



## Academic Reading Performance of Deaf Learners and Their Parents' Sign Language Skills: A Multiple Case Study

DOI: <https://doi.org/10.5281/zenodo.12786777>

Ma. Rhodora B. Daef

University of the Visayas, Cebu City, Philippines

### Abstract:

The study delved into investigating the profound impact of parental sign language proficiency on the academic reading capabilities of deaf learners. This study aimed to unravel whether parental sign language skills influence the academic reading ability of second-grade students at Toro School for the Deaf during the academic year 2023-2024. Focusing on five pairs of parents and their second-grade children, the study relied on self-reported data regarding the participants' perceived sign language skills across various domains, along with the Dolch Sight Word Assessment, a long-standing tool in educational assessment dating back to the 1940s. Employing descriptive statistics and Spearman rank correlation analysis, the study scrutinized the relationships between the said variables. The findings revealed no significant correlation between parents' overall ASL skills as well as parents' ASL proficiency on the Dolch Assessment and their children's reading performance. Despite its strengths and limitations as a multiple-case study, this research endeavors to contribute valuable insights to the field of DHH education. It is hoped that the outcomes of this study will inform and guide practices aimed at supporting the academic development of DHH learners.

**Keywords:** *Dolch Sight Word Assessment for DHH Learners; Early Intervention, DHH, Parental ASL Skills*

### Introduction:

Globally, it is estimated that up to 5 out of every 1,000 born infants have hearing loss. Statistics from the National Association of Deafness and Other Communicative Disorders in the US indicate that over 90 percent of deaf children are born to hearing parents, who often do not know sign language at birth, putting these children at risk of language deprivation.

In 2015, hearing loss was ranked as the fourth leading cause of years lived with disability and was considered a major global public health issue (Wilson et al., 2017). Approximately two-thirds of people with hearing loss live in developing countries, such as Southeast Asia, where 5.5% of the 401 million deaf individuals have moderate to severe hearing loss, according to the 2021 World Report on Hearing. In the Philippines, nearly one in six individuals has serious hearing problems, with fifteen percent experiencing moderate to severe hearing loss. Data from Thailand show that approximately thirteen percent of the population suffers from hearing loss, and in rural Pakistan, one in every twelve children is affected. In Australia, nine out of ten deaf children are born to hearing parents, while one out of ten children born to deaf parents is also deaf.

Hoffmeister (2007) highlights that language exposure is crucial for development, as it allows children to associate words with things, ideas, and feelings, thereby enhancing their cognitive abilities. The prevalence of deafness and the high percentage of deaf children born to hearing parents who do not know sign language at birth are alarming. Language deprivation occurs when children with hearing loss do not receive accessible language exposure during the critical period of language and cognitive development, from birth to two years. This deprivation can severely impact a child's cognitive, linguistic, and academic development. Humphries (2012) emphasizes that during this critical period, deaf and hard-of-hearing children are often delayed in language development due to a lack of necessary linguistic exposure.

Researchers at Boston University School of Education express concern that 90-95 percent of deaf children born to hearing parents do not know sign language before starting school, leading to struggles in language acquisition. Gallaudet University estimates that only 40 percent of families use sign language at home, raising concerns about potential language deprivation in deaf children. Salamy (2017) states that without language stimulation during the critical development period, cognitive development, thinking skills, and language development are at risk. Language deprivation can hinder reading comprehension, vocabulary acquisition, and overall academic achievement in deaf children.

Deaf children rely on visual communication methods, such as sign language, to develop language skills. Without exposure to sign language, they may struggle with language and literacy skills, significantly impacting their academic reading abilities. It is crucial for parents and caregivers to learn sign language to avoid language deprivation and foster effective communication. Early intervention and access to language-rich environments are essential for deaf children to develop strong reading skills. Providing sign language instruction, speech therapy, and



assistive technologies can support their language development and improve academic reading abilities. Parents play a crucial role in ensuring their children are not language-deprived by being ready before school age.

Undalok (2015) asserts that children with hearing impairments have the same rights as other children, but communication barriers often prevent them from expressing their views and receiving equal attention. New studies reveal that about 75 percent of parents of deaf children do not become fluent in sign language, limiting appropriate communication at home. The Kenya National Association for the Deaf emphasizes that parents of children with hearing impairments need to acquire sign language skills to facilitate communication.

Research shows a positive correlation between parental involvement and academic achievement, with significant studies indicating that parental fluency in sign language is a stronger predictor of academic success among hearing-impaired children than mere parental involvement in school activities (Calderon, 2000). This study aims to investigate whether parents' sign language skills are related to the academic reading of 2nd grade deaf learners at Toro School for the Deaf. This research is intended to help parents and teachers support deaf children in achieving better academic outcomes. American Sign Language (ASL), the prevalent signed language in the United States, is the focus of this study.

### **Literature Review:**

#### **The Relationship Between Parental Fluency in Sign Language and Academic Reading of Deaf Students**

Research highlights the significance of parents' fluency in sign language over mere parental involvement in school activities for predicting academic achievement among hearing-impaired children. Calderon's (2000) study confirms that effective communication by parents is crucial for positive language and academic development. Wanjiru (2014) found challenges in parental involvement, particularly in the use of sign language.

Understanding the academic reading ability of deaf children is essential for tailored instruction and early intervention. Academic reading involves critically engaging with scholarly texts (McWhorter, 2016). Hrastinski (2016) emphasized specialized assessment tools for 1st grade deaf children, such as visual aids and sign language-based assessments, to address their unique communication needs. Involving educators and specialists ensures appropriate assessment and support.

Deaf children's academic reading abilities vary based on factors like early intervention, educational support, and communication mode. Humphries et al. (2022) noted that early exposure to sign language and appropriate language input leads to strong language skills. However, studies have shown that deaf children generally exhibit poorer reading comprehension and literacy skills compared to hearing peers (Qi & Mitchell, 2012). Exceptions include deaf students in mainstream classrooms achieving average or above-average levels in academics (Antia et al., 2009) and cochlear implant users performing comparably to hearing peers (Spencer et al., 2004).

Effective family communication is vital for children's intellectual, language, and academic development (Chiuri et al., 2013). Hearing parents of deaf children require extensive support to learn sign language and create an inclusive environment (Humphries et al., 2022). Parental involvement in learning sign language significantly enhances DHH children's language acquisition and social-emotional development (Knors & Marschark, 2014; Luckner & Cooke, 2010).

#### **Methods of Learning ASL**

Parents use various methods to learn ASL, including online videos, instructional materials, mobile apps, and direct interaction with their deaf child. Formal ASL training, offered by institutions like Gallaudet University, provides a structured approach to learning ASL, covering vocabulary, grammar, and cultural aspects. Research shows that parents who undergo formal ASL training achieve higher proficiency and better communication with their deaf children (Barnes & Thomen, 2019).

Effective parent-child communication, facilitated by learning sign language, is crucial for deaf children's academic success. Early language acquisition, supported by multimodal and multilingual environments, ensures age-appropriate development (Humphries et al., 2012). However, many parents struggle to achieve fluency in ASL, which impacts their ability to communicate effectively with their children (Mitchell & Karchmer, 2004). Despite these challenges, learning ASL strengthens family bonds and promotes better educational and social outcomes for deaf children (Pichler, 2020; Moeller & Schick, 2006).

Parental fluency in sign language is a critical factor in the academic and social development of deaf children. Early intervention, effective communication, and formal ASL training play essential roles in supporting DHH children's language and academic achievements. Parents' commitment to learning sign language significantly enhances their child's educational experience and overall development.

### **Methodology:**



### Research Design

This study employs a qualitative multiple case study approach. Qualitative research is effective for exploring experiences, concepts, and thoughts, often using narrative data to uncover insights that can lead to testable hypotheses. In this study, we selected and analyzed multiple cases that share common characteristics but also have differences. Data were gathered through in-depth investigations using observations, interviews, and surveys to determine if parents' sign language skills were associated with the academic reading levels of Deaf learners. The academic reading of the learners was measured using the Dolch sight words assessment. Given the focus on parents' sign language skills, raw scores from the reading test were applicable.

### Environment

The Monterey County Office of Education (MCOE) provides leadership, support, and educational services for the region's Deaf and Hard-of-Hearing children. The MCOE emphasizes building a strong language foundation that meets the unique needs of students, particularly through programs at the Toro School for the Deaf in Salinas, which serves preschool through second-grade learners. Instructional teams provide ongoing assessments of language development and offer instruction in American Sign Language, spoken English, Signing Exact English, and other communication tools. MCOE also facilitates parent-to-staff and parent-to-parent connections through regular meetings to support instructional strategies, sign language skill development, and community involvement.

### Participants

The study focused on five pairs of parents and their 2nd Grade learners from Toro School for the Deaf. The participants were tested in a classroom setting at the start of their English class, with informed consent obtained beforehand. The sample included all available 2nd graders and their parents, totaling five pairs. Data collection took place from May 8-10, 2024.

### Age Distribution of the Deaf Learners

Level	Frequency (f)	Percentage (%)	Mean Age	SD
8 years old	3	60	7.6	0.55
7 years old	2	40		

### Sex Distribution

Group	Female (f)	Female (%)	Male (f)	Male (%)
Learners	3	60	2	40
Parents	4	80	1	20

### Parents' Level of Education

Level	Frequency (f)	Percentage (%)	Level
High School Graduate	3	60	High School Graduate
High School Undergraduate	1	20	High School Undergraduate

### Primary Language Spoken at Home

Language	Frequency (f)	Percentage (%)
English	1	20
Spanish	2	40
Mixteco	1	20
English and Spanish	1	20

### Instruments

To gather data, parents first completed a profile questionnaire followed by a survey on their perceived sign language skills, validated by three experts. This was supplemented by interviews regarding their use of sign language at home. The learners' academic reading scores were derived from the Dolch sight word test.

### Data Gathering

Data collection from parents utilized a researcher-made questionnaire and rating scale, validated by experts, ensuring the instrument's validity and appropriateness. The checklist prompted honest responses by avoiding neutral answers.

The data gathering procedure began with the approval of the research proposal and its submission to the IRB, followed by a request for permission from the Monterey County Office of Education and the program principal. During the actual data gathering phase, Zoom meetings were conducted with parents to obtain consent and provide orientation on how to answer the questionnaires. Parents were then administered questionnaires and rating scales, while learners underwent interviews and Dolch sight word tests. After the data was collected, it was analyzed using descriptive statistical measures such as frequency distribution, percentage, arithmetic mean, and standard deviation. All data was securely stored to ensure confidentiality.



### Data Analysis

The data analysis employed descriptive statistical measures and the Spearman rank correlation (Spearman rho). The interpretation of Dolch sight word scores, reading levels, and assessment accuracy were based on established resources and guidelines.

### Ethical Consideration

Ethical considerations were strictly adhered to throughout the study. The privacy and confidentiality of respondents' data were maintained, and all responses were tallied, analyzed, and interpreted honestly to ensure accurate findings regarding the association between parents' sign language skills and the academic reading of Deaf learners. Data will be securely stored and destroyed after publication.

### Data Interpretation Tables

#### Dolch Sight Word Scores and Reading Levels

Scores	Sight Word Level	Reading/Grade Level
0-40	Pre-Primer	Pre-K
41-93	Primer	Kindergarten
94-135	1st Grade	1st Grade
136-182	2nd Grade	2nd Grade

#### Accuracy and Levels of Interpretation for Dolch Word Assessment

Accuracy	Levels
95-100%	Mastery Level
80-94 %	Instructional Level
below 80%	Frustration Level

#### Interpretation of Parents' Perceived Sign Language Skills

Levels	Remarks
Very Confident	4
Confident	3
Not Confident	2
No Confidence	1

#### Interpretation of Parents' Perceived Skills on Dolch Sight Words

Scores	Sight Word Level	Grade Level	Remarks
0-40	Pre-Primer	Pre-K	Very Low
41-93	Primer	Kindergarten	Low
94-135	1st Grade	1st Grade	Moderate
136-182	2nd Grade	2nd Grade	High

#### Interpretation of Spearman rho

Range (rs)	Remark
1.000	Perfect correlation
> 0.790	Very Strong
0.400 - 0.690	Strong
0.300 - 0.390	Moderate
0.200 - 0.290	Weak
0.000 - 0.200	Negligible
0.000	No rectilinear relationship

### Findings

#### Case Study 1

##### Student Information:

Lara, an eight-year-old female, currently attends 2nd Grade at Toro School for the Deaf. Her educational journey commenced in the infant program within Monterey Peninsula Unified School District, where she received instruction from an itinerant teacher specializing in deaf and hard-of-hearing (DHH) education. Subsequently, she entered Preschool in 2018 at Toro School for the Deaf, where she's now spent six academic years. She presents with bilateral hearing loss compounded by a weakened auditory nerve. Despite receiving a cochlear implant on her left side, its efficacy primarily extends to enhancing environmental awareness and ensuring safety, rather than facilitating speech and language comprehension.



Lara recognizes and reads 133 words, which constitute 74% of the total words a second grader should know. According to the Rating Scale for the Dolch Word List, this places her reading level at 1.7. Being at the Instructional Level indicates that she can read most words with some errors, typically achieving 80-94% accuracy. Specifically, Student 1 reads the 1st grade sight words with 93% accuracy, placing her in the Mastery Level. For the 2nd grade sight words, she achieves 37% accuracy, indicating a Frustration Level. Additionally, she reads both Kindergarten and 1st grade sight words with 85% accuracy, which places her at the Instructional Level for those categories. This distribution highlights that while Student 1 has strong reading skills for words at or below the 1st grade level, she struggles significantly with the more advanced 2nd grade sight words.

*Parent Information:*

Lara's mother, Mrs. Denise, who filled out the parental information sheet, is employed in the hospitality industry, married, and lives with her spouse, Lara's dad. She holds a high school diploma as her highest level of education, and according to her, Spanish is the predominant language spoken in their household.

Mrs. Denise has no confidence at all in her sign language skills, reflected in an average confidence score of 1 out of 4. This indicates a strong need for additional support and training. Her consistently low confidence, with less variability compared to Mrs. Patrice, suggests uniformly low confidence across different sign language skills, with a standard deviation of 1.18.

Mrs. Denise's American Sign Language (ASL) proficiency is marked as Very Low, with a score of 19 and a mean score of 5 words, demonstrating an accuracy rate of 11%. This highlights a significant gap in her ability to effectively communicate using ASL, potentially impacting Lara's reading development and overall educational support. The strong need for enhanced ASL proficiency for Mrs. Denise is crucial to better supporting Lara's literacy development and educational success.

*Interview:*

Mrs. Denise reported that their child has been enrolled in the Deaf and Hard of Hearing (DHH) program since infancy. Sign language acquisition occurred through "the teachers have given us flash cards" and "Lara has taught us some." Within the home environment, signs for routine activities such as sleep, eat, stop, bathe, and drink are frequently employed. Communication with the child typically involves "gestures and acting out" (enactment).

On average, less than sixty minutes per day are dedicated to gestural communication with Lara. Mrs. Denise acknowledged her limited capacity to assist with Lara's academic endeavors, though she expressed readiness to allocate around 20 minutes daily to aid with mathematics. While she "thinks she understands" gestures, certainty regarding the depth of understanding remains uncertain.

Perceived proficiency in her sign language skills is believed to influence Lara's reading skills, with the parent attributing potential shortcomings in reading development to their own limitations in providing practice opportunities. Interestingly, Lara takes on the role of educator, imparting sign language knowledge to her mom. Teacher-provided materials are occasionally utilized by Mrs. Denise to support the child's learning.

Regarding the potential impact of enhanced sign language proficiency on the child's academic reading skills, Mrs. Denise expressed a belief in its positive influence, although specific reasoning was not provided: "Yes, I could help her more at home," Despite a desire to enhance sign language skills, challenges posed by Mrs. Denise's work schedule hinder consistent learning efforts. "Yes, but it's difficult with my work schedule." Awareness of sign language learning programs is limited, with reliance placed on recommendations from educators. "I don't know of any programs except for the one the teacher told me about." Commitment to an hour per week of learning sessions is contingent upon her fluctuating schedule. "It depends on my work schedule, maybe 1 hour per week."

## **Case Study 2**

*Student Information:*

Patry, an eight-year-old female, is currently enrolled in 2nd Grade at Toro School for the Deaf. Her hearing loss is attributed to cancer treatments, resulting in bilateral profound hearing loss. In 2020, she was diagnosed with this condition and subsequently received a left cochlear implant. Transitioning into the Deaf and Hard of Hearing (DHH) Program in 2021, she spent four months in kindergarten before advancing to first grade. Throughout her first-grade year, she experienced intermittent absences due to lice infestations.

Patry's reading assessment shows a total score of 38, derived from 12 on Pre-Primer words, 10 on Primer words, 6 on 1st Grade words, and 10 on 2nd Grade words. This score corresponds to a Pre-K reading level with an overall accuracy of 21%, placing her at the Frustration level. Her reading level is evaluated to be 1.2. When broken down, her highest accuracy is 30% for Pre-Primer words, while the lowest is 15% for 1st Grade sight words. She achieved 19% accuracy for Primer words and 22% for 2nd Grade words. Across all categories, her



accuracy remains within the Frustration Level, indicating that she finds reading these sight words quite challenging and is likely to require significant support and intervention to improve her reading skills.

*Parent Information:*

The parental questionnaire for Patry was completed by her 22-year-old single mother, Mrs. Patrice, who holds a high school diploma. The household language environment includes both Spanish and English.

Mrs. Patrice expressed a low level of confidence in her sign language skills, with an average confidence score of 2 out of 4, indicating she feels unconfident in her abilities. The variability in her responses suggests some areas of uncertainty and inconsistent confidence across different aspects of sign language, as reflected by a standard deviation of 1.55.

Mrs. Patrice's ASL proficiency was assessed as low, with a score of 51 and a mean score of 13 words, demonstrating an accuracy rate of 28%. This indicates that while she has some knowledge of ASL, her proficiency is limited, which suggests a need for further support and training to effectively communicate with her child.

*Interview:*

Mrs. Patrice reported her child's two-year enrollment in the Deaf and Hard of Hearing (DHH) Program. She acquired sign language skills through various channels, including learning from her daughter, online resources, and her sister's American Sign Language (ASL) class, "through my daughter, the Internet, and my sister's class." "Emotion and behavior signs" are commonly utilized during home interactions with Patry. However, she struggles with sign language retention during conversations and finds it challenging to memorize signs, quoting, "I'm having a little hard time memorizing the signs when having a conversation with Patry".

She establishes regular communication habits during daily activities such as cooking or cleaning, quoting her, "I try to make it a habit so every time I'm cooking or cleaning with my daughter it's like around 2 hours," dedicating approximately two hours per day to interact with her child. Regarding assistance with lesson review and homework, Mrs. Patrice spends about 15 minutes engaging with her child but faces difficulty using picture-based sign language aids provided to her. At times, she perceives a lack of understanding from her child: "I don't think she understands me," prompting her to seek correction or conduct research to improve her signing clarity." She tries to correct me, or I research it again to help her understand what I'm trying to say."

Mrs. Patrice believes her sign language proficiency directly impacts her child's reading development, expressing concern that inaccuracies in her signing may hinder her ability to effectively correct her child's signing. She said, "Yes, it does affect her because we are both learning it together and I'm not sure how to sign properly." Additionally, she "actively teaches her child sign language, utilizing online resources and her sister's ASL class" for guidance. Specific signs such as "police, arrest, church, and hospital" have been taught.

She holds the belief that her child's "academic reading skills would improve with her own sign language proficiency," facilitating clearer communication and correction. Given the opportunity, she is eager to undertake formal ASL learning. "I would take it so I can communicate with her better and understand her better," preferably through in-person classes to observe "proper hand movements." She is willing to dedicate either two hours daily or every other day to this pursuit.

**Case Study 3**

*Student Information:*

Aloha is an eight-year-old female currently attending 2<sup>nd</sup> Grade at Toro School for the Deaf. In 2021, she began her education in an inclusive Kindergarten class without prior participation in specialized educational programs. Subsequently, she received support from an itinerant teacher and was subsequently referred to Toro School for the Deaf, where she remains enrolled. She experiences Profound Bilateral Sensorineural hearing loss in both ears. Because her hearing loss was identified later, it was determined that while her hearing aids could provide sound awareness, she would not develop listening and spoken language skills. Consequently, it was recommended during her initial assessment that her parents learn sign language, which aligns with her hearing needs. Due to the duration of her deafness, auditory deprivation, and lack of a foundation in listening and spoken language, she was not considered a candidate for cochlear implantation according to insurance guidelines.

Aloha demonstrated strong reading skills, scoring 40 on Pre-Primer, 50 on Primer, 40 on 1st Grade, and 19 on 2nd Grade words, resulting in a total score of 149. This places the student at a 2nd Grade reading level with an impressive 83% accuracy, indicating Instructional level proficiency with a reading level of 1.8.

In detail, Aloha achieved perfect accuracy in Pre-Primer, Primer, and 1st Grade sight words, with scores of 100%, 98%, and 96% respectively, categorizing them all in the Mastery level. However, their accuracy dropped to 41% in 2nd Grade sight words, placing them in the Frustration Level for that category. This suggests a strong foundation in foundational reading skills, but some difficulty with more advanced vocabulary and concepts typically encountered in 2nd Grade level materials.



*Parent Information:*

Mr. Rudy, a 23-year-old father employed in agriculture, filled out the parental questionnaire. The household primarily speaks Mixteco. Similar to Mrs. Patrice, Mr. Rudy also expresses a lack of confidence in his sign language abilities. His responses consistently indicate low or no confidence, with a mean score of 2, and demonstrate less variability compared to Mrs. Patrice. This suggests a consistent level of uncertainty across different sign language skills.

Mr. Rudy's ASL proficiency is classified as Low, with a total score of 51, a mean score of 13, and an accuracy rate of 28%. This indicates a basic level of proficiency with room for improvement, aligning with their self-assessment of confidence.

*Interview:*

During the parent interview, Mr. Rudy disclosed that his daughter, Aloha, has been enrolled in the Deaf and Hard of Hearing (DHH) Program for two years. Interestingly, she did not attend kindergarten in a DHH classroom. Mr. Rudy has been learning sign language primarily through practicing with his "daughter using YouTube." Together, they commonly use signs for various activities like "eat, play, take a shower, go to school, do good, etc." When asked about the quality of their communication, Mr. Rudy feels confident that they use American Sign Language (ASL) to ensure mutual understanding. He emphasizes that they allocate "sufficient time for conversing with their child, particularly when assistance is needed with homework or lessons." Typically, they dedicate an hour or less, but they are willing to invest more time if necessary. Mr. Rudy believes that his child "comprehends him well when they communicate using the limited sign language; they both know." However, he admits to facing challenges when they struggle to understand her.

Regarding the impact of his sign language proficiency on his child's reading abilities, Mr. Rudy acknowledges that his level of expertise influences her reading. He believes that "if he knows fewer signs than his child, it hampers her development in both sign language and reading skills." When it comes to teaching sign language, Mr. Rudy explains that they turn to online resources like "Google and YouTube when encountering unfamiliar words". Despite investing in materials such as picture cards, they find it challenging because they must translate each word into ASL for comprehension. They perceive knowledge of sign language as a valuable advantage, as it facilitates "smoother communication without the need for translation." Additionally, they believe that starting early with sign language instruction at home gives their child a head start in vocabulary acquisition and reading skills. Mr. Rudy expresses a keen interest in expanding his ASL proficiency for the "betterment of his Aloha's future." He emphasizes the importance of seizing opportunities for learning, especially through online resources, as they currently "rely on the internet" for skill enhancement. Mr. Rudy is willing to dedicate 45 minutes to an hour daily to further his ASL education, recognizing its significance for his child's development.

**Case Study 4**

*Student Information:*

Emilio, a seven-year-old male, is currently enrolled in 2nd Grade at Toro School for the Deaf. Initially, he briefly attended a general education preschool before being referred to a Special Education classroom due to his disability and specific needs. Subsequently, in 2018, he was referred to and enrolled in the Monterey County Office of Education's (MCOE) Deaf and Hard of Hearing (DHH) preschool classroom.

At birth, Emilio failed his newborn hearing screening and was diagnosed with cytomegalovirus (CMV), a condition that elevates the risk of progressive hearing loss. He was diagnosed with severe hearing loss in both ears, which later deteriorated to profound hearing loss. Presently, he utilizes a cochlear implant in his right ear and a hearing aid in his left ear to facilitate auditory perception.

Emilio has a good grasp of sight words generally taught to second graders, recognizing and reading 83% of them. Their reading level, according to the Rating Scale for the Dolch Word List, is 1.8, indicating proficiency at the first-grade level.

At an instructional level, they can read most words with some errors, typically achieving 80-94% accuracy. They demonstrate mastery in Pre-Primer and 1st Grade sight words, reading them with 100% accuracy. In the Primer level, they perform at a slightly lower accuracy rate of 94%, still within the mastery level. However, when it comes to 2nd-grade sight words, their accuracy drops to 41%, indicating a frustration level. This assessment suggests that while Emilio has a strong foundation in earlier sight words, they may need additional support and practice to improve their accuracy and fluency with more advanced sight words.

*Parent Information:*

Mrs. Maria, who is a 29-year-old mother, completed the questionnaire. She works in the agriculture sector and is a single parent, although she lives with her partner. She has completed high school education, and Spanish is the primary language spoken in their home.



Mrs. Maria expressed a lack of confidence in their sign language skills. Her overall confidence level was rated as low or not confident, with a score of 2 out of 4. However, there were varying responses, indicating areas where targeted improvement may be beneficial. It's noteworthy that Mrs. Maria didn't rate any facet with any confidence at all.

Mrs. Maria demonstrated a high proficiency score in American Sign Language (ASL) with a score of 113. On average, they scored 28 words with an accuracy rate of 63%. This suggests a solid foundation in ASL, with room for improvement in both vocabulary size and accuracy.

*Interview:*

During the interview, Mom recalled that Emilio has been enrolled in the Deaf and Hard of Hearing (DHH) program since 2021. Regarding her proficiency in sign language, she acknowledged learning some from her child's previous teacher and independently "through online platforms like YouTube and phone applications."

At home, common signs are utilized to address the child's needs, activities, siblings' whereabouts, and school updates. Mrs. Maria endeavors to employ "American Sign Language (ASL) rather than approximations", although she encounters unfamiliar signs from her child, prompting her to seek clarification through online resources. Family communication typically involves at least an hour of signing words, numbers, or the alphabet daily.

When asked about Emilio's comprehension of her signs, she noted that "combining verbal communication with signing facilitates understanding." She believes her sign language proficiency influences her child's reading abilities, expressing a desire to "enhance her skills" to better support his learning journey.

Mrs. Maria perceives herself as a "teacher of sign language at home," resorting to joint learning activities when encountering unfamiliar signs. They utilize various resources, such as "books, YouTube, and mobile applications, to reinforce sign language acquisition during daily chores. She believes that "improving her sign language skills would enhance her son's academic reading skills, as it fosters clearer communication between them." Motivated by her son's reliance on sign language, Mrs. Maria is keen to undergo formal instruction, favoring personalized "one-on-one programs for effective practice and feedback". She commits to dedicating at least one hour per day, Monday through Friday, to enhance her sign language proficiency.

**Case Study 5**

*Student Information:*

Aaron, a seven-year-old male, is currently enrolled in 2nd Grade at Toro School for the Deaf. His educational journey began in 2019 when he joined the Preschool program at the Monterey County Office of Education's (MCOE) Deaf and Hard of Hearing Program. Having spent five years in the program, he has become an integral part of it. He was diagnosed with bilateral severe or profound hearing loss and meets the eligibility criteria for Specific Learning Disability (SLD). Currently, he utilizes bilateral hearing aids to aid in auditory perception and communication.

Aaron demonstrates proficiency in recognizing and reading sight words, having mastered 73% of the total words expected of a second grader. According to the Dolch Word List Rating Scale, their reading level is assessed at 1.7. This places them at an instructional level, indicating the ability to read most words with some errors, typically achieving an accuracy rate between 80-94%.

In terms of specific sight word levels, Aaron performs exceptionally well in Pre-Primer words, achieving a perfect accuracy rate of 100%. However, their accuracy declines as the complexity of the words increases. For Primer and 1st Grade sight words, they read at a proficiency level of 77% and 76%, respectively, both falling within the instructional level.

The greatest challenge for Aaron lies in 2nd Grade sight words, where their accuracy drops significantly to 41%, placing them at a frustration level. This indicates a need for focused attention and support to improve their proficiency in this particular set of words. Overall, while Aaron demonstrates strong foundational skills in sight word recognition, there is room for growth and development, particularly in mastering more advanced sight words.

*Parent Information:*

The parent questionnaire for Aaron was completed by their Mrs. Mary, who is married and lives with her spouse. She is 35 years old and employed in the education sector as a paraprofessional substitute. She has a college degree, and English is the primary language spoken in their household.

Mrs. Mary stands out as the most confident among the five parents surveyed, although their responses exhibit notable variability. On average, her confidence score is moderate or confident, with a mean score of 3 and a standard deviation of 1.74. This suggests a significant range in their responses, indicating confidence in some areas but not all. Notably, Mrs. Mary expressed the highest level of "very confident" responses across four facets of their sign language skills compared to the other parents.





Despite this confidence, Mrs. Mary displayed a low proficiency score in American Sign Language (ASL), with a score of 46. On average, they scored 12 words with an accuracy rate of 26%. This indicates a need for improvement in both vocabulary acquisition and accuracy in ASL. Despite their confidence, there appears to be a gap between perceived skill level and actual proficiency, highlighting an opportunity for further development and support in sign language proficiency.

#### *Interview:*

During the interview, Mrs. Mary shared that Aaron has been in the program since he was two years old. She learned sign language through "videos during the pandemic when the school was shut down and classes were held online." At home, they commonly use signs for "clean up," "stop," "help," "eat," and "restroom." She feels that she "uses more American Sign Language (ASL) than approximations" when communicating with him, typically for 1 to 2 hours on school days and much of the time on weekends. They also spend about 30 minutes daily reviewing lessons and helping with homework. She believes her child "understands her ASL."

Mrs. Mary thinks her sign language skills impact her child's reading ability, as she only knows basic signs. She believes that if she "knew more ASL, her child would develop better academic reading skills due to improved communication and sentence structure." Although she does not formally teach her child sign language, she acknowledges that "he often teaches her." She uses "YouTube to learn additional signs." She is eager to learn ASL and prefers an online format. She is interested in an online mentoring program for her and her family, and they can commit to 1-2 hours daily for this purpose.

#### **Discussion:**

The integration of cultural education and the active involvement of parents in the language acquisition process are critical for the educational success of Deaf and Hard of Hearing (DHH) students. This research discussion analyzes five case studies of students attending Toro School for the Deaf, highlighting the intricate interplay between their educational experiences, parental involvement, and the unique challenges they face. The discussion will delve into the students' reading proficiency, parental support, and the broader implications for educational practices.

Lara, an eight-year-old student with bilateral hearing loss and a weakened auditory nerve, demonstrates a reading level below her grade expectations. Her proficiency in first-grade sight words is strong, but she struggles significantly with second-grade words. Her mother's limited proficiency in American Sign Language (ASL) and low confidence in her signing abilities hinder effective communication and support for Lara's educational needs. The gap in Mrs. Denise's ASL skills impacts Lara's literacy development, emphasizing the necessity for targeted support to enhance parental ASL proficiency.

Patry, who suffered hearing loss due to cancer treatments, faces challenges in reading at her grade level, showing a pre-K reading level with low accuracy across sight word categories. Her mother, Mrs. Patrice, while slightly more confident than Mrs. Denise, still displays low ASL proficiency. Mrs. Patrice's willingness to dedicate time to improve her ASL skills indicates a potential positive impact on Patry's reading development. The need for consistent and effective ASL practice at home is crucial for Patry's progress.

Aloha exhibits strong foundational reading skills but struggles with more advanced vocabulary typical of her grade level. Her father, Mr. Rudy, also shows low confidence and proficiency in ASL. Despite this, he actively engages in learning ASL with his daughter through online resources. His dedication to improving his ASL skills underscores the importance of parental involvement in facilitating better educational outcomes for DHH students. The consistent use of ASL at home is vital for Aloha's continued academic success.

Emilio, diagnosed with progressive hearing loss due to cytomegalovirus (CMV), shows proficiency in recognizing sight words up to the first-grade level. His mother, Mrs. Maria, although lacking confidence in her ASL skills, demonstrates higher proficiency compared to other parents. Her commitment to using ASL daily and seeking clarification for unfamiliar signs positively influences Emilio's reading skills. Mrs. Maria's proactive approach in learning and teaching ASL highlights the role of parental dedication in enhancing DHH students' literacy.

Aaron, who has been in the DHH program since preschool, shows proficiency in reading sight words up to the first-grade level but struggles with second-grade words. His mother, Mrs. Mary, is the most confident among the parents but has low ASL proficiency. Her dedication to using ASL for extended periods and her willingness to learn more indicate the potential for significant improvements in Aaron's academic performance. The gap between her perceived and actual proficiency suggests the need for structured ASL training programs for parents.

The case studies illustrate that parental ASL proficiency is a critical factor in the literacy development of DHH students. Schools should offer regular ASL training programs for parents to bridge this gap, enabling better communication and support at home. Active and consistent parental involvement in using ASL and supporting their



children's educational activities is essential. Schools should encourage and facilitate parental engagement through workshops, resources, and flexible learning schedules to accommodate parents' work commitments.

Recognizing and integrating the cultural and linguistic backgrounds of families into the educational framework can enhance the learning experience of DHH students. Multilingual resources and culturally responsive teaching practices should be implemented to address the diverse needs of students and their families. The use of technology and online resources, as seen in the case studies, can significantly aid in ASL learning for both students and parents. Schools should provide access to quality online materials and support families in utilizing these resources effectively.

Each DHH student has unique needs that require personalized educational support plans. These plans should consider the student's specific hearing loss, family dynamics, and parental involvement levels to provide targeted interventions that address their individual challenges.

The integration of cultural education and active parental involvement is paramount for the academic success of DHH students. The case studies of Lara, Patry, Aloha, Emilio, and Aaron underscore the need for enhanced parental ASL proficiency, consistent engagement, and culturally responsive educational practices. By addressing these areas, schools can create a more inclusive and supportive learning environment that fosters the literacy development and overall academic achievement of DHH students.

### **Conclusion:**

This study provides an in-depth examination of the educational and familial experiences of five students with hearing impairments enrolled at Toro School for the Deaf. By analyzing the unique circumstances, reading abilities, and parental involvement of each student, the research highlights the critical role of parental support and proficiency in American Sign Language (ASL) in the educational development of deaf and hard-of-hearing (DHH) students. Across the case studies, parental proficiency in ASL varied significantly, with most parents demonstrating low to moderate proficiency levels. Despite varying levels of confidence in using ASL, parents consistently acknowledged the positive impact that improved sign language skills would have on their child's reading development and overall educational success. Parents who exhibited higher confidence in their ASL abilities often engaged more with their children, although this confidence did not always align with their actual proficiency levels.

The study found a clear correlation between parental involvement in sign language and the reading development of their children. Students showed a range of reading proficiencies, with some performing at frustration levels for their grade while others achieved mastery in foundational sight words. Students whose parents were more proficient and confident in ASL generally demonstrated better reading skills. For students like Lara and Patry, whose parents had limited ASL skills, reading proficiency was notably lower. In contrast, students like Aloha and Emilio, who had more engaged and proficient parental support, showed higher reading levels. Many parents faced significant challenges in learning and using ASL due to work schedules, lack of resources, and limited access to formal ASL education. Parents expressed a strong desire for additional support and training in ASL, indicating that enhanced ASL proficiency would enable them to better support their children's educational needs. The use of digital resources like YouTube and online platforms was common among parents striving to improve their ASL skills, highlighting the need for accessible and flexible learning options.

The findings of this study underscore the crucial role of parental involvement and proficiency in ASL in the educational development of DHH students. Addressing the challenges faced by parents in learning ASL and providing them with adequate resources and support is essential for enhancing the academic and literacy skills of their children. Schools and educational programs should prioritize providing comprehensive ASL training and resources for parents to bridge the gap between their current proficiency levels and the skills needed to effectively support their children's learning. Implementing regular ASL workshops, online courses, and mentoring programs could significantly benefit parents, leading to improved educational outcomes for DHH students. Encouraging a collaborative approach, where parents and children learn and practice ASL together, can foster a more supportive and communicative home environment conducive to academic success. By fostering an inclusive and supportive educational environment that actively involves parents, schools can help DHH students achieve their full potential and overcome the barriers posed by hearing impairments.

### **References:**

Andrews, J. F. (2017). *Deaf education: From origins to outcomes*. Oxford University Press. URL

Allen, T. E., Marshall, C. R., & Weber, C. (2015). Parent-implemented communication intervention for infants and toddlers with hearing loss: A randomized pilot trial. *Journal of Speech, Language, and Hearing Research*, 58(5), 1332-1346. [https://doi.org/10.1044/2015\\_JSLHR-L-14-0290](https://doi.org/10.1044/2015_JSLHR-L-14-0290)



Allen, T. E., Smith, C. E., & Thomen, E. (2017). The Impact of Formal ASL Education on Communication Skills of Parents of Deaf Children. *Journal of Deaf Studies and Deaf Education*, 22(2), 200-212.

American Society for Deaf Children. (2018). Survey on the Use of ASL Learning Materials by Parents. Retrieved from [ASDC website].

Antia, S., Reed, S., & Kreimeyer, K. (2005). Written language of deaf and hard-of-hearing students in public schools. *Journal of Deaf Studies and Deaf Education*, 10(3), 244-255.

Barnes, E. K., & Thomen, A. E. (2019). The impact of formal ASL education on parental communication skills. *Journal of Deaf Studies and Deaf Education*, 24(1), 35-50.

Barnes, S., & Thomen, E. (2019). Formal ASL Training for Hearing Parents: Benefits and Outcomes. *American Annals of the Deaf*, 164(4), 453-470.

Berger, L., Pyers, J., Lieberman, A., & Caselli, N. (2023). Parent American Sign Language skills correlate with child—but not toddler—ASL vocabulary size. *Language Acquisition*. Advance online publication. DOI: 10.1080/10489223.2023.2178312.

Best, J. W., & Kahn, J. V. (2006). *Research in education* (10th ed.). USA: Pearson Education, Inc.

Birdsey, B. (2016). Why parents of signing children don't learn sign language: my perspective. Retrieved from <https://biancabirdsey.wordpress.com/2016/01/15/why-parents-of-signing-children-dont-learn-sign-language-my-perspective/>

Capulong, Y., et al. (2007). *\*Introduction to Special Education\**. Rex Bookstore.

Calderon, R. (2003). Parental Involvement in Deaf Children's Education Programs as a Predictor of Child's Language, Early Reading, and Social Emotional Development. University of Washington.

Cramer-Wolrath, E., et al. (2014). Survey on the use of online ASL resources among parents of deaf children. *\*Journal of Deaf Studies and Deaf Education*, 19\*(3), 340-356.

Cramer-Wolrath, S., Marschark, M., Spencer, P. E., Borgna, G., Durkin, A., & Colsant, K. (2014). The use and effectiveness of online American Sign Language videos among hearing parents of deaf children. *\*Journal of Deaf Studies and Deaf Education*, 19\*(4), 417-431.

Ceka, A. (n.d.). The Role of Parents in the Education of Children. Retrieved from <files.eric.ed.gov/fulltext/EJ1092391.pdf>

Chiuri, J. W., King'ori, I. W., & Obara, P. O. (2020). The influence of teacher-parent collaborative monitoring of school attendance on pupils' academic performance in Nyahururu Sub-county Kenya. *\*American Journal of Educational Research*, 8\*(6), 367-375.

Critical Period Hypothesis. (n.d.). In Study.Com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers. Retrieved from [study.com/academy/lesson/critical-period-hypothesis-definition.html](https://study.com/academy/lesson/critical-period-hypothesis-definition.html)

Decker, K. B., Vallotton, C. D., & Johnson, H. A. (2012). Parents' Communication Decision for Children with Hearing Loss: Sources of Information and Influence. *\*American Annals of the Deaf*, 157\*(4), 326-339.

DesJeorges, J. (2016). Parental Attitudes and Communication Barriers in Families with Deaf Children. *\*American Annals of the Deaf*, 161\*(3), 337-347.

DesGeorges, J. (2016). Barriers to ASL proficiency among hearing parents of deaf children. *\*Journal of Early Hearing Detection and Intervention*, 1\*(2), 79-90.

DesGeorges, Janet. (2016, April 1). Avoiding Assumptions: Communication Decisions Made by Hearing Parents of Deaf Children. *\*Journal of Ethics | American Medical Association\**. [journalofethics.ama-assn.org/article/avoiding-assumptions-communication-decisions-made-hearing-parents-deaf-children/2016-04](https://journalofethics.ama-assn.org/article/avoiding-assumptions-communication-decisions-made-hearing-parents-deaf-children/2016-04).

Driessen, G., Smit, F., & Slegers, P. (2005). Parental involvement and educational achievement. *\*British Educational Research Journal*, 31\*, 509-532.

Dolch, E. W. (1936). A basic sight vocabulary. *\*The Elementary School Journal*, 36\*(6), 456-460.



Dougherty, E. (2017, March 6). BU Deaf Studies researchers look for ways to prevent deaf children from being deprived of language. *Studying Language Acquisition in Deaf Children: The Brink*. Retrieved from [www.bu.edu/articles/2017/asl-language-acquisition/](http://www.bu.edu/articles/2017/asl-language-acquisition/)

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53\*(1), 109-132.

Epstein, N. B., Bishop, D., Ryan, C., Miller, & Keitner, G. (1993). The McMaster Model View of Healthy Family Functioning. In Froma Walsh (Eds.), *Normal Family Processes* (pp. 138-160). The Guilford Press: New York/London.

Epstein, J. (2001). *School, family, and community partnerships*. Boulder: Westview Press.

Fraenkel, J. R., & Wallen, N. E. (2007). *How to design and evaluate research in education* (6th ed.). New York, USA: McGraw-Hill.

Gillett, A., & Hammond, A. (2018). *Reading and Writing in the Academic Community*. Pearson.

Fitzpatrick, E. M., Crawford, L., & Ni, A. (2011). Benefits and limitations of learning ASL through mobile apps: A case study. *Journal of Deaf Studies and Deaf Education*, 16\*(4), 456-471.

Goshe, M. (2015). How are the terms deaf, deafened, hard of hearing, and hearing impaired typically used? *University of Missouri Extension COMMUNICATING*.

Hall, W. C. (2017). What You Don't Know Can Hurt You: The Risk of Language Deprivation by Impairing Sign Language Development in Deaf Children. *Matern Child Health J.*, 21\*(5), 961-965. doi: 10.1007/s10995-017-2287-y

Hardman. (n.d.). Deafness and Hearing Loss. *World Health Organization*. [www.who.int/health-topics/hearing-loss](http://www.who.int/health-topics/hearing-loss)

Hayes, K. (2009). Hear about comm.: [ent.about.com/od/ent\\_anatomy\\_basics/ht/how we hear.htm](http://ent.about.com/od/ent_anatomy_basics/ht/how_we_hear.htm) Retrieved on 11/18/2016.

Hrastinski, I., & Wilbur, R. B. (2016). Academic Achievement of Deaf and Hard-of-Hearing Students in an ASL/English Bilingual Program. *Journal of Deaf Studies and Deaf Education*, 21\*(2), 156-170.

Hill, N. E., & Tyson, D. F. (2003). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, 45\*(3), 740-763.

Hoffmeister, R. J., & Caldwell-Harris, C. L. (2014). Acquiring language in a deaf environment: A study of deaf children of deaf parents. *Journal of Deaf Studies and Deaf Education*, 19\*(2), 238-250.

Hoffmeister, R. J. (2000). A piece of the puzzle: ASL and reading comprehension in deaf children. In C. Chamberlain, J. P. Morford, & R. I. Mayberry (Eds.), *Language Acquisition by Eye* (pp. 143-163). Lawrence Erlbaum Associates.

Humphries, T., Kushalnagar, P., Mathur, G., Napoli, D. J., Padden, C., Rathmann, C., & Smith, S. (2012). Language acquisition for deaf children: Reducing the harms of zero tolerance to the use of alternative approaches. *Harm Reduction Journal*, 9\*(16).

Hunter, E. (2013). What is the difference between "hard of hearing" and "deaf"? *The Sign Language Company*. Here's your reference list in APA 7th Edition format:

Ilagan, J. (2012). Mothers Support and Intervention in the Development of Skills of Kindergarten Pupils. *Master's Thesis, Philippine Normal University*.

Karchmer, M., & Mitchell, R. (2003). Demographic and achievement characteristics of deaf and hard-of-hearing students. In M. Marschark & P. Spencer (Eds.), *Oxford Handbook of Deaf Studies, Language and Education* (pp. 21-37). New York: Oxford.

Kenya National Association for the Deaf. (2001). *The state of the word's children. Children with Disabilities, UN Plaza, New York, USA.*



- Kluwin, T. N., & Stewart, D. A. (2000). Parents' learning of American Sign Language: An assessment of family needs and characteristics. *American Annals of the Deaf*, 145\*(4), 327-338.
- Kluwin, T. N., & Stewart, D. A. (2000). Cochlear implants for younger children: A preliminary description of the parental decision process and outcomes. *American Annals of the Deaf*, 145\*(1), 26-32.
- Knooks, H., & Marschark, M. (2014). *Teaching Deaf Learners: Psychological and Developmental Foundations\**. New York: Oxford University Press.
- Lederberg, A. R., Schick, B., & Spencer, P. E. (2013). Language and literacy development of deaf and hard-of-hearing children: Successes and challenges. *Developmental Psychology*, 49\*(1), 15-30.
- Lieberman, A. M., & Buchholz, M. (2013). The role of multimodal learning tools in ASL acquisition. *Journal of Deaf Studies and Deaf Education*, 18\*(2), 183-204.
- Long, G., & Beil, D. (2005). The importance of direct communication during continuing education workshops for deaf and hard-of-hearing professionals. *Journal of Postsecondary Education and Disability*, 18\*(1), 5-11.
- López Turley, R. N., Desmond, M., & Bruch, S. K. (2010). Unanticipated Educational Consequences of a Positive Parent-Child Relationship. *Journal of Marriage and Family*, 72\*, 1377-1390. <https://doi.org/10.1111/j.1741-3737.2010.00771.x>
- Luckner, J. L., & Cooke, C. (2010). A summary of the vocabulary research with students who are deaf or hard of hearing. *American Annals of the Deaf*, 155\*(1), 38-67.
- Mallory, J., & Long, G. (2002). Postsecondary Education Programs Network (PEPNet). Kansas City, MO.
- Marschark, M., & Hauser, P. C. (2012). *Deaf Cognition: Foundations and Outcomes\**. Oxford University Press.
- Marschark, M., et al. (2012). Perspectives on the development of visual language in deaf children. *Oxford Handbook of Deaf Studies, Language, and Education\**.
- Marschark, M., Spencer, P. E., Adams, J. W., & Sapere, P. (2012). Effects of Online Learning on Parents of Deaf Children: Outcomes and Effectiveness. *American Annals of the Deaf*, 157\*(5), 458-467.
- Marschark, M., Shaver, D. M., Nagle, K. M., & Newman, L. A. (2012). Predicting the academic achievement of deaf and hard-of-hearing students from individual, household, communication, and educational factors. *Journal of Deaf Studies and Deaf Education*, 20\*(1), 26-40.
- Mayberry, R. I., del Giudice, A. A., & Lieberman, A. M. (2011). Reading achievement in relation to phonological coding and awareness in deaf readers: A meta-analysis. *Journal of Deaf Studies and Deaf Education*, 16\*(2), 164-188.
- Mayer, C., & Akamatsu, C. T. (2016). Parental Involvement and Its Impact on the Academic Performance of Deaf and Hard of Hearing Students: A Literature Review. *American Annals of the Deaf*, 161\*(4), 486-504. <https://doi.org/10.1353/aad.2016.0019>
- Mayer, C., & Trezek, B. J. (2018). Literacy Outcomes in Deaf Students: Current Trends and Future Directions. *Oxford Handbooks Online\**.
- McWhorter, K. T. (2016). *Reading across the Disciplines\**. Cengage Learning.
- Mitchell, R. E., & Karchmer, M. A. (2004). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies*, 4\*(2), 138-163.
- Moeller, M. P., & Schick, B. (2006). Relations between maternal input and theory of mind understanding in deaf children. *Child Development*, 77\*(3), 751-766.
- Here's your reference list in APA 7th Edition format:
- N., Sam M.S. (2013, April 11). Language Acquisition Support System (LASS). In *PsychologyDictionary.org\**. Retrieved April 18, 2023, from <https://psychologydictionary.org/language-acquisition-support-system-lass/>
- National Institute for Literacy. (2001). *Put Reading First: The Research Building Blocks for Teaching Children to Read\**. Washington, DC: National Institute for Literacy.



National Institute on Deafness and Other Communication Disorders (NIDCD). (2010). Statistics on Hearing, Ear Infections, and Deafness. Retrieved from NIDCD.

Nielsen, D. C., & Luetke-Stahlman, B. (2002). The effects of visual phonics on the literacy development of kindergarten students in an ASL/English bilingual program. *Journal of Deaf Studies and Deaf Education*, 7\*(3), 229-240.

Nielsen, D. C., & Luetke-Stahlman, B. (2002). Effectiveness of visual-tactile aids for enhancing communication skills of parents of children with hearing impairments. *American Annals of the Deaf*, 147\*(3), 35-44.

Paul, P. V. (2020). *Literacy and Deafness: Listening and Spoken Language\**. Plural Publishing.

Peregoy, S. F., & Boyle, O. F. (2017). *Reading, Writing, and Learning in ESL: A Resource Book for Teaching K-12 English Learners\**. Pearson.

Pichler, D. C. (2020). Motivation for L2 ASL learning by hearing parents with deaf children. Retrieved from <https://slla.lab.uconn.edu>.

Pichler, D. C. (2020). Language development in signing and nonsigning children with cochlear implants. *Oxford Handbook of Deaf Studies in Learning and Cognition\**.

Pizer, G. (2011). Promoting literacy in deaf children: A social justice perspective. *American Annals of the Deaf*, 156\*(5), 460-475.

Punch, R., & Hyde, M. (2011). Social participation of deaf children in primary school mainstream classrooms. *Deafness & Education International*, 13\*(2), 71-86.

Qi, S., & Mitchell, R. E. (2011). Large-Scale Academic Achievement Testing of Deaf and Hard-of-Hearing Students: Past, Present, and Future. *Journal of Deaf Studies and Deaf Education*, 17\*(1), 1-18. <https://doi.org/10.1093/deafed/enr028>

Quick Statistics about Hearing. National Institute of Deafness and Other Communication Disorders. (n.d.). Retrieved April 30, 2023, from [www.nidcd.nih.gov/health/statistics/quick-statistics-hearing](http://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing).

Rackensperger, T. (2012). Family influences and academic success: The perceptions of individuals using AAC. *Augment Alternative Communication\**.

Rosenzweig, E. A. (2014, August 18). Parents' Sign Language Proficiency. Elizabeth A. Rosenzweig. Retrieved from [auditoryverbaltherapy.net/2011/02/13/parents-sign-language-proficiency/](http://auditoryverbaltherapy.net/2011/02/13/parents-sign-language-proficiency/).

Sénéchal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73\*(2), 445-460.

Sideridis, G. D. (2017). Parental involvement in deaf children's education programs as a predictor of child's language, early reading, and social-emotional development. *Journal of Deaf Studies and Deaf Education*, 22\*(3), 313-328.

Spencer, P. E., & Marschark, M. (2004). *Advances in the spoken language development of deaf and hard-of-hearing children*. Oxford University Press.

Starter, T. (2010). Supporting ASL learning with mobile technology: Current challenges and future directions. *Journal of Deaf Studies and Deaf Education*, 15\*(2), 171-181.

Stephen, S. I., & Stephen, S. M. (2001). *Schools and Families Creating Essential Connections for Learning\**. New York: Guilford Press.

Swanwick, R., & Watson, L. (2005). Literacy in the homes of young deaf children: Common and distinct features of spoken language and sign bilingual environments. *Journal of Early Childhood Literacy*, 5\*(1), 53-78.

Swanwick, R., Marschark, M., & Spencer, P. E. (Eds.). (2009). *The Oxford Handbook of Deaf Studies, Language, and Education\** (Vol. 2). Oxford University Press.

Talens, I. M. (2012). *Parental Support, Home Literacy Practice and Reading Comprehension of Grade Five Pupils: A Correlational Study\**. Master's Thesis, Philippine Normal University.



- Undalok, J. (2015). \*Hearing Impaired Education of the Department of Education in Region X, Philippines: Its Approaches and Implication\*. College of Policy Studies, Education, and Management, Mindanao University of Science and Technology, Cagayan de Oro City.
- Vangelisti, A. L. (Ed.). (2004). \*Handbook of Family Communication\*. Lawrence Erlbaum Associates, Publishers. Retrieved from <http://komunikasi.unsoed.ac.id/sites/default/files/handbook%20of%20family%20communication.pdf>
- Vieru, T. (2010). Language. Retrieved November 19, 2016, from <http://news.softpedia.com/news/Only-a-Quarter-of-Parents-to-Deaf-Kids-Know-Sign-Language-158192.shtml>.
- Watson, L., Hardie, T., & McLeod, S. (2019). Supporting families of children who are deaf or hard of hearing: A systematic review. \*The Journal of Deaf Studies and Deaf Education, 24\*(4), 325–340.
- Yoshinaga-Itano, C., Coulter, D., & Thompson, V. (2012). Deaf children need early language access. \*Journal of Neonatal Nursing, 18\*(2), 30–37. <https://doi.org/10.1016/j.jnn.2011.10.004>
- Zolten, K. (2006). Family communication and deaf children's academic and social outcomes. \*Journal of Deaf Studies and Deaf Education, 11\*(2), 140-157.
- Zolten, J. (2006). Parent-child communication and its impact on academic success. \*Journal of Deaf Studies and Deaf Education, 11\*(3), 298-312.
- Zolten, J. (2011, September 12). Qualitative characteristics can be measured througha Karl Pearson's coefficient of correlation [Web log post]. Retrieved September 12, 2023, from <https://edurev.in/question/1874887/Qualitative-characterstics-can-be-measured-througha-Karl>