



# Developing Speech Sounds In The Montessori Environment In Children With Disorders Language Development

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**Abstract.** The challenge of being able to actively involve children with language disorders in the classroom so that they can play and learn together with other typical children prompted this literature study to be conducted. Some related problems are phonological awareness (PA) disorders, which make it difficult for children to socialize. Children who have difficulties in developing spoken language will face challenges in their lives. Reduced communication skills can make it difficult to meet life's needs, develop cognitively, follow directions, write words, sentences, or stories, solve problems, make action plans, and negotiate in everyday life. This research examines how the Montessori environment can support language development in the production of speech sounds carried out through phonological awareness. The research aims to find out how the Montessori environment can help develop speech sounds in children with language disorders. The method used is literature study and analysis of library documents. The results obtained show that the Montessori environmental approach can be used to help children with language disorders develop speech sounds.

**Keywords:** Early Childhood, Speech Sound, Montessori, Developmental Language Disorder

## 1 Introduction

Teachers have a significant role in supporting the development of social education and children's emotions at school. However, sometimes teachers are not ready to support children with speech sound disorders and their implications for educational achievement and children's future and society [1]. Meanwhile, according to Bronfenbrenner's Ecological Theory [1], children gain experience of the world through a series of influences and systems where children grow up and develop. This system starts from the child's direct relationship with his family and friends (microsystem) to the child's relationship with other people in the environment and community (exosystem) and their experiences in society wider (macrosystem).

These systems are interconnected with each other and experience a two-way relationship that influences each other. A mesosystem represents a network of relationships

between people in a microsystem that works to meet the needs of a developing child. The teacher is part of the microsystem that provides support for families in this matter, together with other professionals working together to provide resources and sources of support in meeting educational needs and child development.

The early years of school are an essential period in a person's development child. Although most children are competent in communicating at school age, some of them do not have speaking and language skills equivalent to their peers [1]. For a child, speech and language competence can limit engagement with others in social and learning environments [1].

According to the Law (UU) of the Republic of Indonesia No. 20 of 2003, Chapter II Article 3 Objectives, National Education is an educational goal that makes Pancasila and the 1945 Constitution of the Republic of Indonesia the basis for implementing education. Law Number 20 of 2003 can be concluded that the goal of Indonesian education is developing the potential of children, in this case, students, so that they can become human beings who have faith and devotion to God Almighty, have a moral personality, are knowledgeable, independent, noble, creative, healthy, and forms children into good citizens have a democratic attitude and are also responsible [2]. Education is the right of all nations; as stated in the 1945 Constitution Article 31 paragraph (1), every citizen has the right to education. Therefore, education Encouraging the holistic development of individuals is an essential function of schools. In line with this, UNESCO stated that educational programs need to guarantee quality education that is inclusive and fair and encourages lifelong learning opportunities for all" [1]. This means that teachers need to be prepared to understand the skills required to provide a learning experience relevant to students in an educational environment that supports the development of the personality, talents, and mental and physical abilities of all children to their maximum potential.

Recent research shows babies begin to learn the elements of their first language when still in the womb, long before they can babble or make sounds [3]. For spoken language to emerge, several systems had to be intact and work together to formulate the correct articulation of words [3]. The development of articulation assumes the presence of an intact auditory system that can carry language sounds to the brain. It also assumes an intact nervous system that can analyze sounds and words and effectively create motor responses. Finally, The development of articulation requires an intact motor system capable of producing sounds and the combination of sounds required [3]. If one of these systems is not intact, then articulation errors may occur. These articulation errors can make spoken language complex and understood by communication partners. Children who have difficulty developing spoken language will face additional challenges, namely the lack of communication skills in language. This makes it difficult for a child to fulfill his life's needs, develop cognitively socially, follow directions to write words, sentences, or stories, solve problems, make plans and actions, and negotiate in life every day [3].

### **1.1 Children with Speech Sound Disorders**

Speech Sound Disorders or speech sound disorders or also known as Sound Speech Disorder (SSD) is a general term that is often used to describe a series of difficulties producing speech sounds in children [4]. Children with speech sound disorders will experience difficulties in producing intelligible speech, and can experience a combination of difficulties in the perception, production, and/or representation of speech, which can affect intelligibility and speech reception. Whether the origin is known, for example, Down syndrome, lips cleft palate, or those of currently unknown origin [1]. The term speech sound disorder is used broadly, and includes the term delay speech/articulation/phonological delay/impairment/weakness and apraxia of speech in childhood children [4].

### **1.2 Phonological Awareness (PA)**

Phonological awareness is a metalinguistic ability related to component recognition of speech sounds and is a significant predictor of later language skills [5]. Phonological awareness is also sensitivity to the structure of internal sounds in spoken language and the ability to use independent phonemes in the word [6]. In line with Franc and Suboić [5], phonological awareness is a metalinguistic ability related to the general awareness of the components of speech sounds. Phonological awareness includes components non-phonemic and phonemic. The first includes aspects such as syllable awareness and rhyme. At the same time, the latter is usually referred to as phonemic awareness, which is defined as the understanding that spoken words consist of sound individuals who can be analyzed and manipulated [5]. Still, according to Franc and Suboić [5], phonological awareness is usually predictive of reading and spelling abilities). Meanwhile, the research results show that early literacy abilities are moderately and significantly correlated with the production of speech sounds. Research shows that there is a positive correlation between speech sound production, phonological awareness, and letter sound knowledge [7]. Furthermore, PA is included as an essential element in speech processing, as early literacy abilities can predict speech production in students with communication difficulties [7].

### **1.3 Montessori Environment**

Dr. Maria Montessori left a legacy of inclusive communities respecting individual rights and recognizing the potential in each child is the key to the future front of humanity. Building an inclusive Montessori community first starts with the identification of physical integration, then functional inclusion, and finally reaches the pinnacle, namely social inclusion. Physical integration, in the first stage, relates to physical access, where children's rights to physical access are recognized, accommodations are planned and built, and access is guaranteed [8]. This is in line with Law No. 40 of 2008, which mandates the existence of prohibition of discrimination because it is contrary to the values of Pancasila [9] and has equal opportunities for everyone. This means that schools must open the doors and open registration for all children to gain access to school. Functional inclusion, in the second stage, refers to the child's ability to work

and learn in his environment. Children can successfully work, learn, and make developmental progress in school and classroom communities. The third and final stage is social inclusion. That is, it refers to the child's equal and positive social and emotional status in the community class. The ability to gain social acceptance and/or participate in positive interactions with peers [8].

Several findings regarding research on the advantages of Montessori programs are compared to regular preschool programs, which are generally diverse. Some studies do not seem to confirm that Montessori outperforms regular programs. Meanwhile, others, such as Franc and Suboić [5], argue that Montessori is better. While some reports state inconsistent superiority of Montessori provides the possibility of the reason for the variability of these findings, namely showing that there is variation significant in fidelity, that is, the degree to which programs claiming to be Montessori actually follow authentic Montessori pedagogy [5]. From Montessori preschools with high-fidelity (i.e., classical Montessori programs) or Montessori preschools with low-fidelity (i.e., Montessori preschools that supplement their programs with conventional school activities), and/or conventional preschools. It is said that children from Montessori preschool with high accuracy outperformed other children by two groups in various actions [5].

When a child is in an environment where someone is saying something language, and it surrounds the child, Montessori tells us that absorption occurs and is global [10]. Children will absorb language at once in the following months of life and master their mother tongue long before he is three years old. Children hear sounds before producing them and understand the meaning of words before they say them. Children understand the order of words before they can pronounce the sequence. Children understand grammatical structures in speech before having conscious thoughts about passages of speech as a classification of spoken language. Children speak and interact with words, either with peers or adults, before being able to read and write [10].

#### **1.4 Developmental Language Disorders**

Speech Sound Disorder (SSD) is a common term used to describe a series of difficulties producing speech sounds in children [4]. Foundations of clinical assessment, classification, and intervention for children with SSD are strongly influenced by psycholinguistic theories and procedures, which, in part and significantly, provide a firm boundary between phonological and phonetic/articulatory processes [4]. Current definitions describe SSDs as a series of difficulty-producing speech sounds in children that can be caused by various causes limitations related to perception, speech motor, or linguistic processing (or a combination) of known processes (e.g., Down syndrome, cleft lip, and palate) and its origin is unknown [4]. Developmental language disorder (DLD) apparently has a considerable impact on child development [11]. Children with DLD show difficulties in language acquisition and use, resulting in a lack of language skill receptive and expressive [11]. The results of a meta-analysis show that children with SSD experience difficulties in speech perception [12]. This problem of language development disorders can cause severe problems in everyday life, such as being less likely to be accepted by their peers, tending to have fewer friends, and being bullied more often compared to typically developing children [11]. Apart from that, language development

disorders can also inhibit communication between children and their environment. The child becomes incapable of expressing oneself clearly or not being understood well, which can cause behavioral problems such as withdrawing or acting out of frustration. Lack of access to language results in fewer opportunities to learn from the environment about emotions and behavior [11]. According to Vermeij et al. [11], currently increasing evidence shows that from childhood, children with DLD have an increased risk of behavioral problems.

In addition, there are indications that DLD in early childhood is associated with more behavioral problems later in life [11]. However, according to Vermeij et al. [11], the language abilities of children with DLD can still improve or worsen over time, which in turn can cause changes in behavior. Bad behavior can hinder children's social skills so that often it will cause children to experience learning difficulties, internal obstacles in relationships with peers, adjustment problems, behavior problems, and many more may eventually receive a diagnosis of the disorder mental health throughout his life [13]. Disturbance communication results from various situations or different sources. For example, according to Zebron et al. [14], language-based learning disabilities originate from structural differences in the brain at birth. In most cases, these challenges are caused by genetic factors.

Oral-motor difficulties cause other communication disorders; difficulties resulting from stroke, which may involve motor, speech, and/or language problems; traumatic brain injury; And stuttering, which is now believed to be a neurological deficit. According to Zebron et al. [14], the most common factors affecting children's communication include learning disabilities, attention deficit disorder, attention deficit hyperactivity disorder, cerebral palsies, mental disabilities, cleft lip or palate, and autism spectrum disorders. Thus, communication breakdowns range from voice switching to the inability to use speech and language. Categories of communication disorders according to Zebron et al. [14], communication disorders are categorized into expressive language disorders, mixed receptive-expressive language disorders, stuttering, and phonological disorders. Expressive language disorder is characterized by difficulty in expressing oneself beyond simple sentences and limited vocabulary. In contrast, mixed receptive-expressive language disorder consists of problems in understanding other people's commands. Stuttering involves halts in fluency, in which sounds, syllables, or words may be repeated or lengthened.

The impact of communication disorders on learning: according to Zebron et al. [14], there is a strong relationship between communication and academic achievement. They believe that language and communication proficiency, as well as academic success, depend on Students can adapt their communication to the teaching and learning style in class. Zebron et al. [14] further observed that, with the right environment, students with communication disorders can achieve excellent academic results. They only need to learn social, language, and learning patterns in class. Therefore, the teacher should pay attention to classroom interactions and language and communication used in schools to help students learn to communicate in this environment. Still, according to Zebron et al. [14], language and communication planning explicit as well as unintentional use of language (e.g., language choices that are not consciously) is an essential

feature of the school environment and the classroom that provides opportunities for teaching and learning.

## **2 Method**

This study applies literature and library document study methods to investigate how to develop speech sounds through a Montessori environment in children with language disorders. This research aims to provide information to teachers, parents, and other professionals who may be involved in supporting the education and development of children with language disorders so they can be involved in the classroom together with other typical children. Some research on Montessori education demonstrates how well the approach can enhance a child's capacity for self-control, critical thinking, and problem-solving [14,16,17]. Sandpaper is used in Montessori classrooms to teach children the alphabet. According to Buldur and İcalal [6], during the sandpaper exercise, the teacher pronounces the letter's sound as the kid touches it. The main goals of using sandpaper or embossed letters are to help children develop their writing skills and to enable them to recognize the written form of the sounds they are studying through touch and visual perception.

## **3 Results and Discussion**

In order to fulfill educational objectives and inclusion principles in accordance with the Regulations of Minister of National Education No. 70 of 2009 Article (1) concerning inclusive education [18], that inclusive education is an implementation system education for all students who have disabilities and have the potential for intelligence and/special talents to participate in education or learning in one educational environment together with students in general [19]. So, the school system needs to ensure the availability of resources is needed to support children's learning needs, while teachers need to be aware of their students' educational needs. It is reported that meeting the needs of children with speech and language difficulties is very challenging for teachers from various countries [20].

### **3.1 Results**

In Montessori preschools, children's ability to differentiate phonemes is facilitated by the use of objects called apparatus. These objects are arranged in such a way that it is arranged into a stage where every child must pass all stages without being able to skip because all stages are a series sustainable. Children in the Montessori program also regularly participate in various metalinguistic didactic game activities. This includes mindfulness exercises and explicit phonology. Shanks [3] explains that in stages of a child's language development, Montessori principles of observation should guide support for children in articulation errors. Most children experience mental articulation delays, so teachers can apply Montessori materials and use conversational strategies to emphasize correct sound pronunciation [3].

According to the American Speech, Language, and Hearing Association, by eighteen months of age, parents should be able to understand 25% of their toddler's speech. Two years old, average clarity reaches 50% to 75%. At the age of three years, while at the age of four years, parents should be able to understand almost everything their child says or 75% up to 100%. And at five years old, even though some mistakes are still there, your child should be understood by most people in most situations [3]. The development of typical articulation that takes place in the sequence is entirely predictable and is detailed in the following table (Table 1).

**Table 1.** Speech sound norms taken from the Golden Fristoe Test of Articulation-2 [8].

Articulation Development			
By Age	Initial Voice	Medial Voice	Final Voice
2	b dh m np	b m n	m p
3	g k t f	fg k ng p t	b d g k n t
4	kw	d	f
5	ch j l s h y bl	s ch j l sh z	l ng ch j s sh f v z
6	rv br dr fl fr gl gr kl kr pl st tr	rv	
7	z sl sp sw th	th	th

According to Shanks [8], children who experience mistakes for a year or more outside developmental norms, whose errors will have a negative impact on interactions or educational performance and/or mistakes that make it difficult for the child to understand, must be screened at special services [3] like for example doing screening to determine whether there is hearing loss, or whether it is found to be present other indications. Two types of articulation errors are common in children under the age of eight years [3]. The first is the elimination of audible sounds. Deletion possibly appears in any position in the word and is very often heard at the beginning or end of the word and in the mix. Another type of articulation error is substitution, where an error occurs when a child replaces one sound with another. One of the common substitutions is that it occurs on the letters t and c so that the cat becomes tat.

Teachers and adults should not ignore children's speech sound errors or mistakes. Letting it go and making it a habit is not the answer. Teachers must help children. Therefore, one of the keys to helping children who make articulation errors is to increase the child's opportunity to hear sounds correctly [8]. The more often the child hears this sound, the greater the possibility of discrimination occurs. The following table explains the stages of sound development.

**Table 2.** Stages of Speech Sound Development [3].

Development of Speech Sounds	
Stages	Children can produce correctly
Isolation	One voice speaking alone
Syllables	Sounds combined with other sounds

Development of Speech Sounds	
Words	Sounds in one's own spoken words
Sentence	Sounds in words that appear in sentences
Connected Speech	Sound right when speaking and telling stories

Next, the teacher determines the stimulus to determine whether the child can repeat the voice. If the child can make sounds, then work can occur at the word level. If not, the teacher must teach the child how to produce these sounds even though this is a much more difficult path, but not impossible to do. Speech sounds are produced through a combination of various parts of the mouth and respiratory system.

There are several production keys, the first is the position of the tongue. To illustrate, without letting the lips move, say the s sound and the sh sound appear can make both sounds just by moving the tongue. Lips are the second key in the production of speech sounds. The position of the lips is also essential for producing many sounds. To illustrate this, say the sounds m and u. Production of m with open lips and u with closed lips. The position of the lips is obviously crucial for producing these sounds correctly. The final keys in the production of speech sounds are called voiced and voiceless. According to the term, voiced sounds require the addition of sound to the voice. For example, includes the sounds c, g, and d. Voiceless sounds rely solely on air for their production. This includes the sounds for p, t, and s. To illustrate the difference between voiced and voiceless, pronounce the sounds p (voiceless) and b (voiced). The position of the lips and tongue is the same for both sounds. The only difference is the addition of sound to the sound b.

The final key is the position of the mouth where the sound is produced. Some sound is produced near the front of the mouth with the lips, teeth, and tongue. Some are produced near the back mouth using a palette. To illustrate this chord, say the sound for t. This is the front sound. Now, say the sound for c. This sound is produced near the back mouth. Children often substitute front sounds for back sounds. Error Common ones that fall into this category are t for c (tat for cat) and d for g (doddie not doggie) [8]. When teachers help children learn to pronounce something sound, give instructions based on how you produce the sound. This helps the child learn to use many parts of his mouth to produce sounds correctly. The Montessori method of stimulating literacy skills is based on a set of skills that can be managed with elements that stimulate the child's interest. In between these elements can be found using the sandpaper lettering apparatus letter, figure 1), with which the child will hear the sound, see it represented in the form of letters, and feel how to write it according to how the child feels writing with his fingers, learning motor patterns from the first time he tried them. Standout elements Another thing in this literacy method is the moving alphabet. The main goal is to help the child in language analysis and exploration, to reproduce words with graphic symbols, and to prepare for writing and reading. All analyses performed previously lead us to the conclusion that Montessori developed a method that can be implemented in children through communication processing disorders [21].





**Fig. 1.** Sandpaper letters.



**Fig. 2.** Moveable large alphabet.

### **3.2 Discussions**

When reviewing the international literature, it is apparent that the number of studies that examine the influence of the Montessori educational environment on the development of early literacy skills in children, especially those with language disorders, is still limited. However, Pérez-Pérez et al. [21] introduced two activities through "Matching Cards" and "Cards & Sounds" based on the Montessori method which the study tested both activities for children with and without communication disorders to learn how children with communication disorders interact. Children with communication disorders require additional strategies. Explicitly, one of the methodologies applied to

improve literacy skills that are currently being fostered is the Montessori method. The method is based on respect for children at risk of social exclusion, as well as high levels of learning capacity. That's his didactic tool developed based on multiple manageable devices, which makes it possible for children - at the same time, they enjoy the activity - to go through different stages in their learning process. This covers the introductory stages, such as recognition of phonemes, through intermediate ones, such as learning letters and making words, up to as they create and read phrases and sentences.

According to Pérez-Pérez et al. [21], people who suffer from communication disorders in this case, the concept is the discovery of various problems suffered by people of all ages, such as voice, speech, language, and swallowing disorders. Apart from that, one more advantage of the method Montessori can be used for people with communication disorders (CD) [21]. Three crucial aspects cause this: the first is Montessori provides what is needed for success not only in language but for the development of all human potential. Second, children have stimulation due to the use of different materials, colors, and shapes, which is very interesting for the child and thus becomes interested in the activity developed. The third is autonomy or independence, which fosters each child as well as following each child's learning rhythm according to their specific needs [21].

Not only that but from the following research, contributions from other Montessori education environments on several aspects of child development at an early age. For example, the Montessori education system and materials are combined with the support of new technology and its application to various types of Information Technology and Communications (ICT), which showed a great level of success in terms of support towards disabilities and improving the learning process [22]. Differences were significantly also demonstrated in the Montessori preschool program in Croatia, which have a much higher level of phonological awareness than children from regular preschool program [5]. Several studies also show that children from Montessori preschool programs had average phonological awareness scores that were greater compared to children from regular preschool programs. As stated by Buldur and İclal [5] in their research examining the effect of Montessori education on the development of phonological awareness and print awareness as one of the early childhood literacy skills carried out in Türkiye.

Previous research and reports of Montessori Education practices seem to show that teaching early literacy skills is not only beneficial for facilitating the production of speech sounds or phonology in typical children but is also beneficial to developing phonology in children with communication disorders and intellectual disabilities. However, further research is needed to confirm. There may be other factors or other variables that can provide new related findings and connections between speech-sound production, phonological awareness, and letter-sound knowledge in students with language disorders. As well as the process of pedagogical support for children with learning disabilities can be managed more flexibly [23]. It is also possible that the application of the principles of Marian education.

Montessori, in the process of pedagogical support for children with disabilities learning, it is essential to note that a unique role in the educational process belongs to the teacher, who is also a child facilitator and an observer. To build relationships with

children with special needs, teachers must have certain qualities: professionalism, optimism, belief in children's potential, and love for children and their work. If these characteristics are possessed, then the task of forming universal learning activities in children, namely the ability to learn, can be completed in any joint activities between children and adults [23].

## 4 Conclusion and Recommendation

Language difficulties are summarized into oral language difficulties, reading difficulties, and writing difficulties. Meanwhile, speech disorders focus on articulation and phonology, fluency (stuttering), and voice disturbances. Hearing difficulties are expressed in speech problems such as articulation/voice and language problems. According to American Speech, Language, and Hearing, children with communication disorders usually show delays or typical development in one or more of the following areas: articulation, smoothness, understanding language, language production, morphology, phonology, pragmatics, semantics, syntax, and sound.

Phonological disorders are characterized by problems in producing error patterns of sounds. Children who experience communication disorders have many different symptoms and have a significant impact on development. Children with speech sound disorders have difficulty producing intelligible speech and can experience combinations of difficulty in perception. Children with SSD show difficulties in acquisition and language use, resulting in a lack of receptive and expressive language skills. Montessori preschools regularly include phonological awareness activities and utilize multisensory (i.e., haptic and visual-haptic) approaches to learning early literacy, which has also been shown to increase phonemic/phonological awareness. Therefore, in line with findings showing that Montessori programs with high fidelity are a superior alternative to preschool regular/conventional in several aspects, including variables related to literacy. Sound error speech will disappear spontaneously at the age of six years (Phonological Disorders). However, some children make so many mistakes that their speech becomes difficult to understand, thereby reducing clarity significantly. This can lead to frustration, isolation, and loss of self-esteem and negatively impact performance. Further research on children with language disorders should aim to know cause-and-effect relationships, for example, by investigating early reading interventions and their potential impact on speech sound production in children with language disorders.

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