***Barriers and Challenges in Language Acquisition***

Based on the results, there are several obstacles and challenges when helping deaf students in language acquisition. The barriers consist of conditioning students to be ready for conversation situations, adjusting face direction, increasing concentration, and knowing students' interests. For deaf students who are in kindergarten, the teacher is a mother figure for them. So, it means that teachers have a more significant moral burden in language acquisition learning. Deaf students at an early age are easily distracted. Students will quickly move from their seats to other seats if the teacher cannot increase their attention.

In addition, it requires consistent cooperation between the school and parents. Programs that are carried out in tandem will positively impact the language acquisition of deaf students. If the language acquisition of deaf students is only left to the teacher, it will harm children's language acquisition. It is necessary to generalize what is taught in school to be practiced at home. Another obstacle and challenge is the lack of facilities. Complete and ideal facilities are needed to support the learning process carried out by teachers to students.

### **Discussion(s)**

Based on the perspective of special education, especially in the education of deaf children, the problem of speech-language formation is an important part that must be achieved at their stage of development. This problem is typical, because it is the main characteristic of the deaf. Therefore, it is necessary to optimize their language skills in order to achieve their formal education (long term goal). It is said to be unique because the development of speech-language is the foundation for being able to communicate and interact with other people (Gunawan, 2016). Believed by many people based on various studies, the golden age is a very important age range for children. (Agustin, 2019; Fitria, 2014). Where the brain and physical development to the fullest. This period is an important period in the educational process. Furthermore, Landshears clearly explains that at the age of 4 years, children's intellectual development reaches 50%, ages 4-8 years their intellectual development reaches 30%, and 20% at the age of 9-17 years. (Mahesa, 2005).

This view is in accordance with the results of research by Winarsih (2010) in a special school for the deaf in Jakarta. The results of the study found that the deaf (hard of hearing and total deafness) at the school were given services in language acquisition from an early age, starting with the TLO (Observation Training Park) class using the reflective maternal method. The results of the early intervention resulted in students having good communication skills and could be understood by others. Utilization of the golden age for deaf children is very necessary considering that brain absorption is very maximal at this time, including absorption in the process of language acquisition development. In addition, early intervention in language skills will help deaf children in their self-development, so that they are no different from children with normal hearing (Meinzen-Derr et al., 2011).

-Children with hearing impairment who use cochlear implants from an early age, their language development level is very similar to children with normal hearing (Svirsky, 2000). Based on the age when the cochlear implant was installed, children can still follow the pre-verbal chronological stage and age experienced by children with normal hearing (Novialassafitri, 2020). In addition, there are 4 factors that state the causes of the successful development of language acquisition for the deaf using cochlear implants such as: age at onset of deafness, duration of deafness, device factors, and intervention support from the family (Husni, 2008). Children who use cochlear implants under 2 years old can still follow the chronological age of children with normal hearing, to achieve this goal, the role of parents in

efforts to improve language skills and switch on the cochlear implants that have been installed in the ears of deaf children is very much needed (Manrique, 2007). Cervera-Paz, Huarte, et al., 2004). The reason parents have an important role in the process of language acquisition for the deaf is imitation.

This is in line with the opinion of Yulvira (2014) which says that deaf children who have used cochlear implants do not learn speech-language spontaneously, nor can they immediately hear and speak on their own without practice and stimulus from the people around them. When kindergarten is a place for early childhood to develop, kindergarten must also prepare itself in services for students with special needs. The selection of communication methods and learning principles for early deaf students considers their needs and abilities, not necessarily choosing without considering the needs and abilities of the deaf students (Winarsih, 2007). The oral method is a system that uses speech, residual hearing, speech reading, vibration and touch for a spontaneous conversation (Bunawan, 1997). The oral auditory approach is based on the fundamental premise that acquiring competence in language, both receptively and expressively, is a realistic goal for deaf children (Wahyuni, 2018).

Of course, learning in kindergarten requires fun learning principles, and stimulates various aspects of development. One of the approaches to learning that is fun and full of meaning is learning by doing. Early childhood tends to use all the senses and limbs in recognizing something (Schank et al., 1999). Providing learning experiences to early childhood through activities involving all body, soul and heart will have a good impact on the concepts they learn (Dale, 1969). Language acquisition requires the right method in serving the language needs of early deaf students. The oral method coupled with learning by doing provides up-to-date, fun and meaningful learning.

Language learning at an early age is the right of all children, not only for those who hear but also for those with hearing loss (deafness). In other words, deaf and hearing children have the same right to stimulation to develop potential at this stage of their development. By providing early intervention services, it is expected to provide deaf children with the opportunity to be able to verbally speak and develop cognitive skills through language.

## **CONCLUSION**

The results showed that after using a cochlear implant and intervention in the inclusion kindergarten, both subjects, X and Y, had language and speech abilities that were not much different from hearing children. In fact, before the cochlear implant was placed and received intervention, their language skills were far below their age. Language acquisition in both subjects was obtained because during the intervention at school, the teacher maximized the hearing function with things that were familiar to children. The intervention also uses the principle of learning by doing, so that children get more meaningful in learning. Teachers and parents also collaborate to create a home program, so that children can learn to acquire languages at home. Not only that, the service continues with the habit of listening and speaking in a natural context. Although it takes time, patience, and consistency, it can be said that the use of cochlear implants with appropriate interventions contributes to the language acquisition of deaf children.

So, it can conclude that using cochlear implants accompanied by the proper method can help the language acquisition of early deaf children. In addition, the age when the child gets a cochlear implant is very influential. The younger the child is to use a cochlear implant, the earlier intervention can be initiated. Thus, the better the child's ability to acquire language. It takes creativity, and the incorporation of appropriate learning methods and principles according to the needs of the deaf at an early age in providing services related to language acquisition. In this case, the oral method of communicating and the learning by doing approach succeeded in helping deaf children with cochlear implants in language acquisition

for the deaf. In addition, cooperation from various experts and families as a support system for deaf children also plays a role in the development of the language of the two subjects.

## REFERENCE

- Agustin, S. A. (2019). *Peran Prophetic Parenting Dalam Meningkatkan Kecerdasan Majemuk Pada Anak Usia Emas (Golden Age): Studi Kasus Di Pas (Pembinaan Anak Salman) Itb Jalan Ganesha No. 7 Kota Bandung* (Doctoral Dissertation, Uin Sunan Gunung Djati Bandung).
- Bunawan, L. (1997). *Komunikasi Total*. Jakarta: Departemen Pendidikan Dan Kebudayaan Direktorat Jenderal Pendidikan Tinggi Proyek Pendidikan Tenaga Akademik.
- Dale, E. (1969). *Audiovisual Methods in Teaching*.
- Dardjowidjojo, S. (2005). *Psikolinguistik Pengantar Pemahaman Bahasa Manusia*. Jakarta: Yayasan Obor Indonesia
- Fitria, A. (2014). Penggunaan Media Audio Visual Dalam Pembelajaran Anak Usia Dini. *Cakrawala Dini: Jurnal Pendidikan Anak Usia Dini*, 5(2).
- Gargiulo, R. M. (2012). *Special Education in Contemporary Society 4th Ed: An Introduction to Exceptionality*. Sage Publications.
- Gunawan, G. (2016). Gambaran Perkembang Bicara Dan Bahasa Anak Usia 0-3 Tahun. *Sari Pediatri*, 13(1), 21-5.
- Heward, W. L. (2013). *Exceptional Children: An Introduction to Special Education 10th Ed*. Pearson.
- Husni, T. 2008. Cochlear Implant. *Jurnal Kedokteran Syiah Kuala*, 8(3), 157-165
- Kulkarni, V., Raghuwanshi, S., Kumar, A., & Batni, G. (2018). Cochlear Implant in Prelingually deaf children: Our Experience. *Indian Journal of Otolaryngology and Head and Neck Surgery: Official Publication of the Association of Otolaryngologists of India*, 70(4), 544–548. <https://doi.org/10.1007/S12070-018-1435-Z>
- Maciver-Lux, K. 2009. Intervention for Children with Cochlear Implants: Maximizing Auditory Benefits of Bilateral Hearing. *Perspectives on Hearing and Hearing Disorders in Childhood*, 19 (2). 85-97
- Mahesa. (2005). Makalah Seminar Anak Kesulitan Belajar: Stimulasi Otak Pada Proses Pembelajaran Anak Dini Usia. 14 Maret 2005. Universitas Negeri Jakarta
- Manrique M, Cervera-Paz F, Huarte A, Et Al. 2004. *Advantages of Cochlear Implantation in Prelingual deaf children Before 2 Years of Age When Compared with Later Implantation*. *Laryngoscope* 114:1462-9. <https://doi.org/10.1097/00005537-200408000-00027>.
- Meinzen-Derr J et al. 2011. *Impact of Early Intervention on Expressive and Receptive Language Development among Young Children with Permanent Hearing Loss*. *Am Ann Deaf*, 155(5), 2011, P. 580-591. <https://doi.org/10.1353/Aad.2011.0010>.
- Nicholas, J. G., & Geers, A. E. (2007). Will They Catch Up? The Role of Age at Cochlear Implantation In The Spoken Language Development Of Children With Severe To Profound Hearing Loss. *Journal of Speech, Language, and Hearing Research: Jslhr*, 50(4), 1048–1062. [https://doi.org/10.1044/1092-4388\(2007\)073](https://doi.org/10.1044/1092-4388(2007)073)
- Novialassafitri, Sibi Dyah. (2020). Penggunaan Koklea Implan Sejak Dini Terhadap Perkembangan Bahasa deaf children: Sebuah Literatur Review.
- Rapisa, Dr. (2020). Menemukanali Anak Dengan Hambatan Pendengaran. Yogyakarta: Deepublish
- Robbins, A.M, Koch, D. B., Osberger, M. J., Zimmerman-Phillips, S., & Kishon-Rabin, L. (2004). Effect of Age at Cochlear Implantation on Auditory Skill Development in Infants and Toddlers. *Archives of Otolaryngology--Head & Neck Surgery*, 130(5), 570–574. <https://doi.org/10.1001/Archotol.130.5.570>
- Rukajat, A. 2018. Pendekatan Penelitian Kuantitatif: Quantitative Research Approach. Yogyakarta: Deepublish
- Salamah, S. 2015. Studi Ringkas Pemerolehan Bahasa Pada Anak. *Bahastra*, 3 (2), 73-81
- Schank, Roger C., Tamara R. Berman, and Kimberli A. Macpherson. "Learning By Doing." *Instructional-Design Theories and Models: A New Paradigm Of Instructional Theory 2*, No. 2 (1999): 161-181.
- Novialassafitri, S. D., & Purbaningrum, E. (2020). Penggunaan Koklea Implan Sejak Dini Terhadap Perkembangan Berbahasa deaf children: Sebuah Literatur Review. *Jurnal Pendidikan Khusus*, 15(1).
- Sugiyono. 2016. *Metode Penelitian: Kuantitatif, Kualitatif Dan R&D*. Bandung: Alfabeta
- Svirsky, M. A., Robbins, A. M., Kirk, K. I., Pisoni, D. B., & Miyamoto, R. T. (2000). Language Development in Profoundly deaf children with Cochlear Implants. *Psychological Science*, 11(2), 153–158.
- Wahyuni, S. (2018). Perkembangan Anak Disabilitas (deaf children Belajar Melalui Metode Oral). *Tribakti: Jurnal Pemikiran Keislaman*, 29(1), 122-134. <https://doi.org/10.33367/Tribakti.V29i1.570>
- Winarsih, Murni. (2007). *Intervensi Dini Bagi deaf children Dalam Pemerolehan Bahasa*. Departemen Pendidikan Dan Kebudayaan. Direktorat Jenderal Pendidikan Tinggi. Direktorat Ketenagaan.
- Winarsih, M. (2010). Pembelajaran Bahasa Bagi deaf children. *Perspektif Ilmu Pendidikan*, 22(Xiii), 103 - 113. <https://doi.org/10.21009/Pip.222.1>



- Wuryanti, Sri. (2019). *Kemampuan Verbal Peserta Didik Tunarungu Usia 6-11 Tahun Di Indonesia*. Working Paper. Badan Pengembangan Dan Pembinaan Bahasa, Jakarta
- Yulvira, Anha. (2014). *Dampak Penggunaan Alat Bantu Dengar Dan Implan Koklea Terhadap Kemampuan Berbahasa Siswa Tunarungu Di Slb – B Pangudi Luhur Jakarta*. Perpustakaan UPI.