



Evidence-Based Research on
Bilingual Deaf Education
for Deaf and Hard-of-Hearing Children

Final Report

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The Nippon Foundation

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Children

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Abbreviations

ADDP	Asian Development with the Disabled Persons
ASL	American Sign Language
AVT	Auditory-Verbal Therapy
CEAD	Center for Education Advancement of the Deaf
CODA	Children of Deaf Adults
CRPD	UN Convention on the Rights of Persons with Disabilities
DHH	deaf or hard-of-hearing
EFA	Education for All
ENT	Ear, Nose, Throat
FSL	Filipino Sign Language
IDCJ	International Development Center of Japan, Inc.
JICA	Japan International Cooperation Agency
JSL	Japanese Sign Language
LDPA	The Lao Disabled People's Association
NHS	Newborn Hearing Screening
SEAMEO	Southeast Asian Ministries of Education Organization
SPED	Special Education
TC	Total Communication
TTC	Teacher Training College
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WFD	World Federation of the Deaf
WHO	World Health Organization

The definitions of terms used in this survey are listed below.

Modality	Medium or format through which language is conveyed. Sign language is a visual modality. This refers to the expressive and receptive modalities of each language, such as aural-oral or visual-gestural. In the case of sign language, the visual modality is used, while in the case of Japanese, the vocal modality is primarily used. Therefore, when using only Japanese Sign Language and written Japanese, one is considered bilingual who uses only the visual modality. Deaf individuals who can utilize hearing through devices like cochlear implants are bimodal bilinguals using different modalities, which are visual and auditory, when employing Japanese Sign Language and spoken Japanese.
Literacy	Vocabulary skills, reading comprehension, and language proficiency
Monolingual	Being able to use one language as the main language. In this study, this term refers to situations where children and adults with hearing loss acquire spoken language using hearing technology without acquiring sign language.
Total Communication (TC)	A method of deaf education that utilizes all possible communication means, including oral speech, sign language, lip reading, and gestures.

The Use of the Term “Deaf”

While the sociocultural definition of “Deaf” as individuals who share a sign language-based language and culture and self-identify with that community has gained some acceptance, this Study focuses on the education of school-age children in developing countries. This stage precedes the establishment of a Deaf identity, and the formation of such an identity is considered variable depending on the educational environment. Therefore, considering the purpose of this Study, this Study uses the term “deaf” to refer to individuals with hearing loss severe enough to make spoken language communication difficult. When referring to individuals including adults and children with hard-of-hearing or acquired deafness, the term “deaf or hard-of-hearing (DHH)” is used. In accordance with sign language studies conventions, use “Deaf” (capital D) when referring to Deaf culture identity and knowledge.

Chapter 1 Survey Objectives and Methodology

1.1 Study Objectives

The Nippon Foundation, based on the perspective that “sign language is the mother tongue of the Deaf,” has supported Deaf in education and employment both domestically and internationally. It has also promoted bilingual deaf education that provides instruction in both sign language and written language. In the Philippines and the Lao People's Democratic Republic (hereafter referred to as Laos), The Nippon Foundation has established model schools for bilingual deaf education, focusing on the development and dissemination of sign language and education through sign language. Based on this background, this Study was conducted with the following objectives.

To review research and survey findings on bilingual deaf education and obtain theoretical support for its effectiveness in developing countries.

1.2 Study Period

This Study was conducted during the period from June 1, 2025, to December 31, 2025.

1.3 Background of the Study

(1) Bilingual deaf education

Bilingual deaf education is a form of deaf education where DHH children and adults learn using sign language while also acquiring the reading and writing skills (written language) of the spoken language that is the official language of their country or region. In this context, “bilingual” does not mean being proficient in two different sign languages, but rather being proficient in both sign language and spoken language. For deaf individuals living in Japan, this means Japanese Sign Language and Japanese. Therefore, bilingual deaf education in Japan involves learning the written system of Japanese using Japanese Sign Language as a means of communication.

Infants with hearing loss who have difficulty “hearing” and “speaking” acquire sign language as their native language in the same way that hearing infants acquire their native language by hearing the spoken language spoken by their parents and those around them. If parents and those around them use Japanese Sign Language, children with hearing loss will acquire sign language as their native language. Linguistic research since the 1960s and recent neuroscience studies have demonstrated that sign language is a natural language with its own grammatical structure, distinct from being merely a representation of spoken language using hands and fingers¹. Parallel to this, movements and research

¹ Active linguistic research on sign language since the 1970s has clarified its grammatical structure. Stokoe (1960/1978) at Gallaudet University, a university for the deaf in the United States, focused on speech and facial expressions accompanying hand movements in sign language. He proposed that sign language consists of three aspects; “location,” “shape,” and “motion.” He proposed that each aspect consists of the smallest meaningful unit, the “chereme,” analogous to phonemes in spoken languages. He elucidated that non-manual cheremes, such as vocalizations and facial expressions, carry linguistic meaning because they distinguish morphologically distinct syntactic units. Berent (2004) demonstrated that code-switching—the switching between languages during speech by bilingual speakers—also occurs between sign language and spoken language, proving that sign language is a language

(Deaf studies) emerged in the 1970s, primarily in Europe and America, recognizing Deaf people as a minority language and cultural group possessing their own language and culture. CRPD, adopted in 2008, defines language in Article 2 as including spoken language, sign language, and other forms of non-spoken language. As of May 2025, 81 countries have legally recognized sign language as a language². Thus, the legal recognition of sign language is a global trend. However, approaches to deaf education using sign language vary widely. The next section will first provide an overview of the demographic trends of the population and the usage status of sign language.

(2) Status of DHH People

According to World Health Organization (WHO) estimates, of the 1.58 billion people worldwide with some form of hearing loss, approximately 163 million have severe or profound hearing loss that significantly impacts their daily lives (WHO, 2021). For those with mild to profound hearing loss, as shown in the table below, hearing aids often enable them to hear conversations³.

Table 1 Classification of Hearing Loss Severity

Grade	Hearing threshold in the better hearing ear in decibels (dB)	Hearing experience in a quiet environment	Hearing experience in a noisy environment
Mild	20 – less than 35dB	No problem hearing conversational speech	May have difficulty hearing conversational speech
Moderate	35 – less than 50dB	May have difficulty hearing conversational speech	Difficulty hearing and taking part in conversation
Moderately severe	50 – less than 65dB	Difficulty hearing conversational speech with raised voices	Difficulty hearing most speech and taking part in conversation
Severe	65 – less than 80dB	Difficulty hearing and understanding raised voices	Extreme difficulty hearing speech
Profound	80 – less than 95dB	Extreme difficulty hearing raised voices	Conversational speech cannot be heard
Total hearing loss	95dB and more	Cannot hear speech and most environmental sounds	Cannot hear speech and most environmental sounds

Source: Prepared by the Study Team based on WHO (2021) World Report on Hearing.

just like spoken language. Based on these findings, it is now indisputable that sign language is a natural language possessing a sophisticated grammatical system comparable to spoken language.

² World Federation of the Deaf (WFD), https://wfdeaf.org/wp-content/uploads/Legal-Recognition-of-National-Sign-Languages-World-map_May2025.png

³ Japanese Society of Audiology (2014) Report of the Hearing Loss Countermeasures Committee - Classification of Hearing Loss (Hearing Impairment) Severity

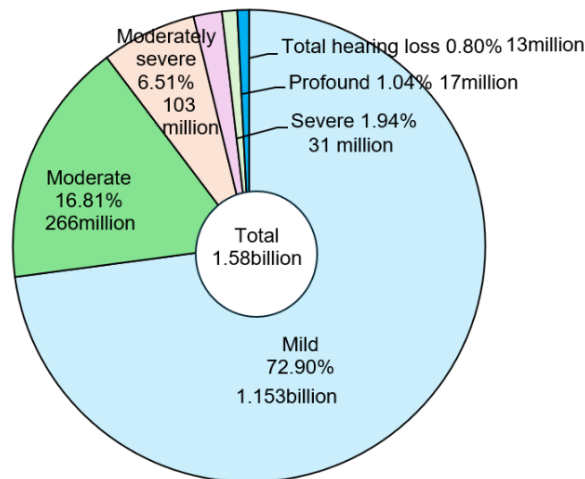


Figure 1 Worldwide population with DHH people (2021, WHO estimate)
Source: Prepared by the Study Team based on WHO (2021) World Report on Hearing.

a. The Relationship Between Hearing Technology and Sign Language Acquisition

The probability of being born with a hearing loss is approximately 1 in 1,000 (Moores, 2001; Mori, 2015; Athanasopoulos, 2024). However, Olusanya (2012) reports that in developing countries, 6 in 1,000 individuals have congenital profound hearing loss. Approximately 90% of the parents of these children are hearing, and about 90% of children of deaf parents are hearing (Iwata, 2000; Sasaki, 2018; Kanazawa, 2023). It is estimated that less than 10% of children with hearing loss in the United States and less than 2% globally have early exposure to sign language (Murray et al., 2020). Proficiency in sign language is significantly correlated with the age of first exposure to sign language, rather than the number of years of use or educational background (Newport, 1990; Mayberry & Eichen, 1991). In developed countries, newborn hearing screening (NHS) is widely used for the early detection of hearing loss. When hearing loss is identified, families choose communication methods suited to the child, such as auditory-oral communication (watching mouth movements while speaking) or sign language, based on family preferences and expert advice, and may utilize hearing aids or cochlear implants to leverage residual hearing. Those with more severe hearing loss are not necessarily native signers. In developed countries, widespread use of NHS means that even children with profound hearing loss increasingly acquire spoken language as their first language by utilizing residual hearing through cochlear implants⁴ (detailed in Section 2.4).

In Deaf parent households, children can acquire sign language as their first language because their parents use it. However, as mentioned above, many children with hearing loss are born into hearing families. Since hearing parents typically do not understand sign language, they tend not to choose sign language as the first language for their children with severe hearing loss (Takashima, 2020; Takashima

⁴ However, the sound quality provided by a cochlear implant is closer to electronic tones, making it difficult to understand speech in noisy environments or appreciate music. Furthermore, while high-frequency sounds can be perceived, there are limitations in distinguishing subtle frequency differences and understanding intonation. It is important to note that cochlear implants do not provide hearing equivalent to normal hearing.

& Sugimoto, 2020; Moriya, 2025). Therefore, acquiring sign language as a first language requires exposure to the Deaf community outside the home environment. While deaf schools play a crucial role in enabling children with hearing loss to learn sign language within a community of peers with hearing loss, if hearing parents choose mainstream schools for their children, they lose the opportunity to acquire sign language and meet peers who can communicate with them in sign language (Kanazawa, 2023).

b. Differences in Use of Auditory Modality Between Developed and Developing Countries

Meanwhile, the majority of children with hearing loss reside in developing countries (Tucci et al., 2010). WHO (2021) states that approximately 60% of childhood hearing loss is due to preventable acquired causes. Olusanya et al. (2015) report that in developing countries, many children acquire hearing loss due to causes such as infections and otitis media during infancy and early childhood. In an underdeveloped economic environments where access to hearing aids or cochlear implants is limited, as in developing countries, even moderate to profound hearing loss can significantly impair auditory processing. This makes it difficult to use the auditory modality and acquire spoken language as a first language; therefore, sign language may become more suitable first language.

(3) Status of Sign Language

The World Federation of the Deaf (WFD) estimates that approximately 70 million people daily use 200 different sign languages⁵. During the early development of deaf education in the late 18th to early 19th centuries, two distinct approaches emerged; deaf schools teaching through sign language (in countries such as France⁶, the United States, Spain, Portugal, Sweden, and Japan), and deaf schools teaching through pure oralism⁷, which focused solely on learning spoken language through lip-reading and vocal exercises (in countries such as the United Kingdom⁸, Germany, and Italy). At the Second International Congress on Education of the Deaf (Milan Congress) in 1880, primarily organized by European deaf education institutions, a direction was established to conduct deaf education using oralism and to exclude the use of sign language from school education. Following the Milan Congress, oralism became dominant until the mid-20th century. In Japan too, pure oralism spread. After the Ministry of Education, Science, Sports and Culture prohibited the use of sign language in deaf schools in 1933, sign language was banned from deaf school education. Oralism and manually coded Japanese⁹ as a supplement were adopted (Saito, 2007).

However, it is difficult for deaf children to fully acquire spoken language grammar through oralism

⁵ <https://www.jfd.or.jp/info/misc/sgh/20170606-sgh-tokyo-slides.pdf><https://wfdeaf.org/our-work/>

⁶ In 1760, the National Institute for the Deaf in Paris (École des Sourds-Muets de l'Empire) employed “methodical signs” (signes méthodiques), which adapted French word order and grammar to sign language (Ueno, 1977; Ruben, 2005).

⁷ Today, auditory-oral approach is used, which involves learning speech through vocalization and lip-reading while utilizing hearing thanks to advances in hearing technology. Oral approach without the use of hearing is called “pure oralism”.

⁸ In 1783, the Braidwood Academy implemented an education centered on oral communication and finger spelling (Paul & Moores, 2012).

⁹ It is a signed communication as an alternative sign language used by individuals who acquired Japanese as their first language.

alone. Around the 1970s, “manually coded signs,” which are artificially created signs designed to correspond to spoken language word order and grammar, began gaining attention as an educational aid¹⁰. Unlike sign languages that emerged naturally within the Deaf community, these were devised in educational settings specifically for the purpose of teaching spoken language. It is a form of manual communication used as an alternative sign language after acquiring spoken language as the first language, functioning in conjunction with spoken language. In the Japanese context, it is characterized by the omission of particles and a lack of distinction between intransitive and transitive verbs, making it difficult for deaf children whose native language is Japanese Sign Language to comprehend (Saito, 2012).

This development was underpinned by the growing recognition of linguistic legitimacy, stemming from sign language research as mentioned earlier, alongside a shift toward educational policies incorporate sign language. Concurrently, the teaching method known as “Total Communication” (TC) gained popularity. TC involves conducting deaf education using all possible means of communication without restriction, such as oral speech, sign language, lip-reading, and gestures. However, the sign language used in TC is manually coded sign, which became a target of criticism during the rise of bilingual deaf education. Details are discussed in Section 2.2.

1.4 Study Methodology

(1) The Goal of the Study

This Study aims to explore the extent to which bilingual deaf education is effective in developing countries, particularly the Philippines and Laos. Therefore, the Study took into account the unique background and context of developing countries. In doing so, there were not only the limitations of information gathering through desk research, but also the limited availability of reliable academic papers and reports on the current state of deaf education in developing countries. While interviews with relevant parties were conducted to gather reference information, it is worth noting that this approach cannot comprehensively cover all objective facts. Hypotheses were tested based on the information gathered to the greatest extent possible.

¹⁰ In the United States during the 1960s and 1970s, English-based sign languages such as “Signed English,” “SEE1,” “SEE2,” and “Linguistics of Visual English” became widespread for teaching English grammar to deaf children (Paul & Moores, 2012; Lou, 2012, <https://resolve.cambridge.org/core/books/abs/language-learning-and-deafness/history-of-language-use-in-the-education-of-the-deaf-in-the-united-states/B9D23B76FCE3B14E46EAB2A7F1ED812B>). In the UK, since the 1970s, “Signed English” and “Sign Supported English” were introduced in educational settings. They coexisted with British Sign Language (BSL) and were used primarily as a supplement, especially within inclusive education (Swanwick, 2000; Sign bilingual education; Policy and practice, Swanwick & Gregory, 2007, Sign bilingualism; Language development, interaction, and learning). In France, “Français signé” (Coded French) was introduced in educational settings during the 1970s. This system faithfully follows French word order and grammar while arranging French Sign Language (LSF) vocabulary. Since the 1980s, French schools for the deaf have adopted “oral method + français signé” as their basic approach (Mugnier, 2021, <https://www.degruyterbrill.com/document/doi/10.21832/9781800410756-007/html?lang=en&srsltid=AfmBOopzfnPipEEJ2RzQgh1yEi5vJx0HdVLxDWXplxzzpAXPG9iIuRq>). In Japan, from the postwar period through the 1970s, educators began using “Japanese-corresponding sign language,” an educational sign system distinct from Japanese Sign Language (Sasaki, 2018; Takashima, 2020). In Germany, the birthplace of oralism, Lautbegleitende Gebärden (LBG, speech-accompanying signs) was devised and introduced in the 1970s (Proske et al., 2020).

(2) Hypothesis Setting

Given that sign language is now recognized as a language, it is self-evident that supporting access to sign language as an educational language for deaf individuals is a crucial step from the perspective of guaranteeing linguistic rights. However, since any educational method will yield some degree of effectiveness, we delve deeper into the question, “Is bilingual deaf education effective?” and formulate the following question: “In what contexts, and for which deaf children, can ‘bilingual deaf education’ be said to be more effective than other educational methods?” To test this question, we establish the following hypothesis.

Hypothesis 1

In developing countries where medical infrastructure for spoken language acquisition is underdeveloped, bilingual deaf education represents the optimal solution for deaf children who face difficulties acquiring spoken language.

Hypothesis 2

In developing countries, children using hearing aids or cochlear implants also have the potential to achieve sufficient academic proficiency through bilingual deaf education.

These hypotheses are verified through the method described in the next section.

(3) The Study Methodology

The Study was conducted using the following methods.

Method 1: Literature Review

The following literature was consulted, and the following items were collected.

- The evolution of approaches in deaf education
- Reasons why bilingual deaf education is necessary
- Schools implementing bilingual deaf education
- Deaf children targeted by bilingual deaf education
- Effects of spoken language acquisition in bilingual deaf education
- Effects of academic achievement improvement in bilingual deaf education
- Status of sign language use in developing countries, primarily the Philippines and Laos
- Status of deaf schools in developing countries, primarily the Philippines and Laos
- Status of inclusive education in developing countries, primarily the Philippines and Laos
- Status of hearing aid technology in developing countries, primarily the Philippines and Laos

Literature meeting the following criteria was targeted.

- Research published in peer-reviewed academic journals
- Academic or specialized books that include references and possess a research-oriented nature

- Japanese or English language literature
- Research addressing language development or educational interventions/support for DHH children
- Includes both quantitative and/or qualitative research

On the other hand, the following literature was excluded;

- Non-peer-reviewed literature such as magazine articles, blogs, and personal reports (however, if no other reliable information was available, these were referenced with a clear indication of their non-peer-reviewed status)
- Research targeting individual adults or the elderly
- Literature dealing solely with medical treatment (excluding cochlear implant surgery)

Literature was searched for and viewed or purchased from various sources, including CiNii, PubMed, ResearchGate, Wiley Online Library, Taylor & Francis Online, Google Scholar, J-STAGE, NDJ Online, and OPAC. Collected and viewed literature was organized on summary sheets. The credibility of the collected literature was scored using a three-tier evaluation criterion across the following four items and recorded on the summary sheet. Literature judged to have low credibility (scoring eight points or below out of 12) was used as limited reference information, taking into account factors such as data scarcity.

Method 2: Interviews

The extent of the influence of corresponding sign language and the number of teachers capable of teaching sign language as a natural language are critical factors in realizing bilingual deaf education. Based on interviews with resource persons knowledgeable about local conditions, we organized these factors and trends in deaf education within the country. We also identified the attributes of target students at model schools, the educational methods used in public deaf schools, the status of hearing screening tests, and the use of hearing aids and cochlear implants. This helped us explore the elements necessary for implementing bilingual deaf education.

Table 2 Criteria for Evaluating the Credibility of References

Evaluation Items		1(Low)	2(Intermediate)	3(High)
1	Peer review status	Non-peer-reviewed web articles, blogs, commercially published books, preprints	Conference proceedings, university journals/working papers, official government reports	Peer-reviewed academic journals, edited academic monographs by leading experts
2	Clarity of argument	Multiple claims are mixed together, and the focus is unclear	Primary objectives and arguments are clear, though secondary claims and conceptual definitions exhibit some ambiguity or dispersion	Research questions, objectives, and conclusions are consistently and exceptionally clear
3	Logical validity	Logical leaps or contradictions are evident	Core reasoning is sound, but leaps or gaps in the scope of generalization are evident	No logical leaps or contradictions between evidence and conclusions
4	Appropriateness of references	Outdated, unreliable, or insufficiently substantiated claims	Most citations are appropriate, though some references are outdated or fail to directly support the claims	References are current, authoritative, and fully substantiate claims

1.5 Study Team

The members of the survey team that conducted this survey are as follows.

Table 3 Study Team

Position	Name	Affiliation
Team Leader / Bilingual Deaf Education	Kohei Horiba	International Development Center of Japan Senior Researcher
Advisor	Takayuki Kanazawa	Gunma University Cooperative Faculty of Education, Professor
Situation Assessment 1	Meri Hirose	Yes, Deaf Can! Representative
Situation Assessment 2	Peggy Prosser	Yes, Deaf Can! Deputy Representative

1.6 Limitations of the Study

The following limitations existed in conducting this Study.

- As this Study primarily relies on literature review for information collection, it did not analyze deaf education practices that have not been reported in an academic and widely accessible format. Therefore, unless empirical research has been conducted, it did not collect information on the actual state of deaf education in individual schools or on the language abilities and academic performance of children and students, nor did it evaluate educational effectiveness.
- Reliable academic papers and reports on the current state of deaf education in developing countries were limited. While interviews with relevant parties were conducted to collect reference information, it should be noted that these interviews could not comprehensively cover objective facts.

- This Study fundamentally verified the effectiveness of bilingual deaf education for children with hearing loss as their sole disability. In developed countries, the promotion of inclusive education and the widespread use of hearing aids and cochlear implants have led to an increase in children with hearing loss attending mainstream schools. Consequently, deaf schools are seeing a trend toward an increase in children with multiple disabilities, specifically those with hearing loss combined with other disabilities. This Study did not actively address deaf education for such children.

Chapter 2 Research Trends in Developed Countries

2.1 Linguistic Interdependence Hypothesis

Cummins, a researcher in bilingual education in spoken language, argued that all languages share the underlying linguistic knowledge and cognition (Common Underlying Processes; CUP) that supports them, even though their surface linguistic forms, such as modality, phonology, pronunciation, vocabulary, and grammatical forms, appear to be separate (Cummins, 1979, 1981). For example, when a native speaker of English (L1) learns a second language (L2) such as Spanish, they use the cognitive abilities (CUP) developed in L1 to access the linguistic forms of L2. The skills, knowledge, and processing abilities developed in CUP are then utilized (transferred) to facilitate understanding and acquisition of L2, thereby promoting L2 learning. This is called the Linguistic Interdependence Hypothesis (or Common Underlying Proficiency hypothesis).

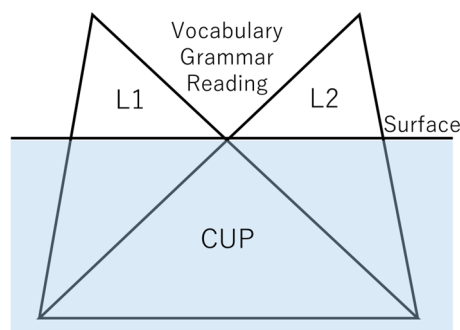


Figure 2 Linguistic Interdependence Hypothesis

Source: Prepared by the Study Team based on Cummins, 1980, 1996.

Bilingual deaf education, which involves learning to read and write spoken language while using sign language, has been based on the theory of Cummins's theory of bilingual interdependence applied to sign language, which cultivates the ability to read and write spoken language based on the development of sign language (Strong & Printz, 2000; Marschark & Spencer, 2010; Sano et al., 2018, Abe, 2021; Kanazawa, 2023). Sign language is a unique language within the Deaf community, characterized as a visual language without a written system. Therefore, deaf children who use sign language as their L1 need to acquire two languages.

Although the degree of variation varies, many medical and hearing specialists have long advised against teaching sign language to children, fearing that it may hinder the acquisition of spoken language (Henner et al., 2016). Regarding the reason this discourse that sign language hinders spoken language development in deaf children has been supported despite insufficient empirical evidence, Hall et al. (2017) analyzes that it fundamentally confuses natural sign language with manually coded sign.

In response to this discourse, several studies have demonstrated a strong correlation between American Sign Language (ASL) proficiency and English literacy. Strong and Prinz (1997) showed that deaf children with high ASL proficiency also tend to have high English literacy. Padden and Ramsey (1998) reported that deaf children whose L1 is ASL have a strong understanding of English vocabulary and sentence structure and high reading comprehension, arguing that the mechanism of

interlingual transfer proposed by Cummins also functions between sign language and spoken language. Hoffmeister (2000) and Singleton et al. (2004) reported similar findings, and Hassanzadeh (2012) demonstrated that early exposure to sign language does not inhibit but rather promotes spoken language development, as deaf children with deaf parents showed greater effectiveness in auditory and vocal development after cochlear implantation than deaf children with hearing parents. Furthermore, Davidson et al. (2014) concluded that sign language input does not negatively impact spoken language development, provided that children are not placed in a language-deprived environment without prior exposure to sign language before cochlear implantation. This conclusion was based on their comparative study of children with cochlear implants and CODA, which found comparable levels of language development in both groups.

While these studies provide evidence that sign language use does not hinder L2 literacy learning, there is debate regarding the application of Cummins' hypothesis to sign language (Marschark & Spencer, 2010). Although it has been proven that sign language has a structure similar to spoken language, the Cummins hypothesis assumes transfer between spoken languages that have a written form, whereas sign language is a language that uses visual modalities such as gestures and facial expressions for communication and visual reception, and does not use a written form. Mayer and other researchers question the application of Cummins' hypothesis to sign language, arguing that natural transfer cannot occur in L2 acquisition (without exposure to speech) because sign language lacks a writing system (Conrad, 1979; Mayer & Wells, 1996; Mayer & Akamatsu, 1999; Paul, 1998; Swanwick, 1998; Mayer & Leigh, 2010). Cummins also states that transfer is possible when the two languages are structurally similar on the surface (Cummins, 2000, 2005) and does not actively affirm transfer from sign language L1 to spoken language L2.

The next section provides an overview of the rise and expansion of bilingual deaf education, grounded in this theory.

2.2 Rise of Bilingual Deaf Education

From the early 1970s onward, it became increasingly evident that the previous oral approach, which aimed to teach only spoken language through lip-reading and vocalization without using sign language, resulted in many deaf individuals having literacy skills equivalent to a fourth-grade elementary school level by the time they graduated high school (Gibson et al., 1997; Swanwick, 2010; Marschark et al., 2012). Although sign language began to be used in deaf education with the introduction of TC in the 1970s, which employed all methods including sign language, finger spelling, and writing, it was pointed out that this was essentially monolingual education using manually coded sign and did not lead to improvements in reading and writing (Pickersgill & Gregory, 1998; Knoors et al., 2014).

Sweden passed the world's first government proposal in parliament in 1981 recognizing sign language as the first language of deaf children, and transitioned to bilingual deaf education in 1983 (Proposition 1980/81:100) (Hualanda & Holmström, 2019; Sasaki 2018). Svartholm (2014) overviewed Sweden's bilingual deaf education, summarizing that the “Swedish Model” of the 1980s established sign language as the first language and oral language as the second language. Unlike previous deaf education approaches using oralism or total communication, this method did not completely exclude speech; instead, it treated speech as complementary to sign language and literacy. In the UK, awareness of sign language also grew from the 1970s. Combined with dissatisfaction with the effectiveness of TC using Sign Supported English (SSE), momentum built for transitioning to bilingual deaf education (Pickersgill & Gregory, 1998). Factors behind this shift from TC to sign-based education included disappointment with traditional methods, alongside advances in sign language research during the 1980s. This research established that sign language is not a gestural version of spoken language and that deaf children acquire sign language as their first language through stages similar to those of hearing children. Additionally, a significant increase in children for whom English was not their first language in schools fostered a climate that accepted bilingualism (Kyle & Woll, 1985; Swanwick, 2010).

In the United States, TC was widely adopted in public deaf schools starting in the 1960s. However, the limitations of TC as an educational outcome became apparent after the 1980s. In 1988, the Commission on Education of the Deaf (CED) declared that TC was “unacceptably inadequate.” Building on the CED report, researchers at Gallaudet University noted that a lack of access to sign language and low expectations were contributing to poor educational outcomes for deaf individuals (Johnson et al. 1989). Furthermore, this paper advocated a bilingual model positioning ASL as the first language for deaf children and teaching spoken language (English) as a second language.

The characteristics of this educational approach, known as bilingual-bicultural education, as described by Johnson et al. (1989) above, are listed below:

- The natural sign language acquired by a deaf child provides the best access to educational content.
- The acquisition of natural sign language should begin as early as possible in order to take advantage of critical period effects¹¹.
- English will be taught as a second language and methods of English instruction will take advantage of the first language competence the children already have.
- The deaf teacher will be the native model for the acquisition and development of ASL proficiency
- The best models for natural sign language acquisition, the development of a social identity, and the enhancement of self-esteem for deaf children are deaf signers who use the language

¹¹ A period considered crucial for language development.

proficiently.

- Family support program will be provided for students' families to ensure home environments promote cognitive, linguistic, social, and emotional growth.
- Sign language and spoken language are not the same and must be kept separate both in use and in the curriculum.
- Hearing should not be the primary channel for the learning of a spoken language for deaf children.
- This approach is to prepare the deaf children to participate fully and effectively in modern society through English literacy development and the provision of grade-equivalent access to the curriculum.

Thus, bilingual-bicultural education emphasizes the placement of deaf teachers whose native language is sign language, not only to provide instruction using natural sign language but also to serve as models for the formation of deaf students' identity and self-esteem. Mason (1994) reported that as of 1992, the ratio of deaf to hearing staff members at California schools for the Deaf practicing bilingual-bicultural education was equal.

Since the 1990s, pilot programs began at Gallaudet University and some deaf schools, and since then, bilingual deaf education has become a central topic in deaf education policy, research, and practice. Through the 2000s, bilingual deaf education expanded primarily in developed countries, including Denmark, the United Kingdom, the United States, Canada, New Zealand, Australia, the Netherlands, Spain, Brazil, China, Hong Kong, Taiwan, Japan, Vietnam, and South Africa (Knoors et al., 2014). By 2003, there were 19 schools in the United States offering bilingual deaf education in ASL and written English (LaSasso & Lollis, 2003). A common feature of these programs, characteristic of the bilingual-bicultural education mentioned above, was the use of sign language as the primary language of instruction, limiting the use of the auditory modality (Swanwick et al., 2014), emphasizing Deaf culture and community, ensuring equal educational opportunities, fostering self-esteem and identity as Deaf, and recognizing that Deaf children possess linguistic potential equivalent to hearing children. Achieving age-appropriate academic outcomes was a fundamental assumption (Mayer & Leigh, 2010; Swanwick, 2010; Nakajima, 2018).

Several reports have been made regarding the learning outcomes of deaf children in this program. Heiling (1995) reported that at a Swedish school for the deaf, 14 out of 40 deaf eighth graders demonstrated reading comprehension and vocabulary skills equivalent to or above those of fourth graders, while five demonstrated reading comprehension and vocabulary skills equivalent to or above those of hearing children in the same grade. In the United States, Nover and Andrews (as cited in Andrews & Rusher, 2010) reported that 153 deaf students in an ASL/English bilingual project showed improvements in English vocabulary, English reading comprehension, and English language test scores for three consecutive years. Furthermore, Lange et al. (2013) demonstrated that through a four-

year practice in the United States, 66% of students achieved above-average scores in mathematics and reading comprehension, reaching levels equivalent to hearing children. Swanwick (2016) stated that while these studies do not allow for inferences about specific teaching methods and make further analysis of the results difficult, they provide evidence that this approach is beneficial for some deaf children.

2.3 Discussion on Literacy Acquisition and Academic Achievement

Since the 2010s, questions have been raised about whether bilingual deaf education is sufficiently effective in improving the literacy and academic abilities of deaf children (Spencer & Marschark, 2010; Swanwick, 2016). Marschark, a prominent researcher in deaf education at the Rochester Institute of Technology in the National Technical Institute for the Deaf (NTID), states in his 2009 work that bilingual-bicultural education is most commonly implemented in deaf schools in the United States. However, he also points out that there are few official evaluation studies reporting improvements in the abilities of deaf children in both sign language and written language (Marschark, 2009). Karchmer and Mitchell (2003) state that the academic performance of deaf children in the United States lags behind that of hearing children, particularly in reading comprehension. Regarding the results of bilingual deaf education in Sweden in the 1990s, Bagga-Gupta (2002) reports that Heiling, mentioned in the previous section, reported a decline in reading comprehension in the 1990s, the National Agency for Education showed in 1997 that writing skills among deaf students in five public deaf schools fell below those of hearing students, and that in 1999, over two-thirds of graduating deaf students failed to achieve passing grades in at least one subject in Swedish, mathematics, or English, thereby failing to gain admission to regular upper secondary school programs. This highlighted concerns about the prolonged period focused on sign language acquisition delaying the start of L2 literacy instruction (Nakajima, 2018). Based on these reports, Marschark and Spencer (2010) argue that there is insufficient empirical evidence demonstrating the benefits of traditional bilingual education for language development.

Questions about the effectiveness of bilingual-bicultural education also raise questions about the application of Cummins' hypothesis, which forms its theoretical basis, to sign language (Hermans, et al., 2010). Hermans et al. (2010) attempt to refute the empirical research mentioned in 2.1, which found a positive correlation between sign language skills and reading comprehension in deaf children. For example, Strong and Prinz (1997) point out that in comparing sign language comprehension and reading proficiency, they did not analyze the relationship between surface knowledge, such as sign language grammar and vocabulary and English. Their criticism is that automatic transfer in Cummins' hypothesis is limited to cognitive abilities and conceptual knowledge, and does not answer the question of how understanding sentence structure and operational skills affect the improvement of reading and

writing. Mayer, the foremost skeptic of the application of Cummins' hypothesis to sign language, also argues that despite the empirical studies on positive correlations by Strong & Prinz and Padden & Ramsey, there is no data showing that this approach has achieved the age-appropriate language and literacy levels that were expected in bilingual deaf education (Mayer & Leigh, 2010). Thus, the success or failure of applying the theory of bilingual interdependence remains unresolved and unsound, as Cummins himself (2000) acknowledges, calling it high stakes and a complex and controversial issue. and unsound (Ueno, 2002; Wauters et al., 2006; Plaza-Pust & Lopez, 2008; Tang et al., 2014).

Swanwick, a renowned researcher in deaf education at the University of Leeds, the UK, acknowledges these criticisms of bilingual-bicultural education but argues that the following counterarguments are possible (Swanwick, 2016). 1) It developed as an educational response to the language and learning needs of deaf children that oralism could not adequately address; it was not established with the goal of being a superior method over others, 2) The perspective of measuring the success of educational methods solely by academic achievement obscures discussions about broader, fundamental linguistic, cognitive, and socio-emotional outcomes, and 3) Attempts to prove the superiority of one educational approach over another using studies of small, heterogeneous groups suffer from methodological problems.

Regarding the second point on linguistic, cognitive, and socio-emotional outcomes, multiple researchers have argued for the effectiveness of bilingual-bicultural education in enhancing socio-emotional skills, self-esteem, and a sense of belonging. Wilbur (2001) states that bilingual-bicultural education significantly contributes to improving cognitive and social skills. Furthermore, Hauser et al. (2010) provide a framework suggesting that access to visual language and Deaf culture supports self-affirmation and promotes health and learning behaviors. Bat-Chava (2000), based on a survey of 267 Deaf adults, points out that individuals possessing a Deaf cultural or bicultural identity tend to exhibit higher self-esteem. Hintermair (2008) similarly reinforced the effectiveness of bilingual-bicultural education. Their questionnaire survey of 629 deaf individuals showed that those with a bicultural identity had the highest self-esteem/life satisfaction, while those with insufficient cultural belonging (marginalized) had the lowest. Bilingual-bicultural education, which aims to affirm the value of both “sign language + written language” and “Deaf culture + hearing culture,” prevents marginal acculturation, fosters an integrated identity, and enhances social-emotional well-being (*ibid.*). Leigh et al. (2009) and Maxwell-McCaw and Zea (2011) presented models conceptualizing Deaf cultural identity as diverse forms of acculturation based on combinations of engagement with Deaf and hearing cultures, demonstrating correlations between the degree of engagement with Deaf cultural spheres and well-being. This perspective is crucial for examining another approach to bilingual deaf education, as discussed in the following sections.

Since the 2010s, debate surrounding these educational methods has diminished. Instead, research

has increasingly focused on whether delayed language acquisition or academic performance stems from the presence or absence of language access during early childhood. Mayberry and Lock (2003) demonstrated that adults who likely had minimal language access in early childhood consistently scored lower on grammar comprehension and writing tasks, regardless of whether they later learned ASL as their first language or subsequently acquired a second language (English). Hall et al. (2017) and Murray et al. (2019) similarly argued that delayed exposure to natural language during the critical period of early childhood has persistent and widespread negative effects on many aspects of cognitive development. They contended that the primary cause of academic delays is not a lack of auditory but “language deprivation.” In other words, because parents and surrounding individuals are typically hearing, many deaf children find it difficult to be in an environment where they encounter sign language, placing them at high risk of language deprivation (Moriya, 2025). Mayberry and Kluender (2018) states that many researchers agree that the presence or absence of early language input, regardless of modality of spoken or sign language, determines later language development. Research has also emerged demonstrating that early access to sign language enables deaf children to learn written language similarly to hearing children. However, this applies specifically to children with cochlear implants, as detailed in Section 2.6. The following sections describe the changes that led to the emergence of another form of bilingual deaf education.

2.4 Expansion of Newborn Hearing Screening and Advances in Digital Hearing Aid Technology

European countries have achieved nationwide implementation of NHS (Bussé et al., 2021; Athanasopoulos et al., 2024), with Sweden reporting a rate of 99.1% (Hergils, 2009). The screening rate in the US was 98% as of 2012¹². According to the Ministry of Health, Labour and Welfare website, NHS coverage rate in Japan was 94.2% as of 2021. NHS in Japan began in some municipalities in 2004, became publicly funded in 2007, and has exceeded 90% coverage in most municipalities since 2016 (Holloway & Takagi, 2022).

The expansion of NHS has led to an increase in cochlear implant use since 2010 (Archbold, 2010), with many European countries reporting one cochlear implant per 1,000 live births (Raeve et al., 2020). In Nordic countries, nearly all children with genetic hearing loss are reported to receive cochlear implants (West et al., 2020). In the UK, the estimated cochlear implant rate for eligible children aged one to three years is 74% (Raine, 2013). In Japan as well, many children with hearing loss who are diagnosed with bilateral profound hearing loss between six months and one year of age and meet the pediatric cochlear implant eligibility criteria undergo cochlear implant surgery. The number of

¹² <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6121a2.htm>

preschoolers and students with cochlear implants in elementary school and junior high school in deaf schools surged more than threefold over a decade: from 695 in 2008 to 1,290 in 2013 and 1,907 in 2018.

In 1996, Widex and Oticon, Danish hearing aid manufacturers, launched digital hearing aids. The ability to incorporate digital signal processing chips internally enabled full digitalization, allowing devices to optimize high and low frequencies separately and adjust speech and environmental noise independently, rather than merely amplifying sound. Global hearing aid shipments hovered around 4 million units until 1997 but surged sharply after 1998, reaching 15 million units by 2017. From the mid-2000s, devices gained the ability to distinguish between sounds from the left and right ears, recognize sound source: direction, reverberation, and environmental noise, dramatically improving speech comprehension.

In 1990, the U.S. government approved the use of the cochlear implant system developed by Cochlear for children. In 1999, behind-the-ear sound processors were introduced, improving comfort and making them easier to wear even for children with small ears. Furthermore, digital signal processing (DSP), used in hearing aids, was fully introduced and established as standard technology from the late 1990s to the early 2000s (Swanson et al., 2007). Earlier cochlear implants relied on analog signal processing, but the introduction of DSP improved sound quality and enabled noise suppression. Thus, digital hearing aid technology advanced dramatically, particularly from the 1990s onward. In developed countries, the expansion of NHS and early cochlear implantation became prominent, with over 80% of deaf children now using cochlear implants (Humphries et al., 2014).

In surgeries of cochlear implants, it is sometimes required that deaf children undergo AVT (auditory-verbal therapy) and refrain from acquiring sign language (Snoddon, 2008; Small & Mason, 2008). Alongside the rapid expansion of cochlear implants, there is considerable opposition to this “language deprivation,” including ethical concerns about such trends that suppress sign language acquisition (Christiansen & Leigh, 2002). Humphries et al. (2014) argue that cochlear implant surgery does not always guarantee success, and that some deaf children are deprived of opportunities for early language acquisition due to the lack of language access via sign language. Evidence exists linking early intervention in sign language acquisition to language acquisition (Kennedy et al., 2006; Yoshinaga-Itano, 2004). Furthermore, Hall et al. (2017) point out that language deprivation can occur due to a lack of sign language exposure during the period required for cochlear implant surgery. Researchers advocating for early exposure to sign language report cases of deaf children who failed to acquire language appropriately due to the absence of sign language in early childhood (Mayberry & Fischer, 1989; Emmorey & Corina, 1990; Newport, 1990; Emmorey, 1991; Mayberry & Eichen, 1991; Wood, 2007, 2011). Thus, while many deaf children today have access to phonology and speech through cochlear implants, it is important to note that not all deaf children follow this route to literacy (Plaza-

Pust & Lopez, 2008; Punch & Hyde, 2011). Murray et al. (2020) state that relying solely on speech acquisition through hearing technology increases the risk of poor language acquisition and related developmental problems in children with hearing loss. Furthermore, Henner et al. (2016) criticize the practice of prioritizing oral language training and introducing sign language later as a “backup” or secondary means when oral approaches fail. This approach, he argues, occurs after the critical period for language acquisition has passed, resulting in disadvantages for language development.

The expansion of cochlear implant adoption is not limited to developed countries. While cochlear implant surgery is expensive and limited in developing countries due to insufficient medical technology and personnel/services required for maintenance, future expansion is anticipated with economic development. In China, although the adoption rate is low, reports indicate over 30,000 people use cochlear implants, with 85% being children (Li et al., 2018). The WHO (2021) estimates that investing in cochlear implants yields a return of \$1.67 for every \$1 spent, not only in high-income countries but also under a middle-income country scenario. This supports the rationale for introducing them as economies develop. Mayer and Leigh (2010) point out that because the majority of parents of deaf children are hearing, the choice to use hearing technology has resulted in fewer deaf children learning sign language as their first language, reducing the possibility of deaf children acquiring both spoken language and sign language as their first languages simultaneously. This prediction has already become a reality. The emergence of bilingual deaf education for deaf children who use both sign language and speech through cochlear implants is described in detail in Section 2.6.

2.5 Spreading Inclusive Education

The 1990 World Conference on Education for All held in Jomtien, Thailand, served as a catalyst for intensifying global efforts to promote Education for All (EFA). This initiative was particularly driven by the critical state of basic education in developing countries, characterized by high rates of out-of-school children and illiteracy (UNESCO, 2008; Miles & Singal, 2010). The Salamanca Statement, adopted at the 1994 World Conference on Special Needs Education convened by UNESCO and the Spanish government, represents the first international commitment to inclusive education (Ainscow & César, 2006; Minei, 2021). This statement stipulated that children with special educational needs should be included in mainstream schools, positioning inclusive education as the most effective means to achieve “education for all” (UNESCO, 1994). Since the Salamanca Statement, inclusive education has gained broad recognition internationally as encompassing not only children with disabilities but also the education of all children requiring attention due to special circumstances such as race, language, or living environment (Kuroda, 2022).

The growing recognition of the right to education for children with disabilities stems primarily from the normalization movement, which expanded around the 1960s, particularly in Nordic countries. This

philosophy posits that it is natural for individuals with disabilities to live and participate in society just like their non-disabled peers (Wolfensberger, 1972). This philosophy was carried forward into the theme of the International Year of Disabled Persons (1981); “Full Participation and Equality.” The World Programme of Action formulated the following year urged a shift from the medical model, which views disability as a disease or dysfunction to be treated, to the social model, which sees disability as “created by barriers that exist within society” (United Nations, 1982; Barnes & Mercer, 2005). The principle of “full participation and equality” also extended to the field of education, becoming a driving force behind the promotion of “integrated education,” which advocates for the right of all children to learn together. In the United States, integrated education was the mainstream approach from around 1970 until the mid-1980s. This approach allowed children with disabilities to enroll in school only to the extent they could adapt without the school making significant accommodations, based on the degree of their disability (Thomazet, 2009; UNESCO, 2009). Minei (2021) analyzes that during the working phase of the Salamanca Statement, a shift emerged from integrated education toward inclusive education. This shift aimed to reform school culture, policies, and practices to promote the participation of diverse children.

Since the Salamanca Statement, many countries have pursued efforts to shift educational policy and practice toward greater inclusion (Ainscow et al., 2019; Mittler, 2000). Vislie (2003) compared enrollment data from 1990 and 1996 in special schools and special classes in Europe. She suggested that enrollment rates declined in England, Wales, Finland, France, Spain, and Sweden, while the number of children with disabilities learning in mainstream classes increased. Furthermore, the CRPD, adopted in 2006, obligates governments in Article 24 to provide education on an equal basis with others, providing a legally binding basis for promoting inclusive education. Moreover, the Sustainable Development Goals (SDGs), pursued from 2015 to 2030, include Goal 4; “Ensure inclusive and equitable quality education for all.” This has become a key driver for promoting inclusive education in various countries. Thus, over the past 30 years, the educational settings for children with disabilities have undergone significant changes, particularly in European countries, with many children transitioning from special schools and classes to mainstream classrooms (EASPD, 2015; Amor et al., 2017). In the U. S., it has been noted that the No Child Left Behind Act (NCLB, 2001) and the Individuals with Disabilities Education Act (IDEA, 2004) have led to increases in both the number of children with disabilities receiving special education services in regular classrooms and the proportion of instructional time spent there (Richter et al., 2012). In Canada, placing students with special educational needs in mainstream classes has also become a central philosophy of the education system (Bradley, 2022). A similar trend is observed in Japan for children with hearing loss. The number of students taught in resource rooms for DHH students within mainstream schools has steadily increased, from 1,077 elementary school students and 129 junior high school students in 1995 to 1,695 elementary school students and 419 junior high school students in 2023. In contrast, the number of

deaf schools has been declining. In 1995, there were 107 schools with 7,257 enrolled students; by 2023, this had decreased to 85 schools with 4,354 students.

When DHH children learn in mainstream classrooms, it is often assumed that they use hearing aids (Stepanchak, 2017; Shaver et al., 2014). While sign language interpreters may sometimes be provided for deaf students, such efforts are limited (de Wit, 2017). Winston (2004) describes the challenges faced by DHH children in mainstream classrooms as follows. The integration of DHH children into mainstream classrooms assumes two conditions; that they can learn the content of lessons designed for hearing students in their original form, and that if they use sign language, the presence of a sign language interpreter allows them to access lesson content on an equal footing with hearing students. However, these measures are often implemented without considering the child's linguistic background. This prevents one-on-one communication between teachers and students as well as among students themselves, making it difficult for them to acquire spoken language. Furthermore, while hearing students can simultaneously listen, read, and observe the blackboard, DHH children must focus on the interpreter. This delays information processing and leads to learning delays. Because their access to all classroom information is restricted, opportunities to participate in lessons and school life, as well as natural interaction with peers, become limited, increasing feelings of isolation.

While DHH children in mainstream classrooms may face such challenges, inclusive education has become a major policy trend in many countries since the 1990s. Amid this significant shift in educational environments, the next section discusses how bilingual deaf education is being repositioned and what responses are required.

2.6 Bimodal Bilingual Education

Swanwick notes that due to the contextual changes described in sections 2.4 and 2.5, a trend toward the reduction of traditional bilingual deaf education emerged in Nordic countries and the UK during the 2000s (Swanwick, 2010; Swanwick et al., 2014). Many deaf children began attending mainstream schools and classes. In Sweden and Norway, many deaf schools have closed. In Denmark, the number of children enrolled in deaf schools decreased from 350 in 2002 to 50 by 2020 (Engberg-Pedersen, 2022). The UK has seen a similar trend, resulting in deaf school becoming a setting for deaf children with multiple disabilities (Swanwick, 2010). Torigoe (2009) and Mayer and Leigh (2010) point to the emergence of another concept, specifically regarding the development of literacy and academic skills.

According to Mayer and Leigh (2010), there is no doubt that traditional bilingual deaf education, bilingual-bicultural education, is effective in terms of Deaf identity, emotional well-being, Deaf culture, and the Deaf community. A common thread in the expansion of bilingual deaf education across countries from the 1980s to the 2000s was the use of sign language as the primary language of

instruction, an emphasis on Deaf culture and community, equal educational opportunities, the empowerment of Deaf individuals, and the presumption that deaf children possess linguistic potential equivalent to hearing children. There was a promise to achieve age-appropriate academic outcomes. Underlying this was the theory that sign language development could serve as a foundation for improving oral language reading and writing skills. As discussed in Section 2.3, theoretical and pedagogical concerns regarding this premise have been raised.

Amidst this, another approach to bilingual deaf education that has emerged is the bimodal bilingual program. This educational approach combines two modalities, sign language (visual modality) and spoken language (auditory-oral modality), to support language development and learning (Paludnevičienė & Harris, 2011; Marschark et al., 2014). Bimodal bilingual education aims to address the broader needs of DHH children by not drawing a strict line between sign language and spoken language as the primary modality (Swanwick et al., 2014). Since deaf children who use sign language often have profound hearing loss, they utilize hearing technology such as cochlear implants to access auditory input and learn spoken language. Therefore, this approach requires the availability of NHS services and a medical infrastructure enabling early cochlear implant placement. While it is desirable for the teaching team to include sign language-proficient hearing teachers, audiologists specializing in cochlear implant, and deaf teachers or deaf staff, this does not constitute the core requirements typically associated with bilingual-bicultural education (Mayer & Leigh, 2010; Humphries et al., 2014).

Researchers at Gallaudet University have not remained silent on this trend. In their study analyzing the impact of cochlear implant expansion on deaf education and the Deaf community, Paludnevičienė and Harris (2011) report that the Framingham School for the Deaf in Massachusetts (Marie Philippe School), which pioneered bilingual-bicultural education in the U.S., had also begun addressing spoken language. They argued that for deaf schools to survive, they must adapt to the needs of children with cochlear implants. Additionally, Chen Pichler at Gallaudet University and other researchers conducted a study comparing the level of spoken language acquisition in children with cochlear implants who used sign language as their first language to a group of hearing children who were CODA. The results showed comparable levels in vocabulary, syntax, and speech production. They concluded that early access to sign language does not hinder spoken language acquisition and stated that bimodal bilingualism should be seriously considered as an option (Davidson et al., 2013).

Several studies have attempted to demonstrate the effectiveness of bimodal bilingual education. Hassanzadeh (2012) showed that children with cochlear implants who had deaf parents achieved higher academic performance than those with hearing parents. The study concluded that early exposure to sign language and its development as a first language not only does not hinder but actually promotes spoken language development after cochlear implantation. Swanwick (2016) comprehensively

reviewed 15 years of bimodal bilingualism research, suggesting that sign language skills contribute to promoting spoken English literacy. The study also argued that deaf children with cochlear implants flexibly switch between sign language and spoken language, and that education should evolve to match this reality. Priestley et al. (2017), documenting the transition from sign-based bilingual-bicultural education to sign- and speech-based bimodal bilingual education at a Canadian school for the deaf, found improvements in both sign and spoken language for all students. However, significant individual variation in progress highlighted the diversity of language development among deaf children and the need for support based on individual language profiles. A common finding across these studies is that early access to sign language contributes to improved literacy in spoken English even in bimodal bilingual contexts. This proves the fallacy of the discourse mentioned in Section 2.1 that “sign language hinders spoken language development in deaf children.” However, while it has been demonstrated that sign language does not “hinder” development, comparative studies between the bimodal bilingual approach and learning by only spoken language (auditory-oralism) remain limited. Therefore, it cannot be definitively stated that bimodal bilingual education consistently outperforms others (Swanwick, 2016).

Some cochlear implant users have been noted to experience conflict in establishing their identity between sign-based Deaf culture and hearing-centered spoken language culture (Nakano, 2010; Suzuki, 2022). Consideration for this cultural and linguistic identity was one of the key pillars in bilingual-bicultural education. However, as summarized by Knoors and Marschark (2014) and Swanwick (2016), it is important to note that bimodal bilingual education primarily focuses on language development and communication support through the combined use of two language modes, sign language and spoken language. Consequently, the cultivation of cultural identity is not treated as a primary concern to the same extent as in bilingual-bicultural education.

This chapter has reviewed research trends in bilingual deaf education in developed countries. The decline in direct study on bilingual-bicultural education can be explained not by the “failure” of this educational approach, but rather by significant shifts in institutional and societal contexts. Specifically, this shift can be attributed to the decline in the population of deaf children eligible for bilingual-bicultural education due to the widespread adoption of cochlear implants; the expansion of inclusive education, which shifted the learning environment for DHH children to mainstream schools and led to the downsizing of deaf schools; and the shift in research focus toward “the importance of early access to sign language” and “creating learning environments for bimodal children.”

Chapter 3 Implementation Status of Deaf Education in the Philippines

3.0 Overview of DHH People and Sign Language in Developing Countries

The previous chapter reviewed research trends in bilingual deaf education, primarily in North America and Europe. Chapters 3 and 4 provide an overview of the implementation status of deaf education in the Philippines and Laos, where The Nippon Foundation has provided support, and analyze the outlook for these programs. First, we describe the circumstances faced by DHH children and the state of deaf education in developing countries. The following points are generally noted in developing countries (Jepsen et al., 2015; Knoors et al., 2019):

- In developing countries, the oral approach to deaf education expanded from the 1960s and 1970s onward.
- The delays in the expansion of NHS and fitting and adjusting hearing aids and cochlear implants hinder the use of the auditory modality among DHH children.
- The expansion of inclusive education has led to an increase in DHH children attending mainstream schools, resulting in a declining number of deaf schools.
- There is a shortage of teachers who can teach in sign language.

The lack of widespread NHS and delays in hearing aid and cochlear implant fitting and adjustment indicate that “medical infrastructure for spoken language acquisition is underdeveloped,” supporting Hypothesis 1. However, this is merely a general trend observed in developing countries. Given that the historical development of sign language and the extent of intervention by former colonial powers or development donors vary significantly by country, we will briefly examine the extent to which the situations in the Philippines and Laos align with this general trend and where they diverge. It should be noted that research on deaf education in developing countries is fragmented. Therefore, we supplemented our understanding of each country's situation with information obtained through interviews with grantee organizations and key personnel supported by The Nippon Foundation.

3.1 Status of DHH Children and Sign Language in the Philippines

As part of the information gathering for this chapter, individual interviews were conducted with the following stakeholders to understand the actual conditions that are difficult to grasp from available academic papers, reports, official documents, etc., as well as to obtain informal opinions. Interviews were conducted via video conference or email, with sign language interpretation provided as needed. The information gathered through these interviews was utilized as a basis for the analysis of the current situation. Descriptions based on information obtained from these interviews were noted as such.

Table 4 Interviewees in the Philippines

Name	Affiliation	Date of the interview
Mr. Rafael Vergel de Dios Domingo	BENILDE-CEAD ¹³ , De La Salle College, Head of Deaf Heritage and Filipino Sign Language Studies Unit	August 21, 2025
Ms. Theresa Christine De La Torre	De La Salle College Head of BENILDE-CEAD	September 10, 2025

(1) Status of Sign Language

Following the Spanish-American War of 1898, the Philippines came under American rule. Public education began in 1901 with English as the language of instruction, and since then English has been one of the official languages alongside Filipino (Harrington, 2015). The School for the Deaf and Blind, established by American teachers in 1907, was the first school for the deaf in the Philippines. This school later became the Philippine School for the Deaf (PSD) under the Department of Education (DepEd). The newly appointed American teacher, Ms. Delia Rice, conducted deaf education using ASL. Thus, the indigenous sign language of the Philippines underwent creolization with ASL as a result of contact with ASL in the early 20th century and with English-based sign language from the 1970s onward, leading to the formation of Filipino Sign Language (FSL) (Hurlbut, 2008; Imperial, 2015; Arce et al., 2018; Balanquit, 2025).

In 2018, the FSL Act was enacted, establishing FSL as the national language of the Deaf community (Rogers, 2020). This act designated FSL as an official language and mandated the use of FSL in schools, broadcasting, and workplaces (Daculan et al., 2022; Tabingo & Lovitos, 2025). However, corresponding sign languages remain in practical use. Imperial (2015), citing the National Association of Sign Language Interpreters, reported that in the Philippines, approximately 70% of deaf individuals, primarily residing in metropolitan areas, use FSL, while corresponding sign languages (Artificial Signing System: ASS) are more commonly used in the archipelago regions. Additionally, some deaf schools teach using Signing Exact English (SEE) (Tadeo, 2017; Rogers, 2020).

By the way, the Philippines is a multilingual nation with speakers of over 170 languages (Nolasco, 2008; Oh, 2025). UNESCO emphasizes the importance of mother tongues when considering educational inclusivity and advocates for a multilingual education model called Mother Tongue-Based Multilingual Education (MTB-MLE), which actively adopts the mother tongue as the language of instruction in the early stages of education (UNESCO, 2016). In response, the Philippine government launched a language policy in 2023 that uses children's mother tongue as the language of instruction from the preschool stage through the third grade of elementary school, building upon this foundation with the official languages Filipino and English (Metila et al., 2016). By positioning FSL as the “mother tongue of deaf children,” FSL is integrated into the “learning through the mother tongue” framework of MTB-MLE.

¹³ Centre for Education Access and Development, De La Salle-College of Saint Benilde

Despite the national language policy aimed at unifying sign language, several reasons explain why manually coded signs continue to be used. First, the FSL Act lacks effective implementation because its detailed regulations are still being developed, and government agencies have not provided concrete guidance on enforcement (Fuente, 2021; Asia Foundation, 2021; Interview with Mr. Domingo). This suggests educational language for deaf children has not fully transitioned to FSL. Furthermore, the Philippine School for the Deaf, the only public deaf school mentioned earlier, explicitly states on its website that it adopts the principles of TC, including SimCom (Simultaneous Communication), a type of manually coded sign. This suggests that teacher training has not been standardized based on FSL.

The situation at deaf schools is described further in Section 3.3.

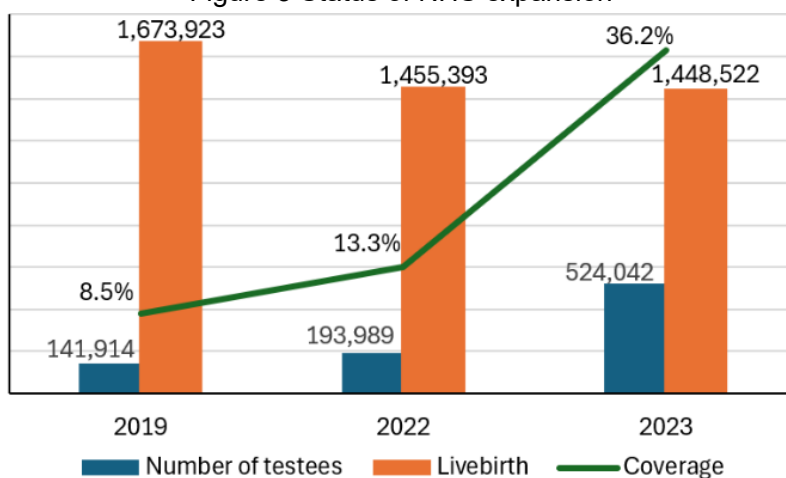
(2) NHS and Use of Cochlear Implants and Hearing Aids

WHO estimates that approximately 5% of the total population requires rehabilitation for hearing loss. According to the Statistics Bureau's National Census results (2020), 1.83% (1.7 million) of the 97.6 million population aged five years and older experience hearing difficulties even with hearing aids. Another study estimated the prevalence of moderate or greater hearing loss at 7.5% among children under 18, 14.7% among adults aged 18–65, and 49.1% among adults aged 65 and over (Newal et al., 2020). The population of deaf individuals using sign language is estimated at 121,000 (0.11%) (Mendoza, 2018).

The NHS program is expanding. According to Chiong (2024) of the National Institute of Otolaryngology at the University of the Philippines Manila, there were 1,217 NHS centers nationwide in 2024. The annual report of the Postnatal Hearing Screening Referral Center indicates that as of 2024, there were 1,217 NHS centers nationwide, with the number of examinees also increasing. The recent trend is shown in the figure below.

According to Chiong (2023) of the National Institute of Otolaryngology at the University of the Philippines Manila, cochlear implant surgery is available at nine referral centers. While no data exists on the proportion of screened infants who start to use cochlear implants, the National Cochlear Implant Program (NCIP), led by the Department of Health and the Postnatal Hearing Screening Referral Center, reported performing cochlear implant surgeries on 20 individuals at tertiary care facilities in Luzon, Visayas, and Mindanao in 2024 (Robles et al., 2024), suggesting the number is in the tens. Furthermore, specialized personnel for audiology tend to be concentrated in major cities. Consequently, access to ear and hearing healthcare remains a challenge, particularly in geographically isolated and disadvantaged areas.

Figure 3 Status of NHS expansion



Source: Prepared by the Study Team based on the NHSRC annual report and the data from the Statistics Bureau

Table 5 Specialized personnel for audiology in the Philippines (2024)

Profession	Standard Value	The Philippines
ENT physicians	At least 1/100,000	862 in total (0.76/100,000)
Audiologist	At least 1/100,000	84 in total (0.074/100,000)
Pathologists	At least 5-20/100,000	462 in total (0.41/100,000)

Source: Prepared by the Study Team based on WHO (2022) and Ramos (2018)

No data exists reporting hearing aid utilization rates, but Dillard et al. (2024) estimated a usage rate of approximately 15% in low- and middle-income countries (GNI per capita \$1,086 to \$4,255) through a systematic review focusing on hearing aid service delivery approaches. The global hearing aid market is supported by an aging population and healthcare infrastructure, with North America accounting for approximately 38% and Europe for about 30%. While high-end hearing aids are very expensive at \$2,500, affordable hearing aids costing less than \$100 are also available in developing countries. Research indicates these can be effective for individuals with mild to moderate hearing loss (Alier et al., 2025). However, hearing aids provided in public hospitals often lack maintenance, many face difficulties obtaining batteries, and only 12% are reported to be used regularly (Newal et al., 2019; Dillard et al., 2024).

3.2 Bilingual Deaf Education

DepEd Order No. 11 in 2000 mandated that each educational district establish at least one Special Education Center to serve students requiring special support. Following the 2008 ratification of the CRPD, the previous Special Education (SPED) system transitioned to an inclusive education system. This integrates students requiring special support into regular classrooms, creating an environment where they learn alongside their peers (DepEd, 2021; Fuente, 2021). Students with disabilities learn in mainstream classrooms and receive instruction from itinerant special education teachers who visit from local special education centers (Wong & Alcantara-Doroja, 2015). However, due to inadequate

implementation of the FSL Act in education and insufficient teacher expertise in deaf education, adequate support is often lacking. As a result, mainstream schools frequently fail to provide appropriate learning environments for DHH children (Pizarro, n.d.; Kilag et al., 2025). Bulatlat, an alternative media outlet in the Philippines, reports on the reality faced by DHH children. Due to the lack of adequate support in mainstream classrooms, they become isolated in terms of communication and are forced to choose to study in self-contained classrooms, where only students with disabilities learn. Since the only public deaf school is the Philippine School for the Deaf located in the capital city, the vast majority of DHH children end up studying in these special classrooms. There are no precise records indicating whether instruction in these special classrooms uses FSL or TC. Considering the lack of specialized training among teachers, it is unlikely that bilingual deaf education using FSL alongside written Filipino and English is being implemented in these special classrooms.

The Philippine School for the Deaf uses English as the language of instruction and adheres to the principles of TC, including manually coded sign. Therefore, it can be concluded that they adopt a monolingual approach using speech, lip-reading, and auditory training. It is presumed that DHH children not enrolled in mainstream schools attend private deaf schools. Numerous private deaf schools exist in the Philippines. According to the website of one such school, the Manila Christian Computer Institute for the Deaf (MCCID), which provides higher education and vocational training, there were 51 private deaf schools nationwide as of 2013. Approximately 80% of these are concentrated on Luzon Island, where the capital city of Manila is located.

Benilde Deaf School, a grantee of The Nippon Foundation, explicitly states that it provides bilingual-bicultural education to deaf students at the secondary level. According to the interview with Ms. De La Torre, the school does not assess students' hearing levels and does not utilize the auditory modality. Detailed information regarding the teaching methods of other private schools cannot be confirmed online. However, several schools explicitly state that they teach hearing and speaking to DHH children, suggesting they use an oral approach. While some schools explicitly state they use sign language, their websites do not clearly indicate whether they provide bilingual-bicultural education like Benilde Deaf School or use the TC approach. Thus, the teaching methods at deaf schools in the Philippines are mixed.

The Challenge of Language Deprivation

While language deprivation discussed in Section 2.3 has been highlighted in research from the U. S. and UK, WFD states that lack of early access to sign language poses risks for deaf children, including language deprivation and associated academic delays, suggesting language deprivation is a universal phenomenon (WFD, 2024). While no studies explicitly demonstrate significant language deprivation among deaf children in the Philippines, the expansion of NHS mentioned in the previous

section is a recent trend. Langga et al. (2021) report difficulties in language acquisition among deaf children born into hearing families. Furthermore, according to the interview with Ms. De La Torre, there is a certain number of deaf students in Benilde Deaf School who are clearly affected by the consequences of language deprivation. This is because the majority of students were born into hearing families that do not use sign language, and either had limited access to signing teachers up to secondary education or transferred from mainstream schools with no signing teachers. The lack of adequate exposure to sign language in early childhood, coupled with years without a rich learning environment, has significantly impacted their academic performance.

3.3 Future Outlook

The situation in the Philippines described in the preceding sections is summarized below:

- Legally, FSL is recognized as one of the official languages.
- Due to a shortage of teachers capable of providing appropriate support, many DHH children have no choice but to learn in special classrooms within mainstream schools.
- The use of hearing aids and cochlear implants is considered limited. However, NHS is expanding rapidly, and usage may increase in the future.
- There is only one public deaf school, which uses manually coded sign. Private deaf schools are primarily located in the metropolitan area, but educational methods vary widely, and educational facilities that utilize natural sign language for learning are limited.
- Some DHH children may have limited exposure to sign language in early childhood, leading to delayed language acquisition later on, which could impact their academic progress.

From these points, it is clear that the medical infrastructure for acquiring spoken language in the Philippines is insufficient, and few DHH children use hearing aids or cochlear implants. DepEd actively promotes inclusive education, and the sole public deaf school employs TC using manually coded sign. Given the background described in Section 2.2, this cannot be considered bilingual deaf education. Opportunities for bilingual deaf education in the Philippines are currently limited. However, considering the ongoing implementation of the FSL Act and the increasing use of hearing aids and cochlear implants, opportunities for bimodal bilingual education may expand in the future.

In this context, Benilde Deaf School practices bilingual deaf education using FSL as the natural language. It employs a bilingual-bicultural approach and does not utilize the auditory modality. While this Study does not evaluate the academic achievement of the deaf students, the interviewees mentioned the severe impact of language deprivation on deaf students. This suggests that their academic levels are likely not equivalent to those of hearing students. This is a common challenge faced by all educational institutions involved in deaf education. Considering these points, two concerns regarding the school are raised below.

- Deaf students who complete secondary education at this school transition to an environment where they learn alongside hearing students in higher education. At this stage, the appropriate learning of these students can be hindered under the following circumstances; 1) when teachers capable of teaching using FSL are not consistently available, and 2) when the students' academic proficiency has not reached a level equivalent to that of hearing students upon completing secondary education.
- While children with cochlear implants are currently estimated to be a minority nationwide in the Philippines, the implant rate is projected to increase in the future, primarily among deaf children from high-income families. As Benilde Deaf School is a private institution located in the capital city, it is highly likely to be selected as an educational destination for these people. Should a child with a cochlear implant enroll, the school lacks expertise in bimodal instruction. This creates a mismatch between the need for learning that utilizes the auditory modality and the current educational provision policy.

As a private school, families who share its educational philosophy have the freedom to choose it as their school of choice. However, considering the evolution of deaf education observed in developed countries and the social responsibility that comes with receiving financial support from The Nippon Foundation, it is expected to play a pioneering role.

Chapter 4 Implementation Status of Deaf Education in Laos

4.1 Status of DHH Children and Sign Language in Laos

Research reporting on the actual conditions of DHH people in Laos is extremely limited. As part of the information gathering for this chapter, individual interviews were conducted with the following stakeholders to understand the difficult-to-grasp realities that are hard to grasp from available academic papers, reports, official documents, etc. as well as to obtain informal opinions. Interviews were conducted via video conference, with sign language interpretation provided as needed. The information gathered through these interviews served as the basis for analyzing the current situation. Descriptions based on information obtained from these interviews were noted as such.

Table 6 Interviewees in Laos

Name	Affiliation	Date of the interview
Ms. Yuki Nakamura	ADDP, Secretary General	June 21, 2025
Ms. Phanita Maiphone	Association for the Deaf, former Secretary General	September 8, 2025
Ms. Masumi Ikeda	ADDP, Project Manager of the Deaf Support Program in Laos	September 26, 2025
Three teachers	Deaf School affiliated with Dong Kham Xang TTC	November 5, 2025

(1) Status of Sign Language

According to the website of the Australian Government's Lao Sign Language Education Support Project, it is estimated that there were approximately 80,000 DHH people in Laos as of 2021. Lao Sign Language was established in 1993 (Interview with Ms. Maiphone; Chanlivong, 2025). While influences from Thai Sign Language and ASL have been suggested for Lao Sign Language, research remains ongoing (Woodward, 1996; Noschese, 2023). The Lao government ratified the CRPD in 2009. However, Lao Sign Language has not been officially recognized as a language, which was highlighted in the first Concluding Observations issued in 2022 (Committee on the Rights of Persons with Disabilities, 2022). The Ministry of Health operates two special schools for deaf and blind children (Enfield, 2008; Chanlivong, 2025). An interview with Ms. Maiphone, former Secretary General of the Lao Association for the Deaf (founded in 2013) provided the following overview of DHH people and Lao Sign Language in Laos. The Lao Association for the Deaf is compiling a Lao Sign Language dictionary, with new words added daily even as of 2025. However, due to its short history as a language and low social recognition, there are fewer than 10 sign language interpreters nationwide. There are no ongoing support programs for parents of DHH children. While some parents take sign language programs at the Deaf Association, attendance is low, and few parents continue until completion.

(2) NHS and Status of Cochlear Implant and Hearing Aids

According to interviews with ADDP (Association for the Development of Disabled Persons in Asia), which implements deaf education programs at the Deaf School affiliated with Dong Kham Xang Teacher Training College (TTC) (Dong Kham Xang TTC Deaf School) with funding from The Nippon Foundation, NHS is not being implemented. According to the government report, which is required to

be submitted periodically to confirm the implementation status of the treaty as a CRPD ratifying country, the Center of Medical Rehabilitation (CMR) is responsible for diagnosing disabilities in children, having conducted 207 diagnoses by 2016 (Government Report, 2016). ADDP provides screening services for DHH children and offers support for hearing aid fitting.

According to the interview, cochlear implants are used by some children from high-income households. Olusanya (2015) reviewed the implementation status of NHS programs in low- and middle-income countries with income levels below \$6,000, stating that NHS is scarcely implemented in the majority of these countries. WHO (2021) points out that access to advanced hearing devices, including cochlear implants, is disproportionately concentrated in high-income countries and among high-income groups, with only a portion of the population unable to access them. Furthermore, Dillard et al. (2024) mentioned in the previous chapter, estimated that the utilization rate of hearing aid-related services in low- and middle-income countries is approximately 15%. While Laos is classified as a low-income country (LDC), with a per capita GNI below \$1,136, its projected per capita GNI is expected to be \$2,375 in 2025 (UN Committee for Development Policy, 2025). Although data specifically indicating usage in Laos could not be confirmed, based on these reports, it is inferred that access to cochlear implants is also extremely limited in Laos, with hearing aid usage likely around 15%.

(3) Inclusive Education

The Lao government enacted the Decree on the Rights of Persons with Disabilities in 2003. Article 20 lists the government's responsibilities as guaranteeing the right of children with disabilities to education, providing reasonable accommodations, and developing appropriate curricula and teaching materials. In 2010, the National Policy on Inclusive Education was formulated (Lee & Outhaithany, 2011). As of 2020, 5,075 children with disabilities were enrolled in 1,968 of the nation's 3,829 primary schools. The system included 81 special education teachers (sign language and braille) and 2,151 inclusive classroom teachers (Committee on the Rights of Persons with Disabilities, 2020).

According to a parallel report by 11 disabled people's organizations, two primary schools in Vientiane accept DHH children. The Lao Association of the Deaf plays a crucial role in systematically supporting two special needs schools and two mainstream schools through providing Lao Sign Language teaching materials, transportation assistance, and training for teachers and students on inclusive education. On the other hand, the concluding observations of the UN Committee on the Rights of Persons with Disabilities (2022), taking into account the points raised by these organizations, summarize that the capacity of teachers to support children with disabilities in schools is low, and opportunities for teacher training on inclusive education are also limited.

4.2 Bilingual Deaf Education

Laos has two deaf schools; Hand of Hope School for the Deaf in Vientiane (established in 1993) and the Luang Prabang Deaf and Mute Community Training Centre (established in 2008). Both provide education up to the primary and secondary levels. They have dormitories, and 211 students from 17 provinces nationwide are learning at these two schools¹⁴. Additionally, 19 deaf students, including adults, are enrolled in higher education at Dong Kham Xang TTC Deaf School in Vientiane. Since there are only two deaf schools nationwide offering primary education, according to Ms. Maiphone, the majority of DHH children enter mainstream schools starting at age five. In mainstream schools, lessons are conducted using oral communication, making it difficult for DHH children to understand the content. Consequently, most deaf students learn independently at home or with tutors after school. Very few deaf students advance to high school after graduating from junior high, and those who obtain a high school diploma are extremely rare. After completing secondary education, a few deaf students who have enrolled at either of the two deaf schools or mainstream schools advance to Dong Kham Xang TTC Deaf School.

Based on the results of the interviews, the educational methods at these deaf schools are summarized below.

Table 7 Status of Deaf Schools

	Hand of Hope School for the Deaf Luang Prabang Deaf and Mute Community Training Centre	Dong Kham Xang TTC Deaf School
Teachers	Most teachers are hearing 5 deaf teachers in total	Hearing teachers only Teachers learn from ADDP training and deaf instructors
Sign language	Many teachers use “school sign language” which combines sign language and oral communication	Lao Sign Language
Students’ sign language proficiency	N/A	While it varies, students from deaf schools sign better and have better communication skills, compared to those from mainstream schools
Oral approach	Training in vocalization or lip reading has not been conducted.	There are no students using hearing aids or cochlear implants. No emphasis on oral communication.

Source: Prepared by the Study Team based on interviews with Dong Kham Xang TTC Deaf School teachers and ADDP

This Study could not confirm whether “school sign language” is TC or not. With support from ADDP, Dong Kham Xang TTC Deaf School aims for deaf students who complete three years of higher education to advance to TTC, undergo a four-year teacher training period, and become deaf teachers. If the project proceeds as planned, the first deaf teachers educated in Lao Sign Language are expected

¹⁴ Members of 11 Organizations of Persons with Disabilities (OPDs) and Disability Service Centers operating in Vientiane and 11 Provinces of Lao PDR. (2022). Submission Report on the Implementation of the Convention on the Rights of Persons with Disabilities in Lao PDR.

to emerge by 2030.

Language Deprivation Situation

In the 2022 parallel report, the Lao Association of the Deaf reported that DHH children begin special education later than their peers due to insufficient awareness at the community and household levels, with the majority being enrolled in first grade between the ages of 10 and 14. This, they state, makes transitioning to mainstream education even more difficult. Furthermore, interviews with teachers of Dong Kham Xang TTC Deaf School revealed that some deaf students enrolled at the school are over 30 years old. While the individual circumstances of these students are unknown, given the current lack of a public NHS, this suggests the situation highlighted by the Deaf Association may be common in Laos.

4.3 Future Outlook

The current state of deaf education in Laos can be summarized as follows:

- Lao Sign Language has a short history since its establishment and is not officially recognized.
- While many DHH children attend mainstream schools, they may not receive appropriate instruction.
- The use of hearing aids and cochlear implants is extremely limited, making it unlikely that auditory-based deaf education is being implemented.
- While instruction using sign language occurs in deaf schools, at the primary and secondary education levels, teaching may rely on visual communication closer to manually coded sign rather than Lao Sign Language.
- DHH children generally have few opportunities to access sign language during early childhood, likely leading to delayed language acquisition and subsequently impacting academic achievement.

Bilingual-bicultural education is an educational approach that utilizes sign language, the first language of the deaf, and emphasizes the presence of deaf teachers as role models. However, the reality of deaf education in Laos is thought to be severely hampered by low recognition of sign language and a critical shortage of specialized personnel necessary to implement such approaches. Unlike the Philippines, the necessary medical infrastructure for fitting hearing aids and cochlear implants remains underdeveloped. With no signs of expanding bimodal bilingual education, sign language modality remains the only immediate option for DHH children.

Chapter 5 Deaf Education Interventions in Developing Countries

In addition to the overview of the status of deaf education in the Philippines and Laos presented in the preceding chapters, this chapter examines some interventions that may serve as references for considering future approaches to bilingual deaf education support in developing countries.

5.1 Co-enrollment

(1) Overview and Practices of Co-enrollment Approach

Co-enrollment is an educational model that places DHH children and hearing children in the same classroom, implementing team teaching by two or more teachers (also referred to as co-teaching); the class teacher and deaf education teacher. It has been practiced primarily in developed countries. Antia, a leading researcher on this model, pointed out that the inclusive education approach, which became mainstream after the 1990s and involves placing DHH children in mainstream classrooms, has the following problems due to limited specialized support (Stinson & Antia, 1999):

- DHH children are likely to be isolated. Due to the low prevalence of hearing loss, it is highly probable that no classmates with the same disability are present in the same classroom. This results in a lack of language models and emotional security, and limited interaction with hearing classmates, making isolation and marginalization likely.
- Learning deficiencies due to interpreter dependency. Even with a sign language interpreter, real-time exchanges and deep learning participation cannot be fully compensated for. Participation in classroom communication is restricted, and academic integration is not guaranteed.

At the same time, team teaching began to spread in general education, where children with and without disabilities learned together in the same classroom under the joint instruction of a class teacher and a specialist education teacher or assistant teacher (Friend & Cook, 2010). Concurrently, as bilingual-bicultural education expanded, efforts emerged to explore environments where multiple DHH children were placed within mainstream classrooms alongside hearing children, while treating sign language as the primary language of instruction for deaf children (Stinson & Antia, 1999).

In the co-enrollment model, there are no fixed classes solely for DHH children like special education classes or resource rooms, one class is shared with hearing students, and education is conducted in a manner that respects both languages and cultures. Typically, three professionals collaborate to deliver instruction; one general education teacher, one deaf education specialist, and one deaf teacher (or staff member) (Antia et al., 2002, 2007). Yiu and Tang (2014) identify four key features of the co-enrollment model; 1) Ensuring a balanced ratio of deaf and hearing children per class (equal numbers or 1:3 to 1:4), 2) Guaranteeing a bilingual environment of sign language and spoken language, 3) Equal access to the regular curriculum through team teaching, and 4) Holistic coordination to create inclusive classrooms.

In the earliest stages, the Tripod program was implemented in California in 1982, followed by the Tucson program in Arizona (Antia & Metz, 2014; Kirchner, 2019). Other examples include the Twin-school program in the Netherlands (Hermans et al., 2014), Italy (Rinaldi et al., 2014), the Madrid program in Spain (Martin et al., 2014), and the SLCO program in Hong Kong (Tang et al., 2014; Yiu & Tang, 2014). As of 2025, there are no reported practices in developing countries. However, the U.S. Agency for International Development (USAID) Universal Design for Learning Toolkit (2018) mentions the co-enrollment model as a promising option within the context of developing countries.

(2) Effects of the Co-enrollment Model

Practices in the aforementioned countries have yielded predominantly positive results. McCain and Antia (2005) reported improved academic performance among deaf students who studied in co-enrollment models for four years. Similarly, Kremeyer et al. (2014) documented cases where deaf students who learned in co-enrollment models for two to three years scored higher on reading comprehension tests than those attending deaf schools. However, these scores were lower than those of hearing children. No significant differences in numeracy were observed between the co-enrollment model and deaf schools. Hermans et al. (2014) reported that in the Dutch Twin-school program, deaf children showed improved Dutch vocabulary skills, but their average scores in reading comprehension, numeracy, and writing were lower than those of hearing children. However, they analyzed that a significant difference existed in peer group identity scores, with DHH children tending to form subgroups within mainstream classes, resulting in negative scores. Martin et al. (2014) reported positive results regarding improved peer group identity and increased interaction opportunities in a Madrid case study. Yiu and Tang (2014) and Yiu (2024) evaluated the Hong Kong case, suggesting that while academic performance and social integration were generally favorable, accepting Deaf identity requires a long-term, stable environment. It should be noted that in both the Madrid and Hong Kong cases, all deaf children learning in the co-enrollment model were confirmed to be wearing either cochlear implants or hearing aids.

(3) Constraints of the Co-enrollment Model

All previous implementations have been temporary projects or experiments, presenting constraints to the model's implementation and expansion. For example, this model requires consolidating at least six DHH children into a single class for 30 students. However, the structural difficulty lies in the necessity of securing multiple DHH children annually within the same region, where such children are demographically scarce (Tang, 2016; Antia et al., 2019; Silvestri & Hartman, 2022). In rural and regional areas, the number of DHH children within a school district is even smaller, and commuting outside the district imposes burdens on households, further increasing the difficulty.

Furthermore, for deaf and hearing children to learn together using both sign language and spoken language in public education, sign language must be recognized and used as the language of instruction

(Mayer & Leigh, 2010). Additionally, even in developed countries, there is a tendency for specialized teachers for deaf children to be in short supply, making their permanent placement difficult (Pedersen & Beste-Guldborg, 2019). Kreimeyer et al. (2000) indicate that favorable language development is possible in environments where human resources can be concentrated, while stating that implementation faces numerous challenges. Overall, while the co-enrollment model has successful examples, it remains a niche approach, and its feasibility is limited in developing countries with constrained human resources.

5.2 Early Sign Language Education Program

From the research trends outlined in sections 2.3 and 2.6, it is clear that providing a sign language environment early for deaf children is a prerequisite for advancing bilingual deaf education. Furthermore, given that many deaf children in the Philippines and Laos may be in situations of language deprivation, efforts are needed not only to expand NHS but also to ensure access to sign language for children diagnosed with hearing loss during the neonatal and infant stages. This section examines such initiatives in developing countries.

The UK-based National Deaf Children's Society (NDCS) reports collaborating with CDD, the Bangladeshi non-governmental organization (NGO), to improve early diagnosis and support systems for deaf children. They provided sign language training to medical professionals and taught families and teachers communication methods, including sign language, tailored to DHH children.

Multiple initiatives can be identified in East African countries. UNICEF states the following in its guidance document on deaf education for Eastern and Southern Africa; The majority of DHH children are born to hearing parents who do not use sign language, preventing them from acquiring language naturally. In most African countries, NHS is not common, and many families only become aware of the disability when the child has already reached or passed a critical period in language development. This necessitates the involvement of professionals proficient in sign language and Deaf mentors (UNICEF ESARO, 2021). The project for “Scaling Inclusive Early Learning for Deaf Children” has been implemented since 2024 with support from the Global Partnership for Education (GPE) and Canada's International Development Research Centre (IDRC). It is creating environments where deaf children can access sign language at home and school in Kenya, Malawi, and Rwanda. It also provides sign language training to preschool institutions and parents of deaf children. Through these activities, the project aims to generate evidence positioning sign language as the first language and language of instruction for deaf children. In Uganda, many deaf children also miss out on schooling until around age nine, missing a critical period for language development. Sign Health, a UK-based deaf support organization, launched a preschool class for deaf children in 2011, accessible from age three. It

provides sign language training and develops teaching materials for deaf children, their parents, and teachers nationwide, aiming to create a sign language environment both at home and in school from the preschool stage.

Thus, programs in developing countries that prioritize early access to verifiable sign language remain limited. Humphries et al. (2014) report that in developed countries, post-NHS information provision and early intervention practices tend to be auditory-focused, limiting opportunities for early exposure to sign language. In its position paper advocating for sign language rights, WFD expresses concern that in many countries, NHS and early intervention services do not include provision of information about sign language or support for learning it, thereby infringing on opportunities to receive support for communicating using sign language (WFD, 2024). WHO (2021) also states that developing countries lack training, certification, and remuneration systems for sign language services to support language development in deaf infants and young children. Few programs include sign language acquisition as part of intervention following diagnosis through newborn and infant screening programs, other than the practices mentioned above. Examples from Indonesia (Andriani, 2024), Cambodia (Waterworth et al., 2022), Vietnam (Stringer, 2022), Kenya (Ndegwa et al., 2024), and South Africa (Casoojee, 2024) all center on oralism-based interventions where deaf children wear hearing aids or cochlear implants and aim to acquire spoken language by utilizing their hearing. As WFD has expressed concern, even in developing countries, the support systematically provided after early diagnosis is likely to be a speech-based intervention without sign language. However, it should be noted that very few studies report whether sign language is used in early intervention, making it impossible to provide quantitative evidence.

Chapter 6 Conclusion

6.1 Effects of Bilingual Deaf Education by Type

In recent years, bilingual-bicultural education, which emerged in developed countries as an alternative to manually coded sign-based TC, has declined due to the spread of NHS and hearing technology, as well as the expansion of inclusive education. While bimodal bilingual education, which uses hearing technology to learn both spoken language and sign language, is becoming the mainstream approach in bilingual deaf education, research demonstrating that this method achieves academic progress equivalent to that of hearing peers is limited. Based on this, the effectiveness of bilingual deaf education can be summarized as shown in the table below.

Table 8 Effects of Bilingual Deaf Education by Type

Type	L2 Literacy/Academic achievement	Self-esteem/Deaf identity
Bilingual-bicultural	Quantitative research on academic achievement is limited	Positive evidence exists
Bimodal bilingual	Improvements in academic achievement (Not equivalent to hearing children)	Effective when a minimum number of deaf students and deaf teachers can be consistently secured)

The debate over the effectiveness of bilingual-bicultural education using only sign language to learn written language remains unresolved. However, as the majority of deaf children are now learning through bimodal bilingual education, the focus of research has shifted toward “the importance of early access to sign language” and “creating learning environments for bimodal children.” It should be emphasized that language deprivation due to lack of early access to sign language continues to make it difficult for deaf children to achieve academic performance equivalent to that of hearing children, even in bimodal bilingual education.

The effectiveness of bilingual-bicultural education in fostering self-esteem and a sense of belonging has been demonstrated. This is particularly evident in the co-enrollment model, where emphasis is placed not only on providing an environment where communication in sign language is possible, but also on ensuring a certain ratio of deaf children and the placement of deaf teachers. Given that deaf children are more likely to be born to hearing parents who do not use sign language as their first language, it is an inevitable trend today for parents to choose to use hearing technology to enable their children to acquire spoken language. However, this does not imply that sign language is unnecessary. Numerous studies demonstrate the importance of access to sign language from infancy, even for children who undergo cochlear implant surgery (e.g., Hassanzadeh, 2012; Davidson et al., 2014). Furthermore, since hearing technology like cochlear implants does not guarantee full access to spoken language, deaf children who require sign language as their primary means of communication will continue to exist. Therefore, the importance of deaf education using sign language will persist.

6.2 Hypothesis Verification

The approach to bilingual deaf education in developing countries varies depending on the context. The approaches to bilingual deaf education in the Philippines and Laos is outlined below.

Table 9 Implementation status of Bilingual Deaf Education by Type

Type	Location	The Philippines	Laos
Bilingual-bicultural	Deaf school	Practices in Benilde Deaf School	Training of deaf teachers underway
Bimodal bilingual	Mainstream school Special class	It is unlikely to be implemented	Not implemented
	Deaf school	It may be implemented at some private schools	Not implemented

Bilingual-bicultural education requires the presence of deaf teachers. For deaf individuals to become teachers, they must complete higher education using sign language, which is established as a medium of instruction, and a written language. This necessitates that deaf education be at a level capable of enabling this. In Laos, Lao Sign Language as a medium of instruction was established only recently, and the foundation for deaf education is fragile. Consequently, it is in the stage of working to train deaf teachers. While the Philippines has FSL as a national language, private education entities manage most of deaf schools, resulting in varied educational approaches. This includes schools teaching through TC methods using manually coded sign. In public education, the vast majority of DHH children attend mainstream schools where specialized personnel are insufficiently deployed. The table below summarizes these situations.

Table 10 Actual Status of Deaf Education

	The Philippines	Laos
Medical Infrastructure for Acquiring Spoken Language	NHS coverage: under 40% Cochlear implant utilization rate: low Hearing aid utilization rate: around 15%	No NHS provision Cochlear implant utilization rate: low Hearing aid utilization rate: approximately 9-15%
Access to Sign Language During the Critical Period	Some programs exist for parents and infants Regional disparities exist Language deprivation often occurs	Access is difficult Often leads to language deprivation
Status of Deaf Education	Private deaf schools implement diverse approaches Public education lacks specialized support	Only three deaf schools Insufficient personnel to teach sign language

Given this situation, the hypotheses of this Study are verified as follows.

Table 11 Hypothesis Verification

Hypothesis	The Philippines	Laos
1. In developing countries where medical infrastructure for spoken language acquisition is underdeveloped, bilingual deaf education represents the optimal solution for deaf children who face difficulties acquiring spoken language.	<u>Supported</u> Bilingual deaf education using FSL as the natural language is arguably the optimal solution, since many DHH children cannot utilize hearing technology.	<u>Supported</u> Nearly all DHH children cannot benefit from hearing technology, making bilingual deaf education the optimal solution. However, there is a shortage of deaf teachers to implement bilingual deaf education, and human resource development is an urgent priority.
2. In developing countries, children using hearing aids or cochlear implants also have the potential to achieve sufficient academic proficiency through bilingual deaf education.	<u>Partly supported</u> For some DHH children who can use hearing aids or cochlear implants, bimodal bilingual education that utilizes the auditory modality may be effective. However, there is insufficient evidence to conclude that it is more effective than the auditory-oral approach. Since Benilde Deaf School does not implement education utilizing the auditory modality, it cannot be considered the best learning environment for children using hearing aids or cochlear implants. This Study could not clarify whether other environments capable of implementing bimodal bilingual education exist in the Philippines.	<u>Not supported</u> In Laos, the number of DHH children who can access hearing aids or cochlear implants is extremely limited. Consequently, bimodal bilingual education is not practiced even in the three public deaf schools. Therefore, the likelihood of bilingual deaf education using sign language being implemented for children with hearing aids or cochlear implants in Laos is low.

When considering approaches to deaf education in developing countries, key variables include the country's unique sign language, the history of its deaf education system, the quality and quantity of deaf education personnel, and the level of accessibility to hearing technology relative to the country's economic capacity. In low- and middle-income countries, where the availability of hearing aids and cochlear implants has not advanced to the point where auditory-oral approach or bimodal bilingual education are common options, the likelihood that bilingual deaf education using sign language is an effective educational approach is high. On the other hand, the main obstacles to its implementation are the shortage of teachers capable of teaching in natural sign language and language deprivation occurring in early childhood.

6.3 Prospects and Recommendations for Supporting Bilingual Deaf Education in Developing Countries

(1) Future Outlook

The findings of this study indicate that deaf education in developing countries faces complex

constraints due to the following primary structural factors:

1) Lack of Language Access in Early Childhood (Language Deprivation)

Many deaf children grow up without sufficient access to either natural sign language or spoken language before reaching school age, resulting in severe language development delays by the time they enter school.

2) Chronic Shortage of Teachers Capable of Teaching in Natural Sign Language

The enrollment of DHH children in mainstream schools is progressing while the absolute number of specialized teachers for deaf education and deaf teachers remains insufficient.

3) Ongoing development of Sign Language as a medium of instruction.

The history of deaf education as public education tends to be relatively short, and deaf children remain spatially and temporally fragmented, resulting in that efforts to establish sign language as a medium of instruction are still in their early stages. The absence of formal sign language dictionaries and grammatical norms, coupled with the ongoing development of the sign language used in educational settings, hinders the stable training of teachers at deaf schools. Consequently, it becomes difficult to ensure consistent educational quality.

Furthermore, in low- and middle-income countries, the limited availability of NHS and cochlear implants and hearing aids means that educational models based solely on spoken language face significant institutional and economic barriers. In this context, bilingual deaf education using natural sign language as the primary teaching language is likely to remain the most realistic educational option. For the many deaf children who have limited access to spoken language, ensuring access to a natural language from an early age is a prerequisite not only for language development but also for cognitive development.

On the other hand, the use of hearing technology is expected to gradually expand going forward. Consequently, the scope for institutionally exploring the potential of bimodal bilingual education is also likely to broaden. However, at this stage, bimodal bilingual education remains a highly specialized educational model that can only be implemented when all three elements; medical infrastructure; specialized personnel, and a linguistic environment where sign language is the teaching language, are in place. It has not yet become commonplace in low- and middle-income countries.

Considering the above, the following two-stage development path is envisioned for the future outlook.

Table 12 Future outlook

	Outlook	Issues
Short to medium term	Promoting and enhancing the quality of bilingual deaf education based on natural sign language	<ul style="list-style-type: none"> • Ensuring early access to natural sign language • Training of deaf teachers • Development of sign language as a medium of instruction
Medium to long term	Building a bimodal bilingual environment in conjunction with the dissemination of hearing technology	<ul style="list-style-type: none"> • Training and strengthening of specialized deaf education personnel in mainstream schools

(2) Recommendations

Based on the above, support for bilingual deaf education in developing countries must center on the following three core points after carefully examining the situation in each target country:

- Early access to sign language
- Training of educators capable of teaching in natural sign language
- Development of sign language as a medium of instruction

Based on these points, the following recommendations are made.

Recommendation 1: Pilot Implementation of a Sign Language Access Guarantee Program from Infancy

The foundation of language development of children is established before school age. Therefore, regardless of the use of hearing technology, develop a packaged support model aiming to generate evidence regarding its effectiveness, consisting of the following components.

- Parent-child sign language classes: Provide opportunities for parents to acquire sign language, ensuring a natural means of communication for both parent and child, following a diagnosis of hearing loss. This avoids over-reliance on spoken language-based support and prevents language deprivation.
- School enrollment support: Provide transition support to educational settings based on early childhood language development, minimizing learning delays that often occur after school entry.
- Language development and academic assessment: Systematically evaluate the impact of early sign language access on language, cognitive, and academic development through longitudinal studies.

As mentioned at the end of Chapter 5, it is important to note that support provided after early diagnosis may tend to focus on oral-based interventions without sign language. Through this pilot program, it is expected to provide policy implications by demonstrating that learning through natural sign language in a non-language-deprived environment enables age-appropriate development in deaf

children.

Recommendation 2: Establishing a Long-Term Human Resources Strategy for Training Specialized Teachers and Teachers of the Deaf

To ensure that more DHH children receive quality education regardless of household income, it is appropriate to establish a system capable of implementing bilingual deaf education within the public education framework. Since the sustainability of this system depends on the teacher training system, a course should be created within the training program to cultivate specialized teachers who use sign language as the language of instruction. During the initial implementation phase, flexible measures are required, such as providing additional training for experienced, incumbent specialized teachers and provisionally certifying those who meet certain criteria as master trainers. Regarding deaf teachers, recognizing the current high barriers for deaf students to complete higher education and obtain teaching licenses, institutional options should be developed to allow their employment as assistant teachers based on their proficiency in sign language. Furthermore, mechanisms enabling diverse participation of deaf individuals in the education field must be created, such as establishing scholarship programs to promote teacher recruitment.

Recommendation 3: Development of Sign Language as a medium of instruction

Development of sign language as a medium of instruction must proceed while harmonizing both its autonomy as a natural language and its public nature as an institutional language of use. This does not deny the diversity of sign language in the country; rather, it is about establishing the necessary infrastructure to guarantee access to public education. When providing support, efforts should proceed based on the consensus of the domestic deaf community through the participation of deaf people. Therefore, it is desirable to establish a permanent consultative body involving deaf organizations, the Ministry of Education, and universities (including sign language researchers and deaf education researchers) to systematically collect/organize vocabulary in education, assess usage patterns, harmonize with the existing curriculum, develop learning materials in sign language and teaching aid and coordinate educational terminology. Having deaf individuals take the lead in sign language collection and creating digital video dictionaries, while prioritizing the establishment of core vocabulary needed for education, will establish sign language's public role as an educational language. Development of sign language as a medium of instruction is underpinned by societal understanding. Establishing a legal framework recognizing sign language as a medium of instruction, providing basic training for teachers, healthcare professionals, and government officials, conducting awareness campaigns like Sign Language Day/Week, and promoting outreach through television and social media will form the foundation for society to recognize sign language not as special support but as a legitimate educational language.

Furthermore, since the development process and early intervention are interdependent, establishing a cyclical mechanism, extracting the educational core vocabulary used in the pilot described in Recommendation 1 from the development process, feeding back language usage data observed in the pilot to the development task team, and reflecting actual natural sign language usage in parent-child classes into dictionaries and teaching materials will prevent development process from becoming detached from the field while enabling a language planning approach rooted in practice. These measures hold significant policy implications, directly contributing not merely to the development of sign language but to safeguarding the language rights of deaf children, building foundational academic skills, and addressing educational disparities.

(3) Concluding remark

Supporting bilingual deaf education in developing countries does not mean choosing a specific teaching method but rather represents a comprehensive response to complex challenges; guaranteeing language rights, developing human resources, and ensuring the quality of learning for DHH children within inclusive education. Multiple approaches, such as TC and auditory-oral methods, coexist in some countries, and educational settings are not uniform. Within this diversity, providing options that reliably ensure learning opportunities for children with limited access to spoken language is particularly crucial from a rights-based perspective.

On the other hand, few developing countries have achieved sufficient coverage of NHS and hearing technology, yet numerous deaf children reach school age without receiving adequate language input during infancy and early childhood. This situation creates a serious challenge of language deprivation. Given the long-term effects of language deprivation on cognitive development, self-concept, academic achievement, and social-emotional skills, the paramount challenge in developing countries is establishing systems that guarantee reliable language access from early childhood. From this perspective, areas requiring sustained support include: developing environments that guarantee early access to sign language while adapting to each country's context; continuously generating evidence to ensure sign language is appropriately positioned as an educational language without marginalization; and strengthening the foundation for bilingual deaf education. This is expected to lead to the establishment of systems that enable all DHH children to access appropriate language environments and quality learning.

References

English

- Ainscow, M. & César, M. (2006). The Salamanca Statement; 25 years on. *European Journal of Psychology of Education, Volume 21*.
- Ainscow, M., Slee, R. & Best, M. (2019). Inclusive education ten years after Salamanca; Setting the agenda. *International Journal of Inclusive Education, Volume 23, Issue 7/8*.
- Alier, K. K., Malcolm, K. A., Zhang, W., Alphonse, J., Lee, T. T., Akera, M., Okwahi, A., Rubena, J., Cole, J., Solomon, D., & Reed, N. (2025). Hearing care in low-resourced and humanitarian settings; findings from a pilot study in South Sudan. *International Journal of Audiology, Vol. 64, No. 8*.
- Amor, A. M., Hagiwara, M., Karrie A. Shogren, K. A., Thompson, J. R., Verdugo, M. Á., Kathryn M. Burke, K. M. & Aguayo, V. (2018). International perspectives and trends in research on inclusive education; a systematic review. *International Journal of Inclusive Education, Volume 23, Issue 2*.
- Andrews, J. F. & Rusher, M. (2010). Codeswitching techniques; Evidence-based instructional practices for the ASL/English bilingual classroom. *American Annals of the Deaf, Volume 155, Number 4*.
- Andriani, N. W., Naftali, Z., Marliyawati, D., Widodo, P. & Muyassaroh. (2024). Factors influencing auditory verbal therapy outcome among children with cochlear implant. *Indonesian Journal of Biomedicine and Clinical Sciences, Volume 57, Number 1*.
- Antia, S., Stinson, M. S. & Gaustad, M. G. (2002). Developing Membership in the Education of Deaf and Hard-of-Hearing Students in Inclusive Settings. *Journal of Deaf Studies and Deaf Education, 7(3)*.
- Antia, S., Sabers, D. L. & Stinson, M. S. (2007). Validity and reliability of the classroom participation questionnaire with deaf and hard of hearing students in public schools. *Journal of Deaf Studies and Deaf Education, 12(2)*.
- Antia, S. & Metz, K. K. (2014). Co-enrollment in the United States; A critical analysis of benefits and challenges. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*.
- Antia, S. Knoors, H. & Marschark, M. (2019). Co-Enrollment and the Education of Deaf and Hard-of-Hearing Learners; Foundations, Implementation, and Challenges. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Archbold, S. (2010). Children with cochlear Implants — what is needed — and what is wanted in the long-term? *Cochlear Implants International, Volume 11*.
- The Asia Foundation. (2021). *Philippine Disability Sector Research; An Initial Analysis of Access to*

Social and Public Services, Education, Work and Employment, and Civic Participation and Governance. Asia Foundation.

- Athanasopoulos, M., Samara, P., Batsouras, G. & Athanasopoulos, I. (2024). Making a difference from day one; The urgent need for universal neonatal hearing screening, *Children*, 2024, 11, 1479.
- Bagga-Gupta, S. (2002). Explorations in bilingual instructional interaction; a sociocultural perspective on literacy. *Learning and Instruction*, 12.
- Balanquit, L. N. (2025). Language change in Filipino Sign Language cardinal numerals. *University of Pennsylvania School of Arts & Science, Penn Working Papers in Linguistics, Volume 31.2*.
- Barnes, C. & Mercer, G.(eds.) (2005). *The Social Model of Disability and the Majority World*. The Disability Press.
- Bat-Chava, Y. (2000). Diversity of deaf identities. *American Annals of Deaf*, 145(5).
- Berent, G. P. (2004). Sign language-spoken language bilingualism; Code mixing and mode mixing by ASL-English bilinguals. In Bhatia, T. K. & Ritchie, W. C. (eds.), *The handbook of bilingualism*. Wiley-Blackwell.
- Bradley, J. (2022). The Changing Roles of Special Education Teachers in the 21st Century. *Brandon University Journal of Graduate Studies in Education, Volume 14, Supplement 2*.
- Bussé, A. M. L., Mackey, A. R., Bussé, M. L., Hoeve, H. L. J., Goedegebure, A., Carr, G., Simonsz, H. J., Uhlén, I. M. & for the EUSCREEN Foundation. (2021). Assessment of hearing screening programmes across 47 countries or regions II: coverage, referral, follow-up and detection rates from newborn hearing screening. *International Journal of Audiology*, 2021, Vol. 60, No. 11.
- Casoojee, A., Khoza-Shangase, K. & Kanji, A. (2024). A comparative study of learning outcomes for hearing-impaired foundation phase learners. *South African Journal of Childhood Education*, 14(1).
- Chanlivong, K. (2025). Empowering Laos' Deaf Community Through Education and Employment, *The Laotian Times (February 14, 2025)*, <https://laotiantimes.com/2025/02/14/empowering-laos-deaf-community-through-education-and-employment/>
- Chiong, C. M. (2023). Newborn Hearing Screening and Beyond; A Continuing Journey in the Philippines. *ACTA Medica Philippina*, Vol. 57, No.9.
- Christiansen, J.B. & Leigh, I.W. (eds.) (2002). *Cochlear implants in children; Ethics and choices*. Gallaudet University Press.
- Conrad, R. (1979). *The deaf school child; Language and Cognitive function*. Harper & Low.
- Cummins, J. (1979). Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters. *Working Papers on Bilingualism*, No. 19.
- Cummins, J. (1980). Psychological assessment of immigrant children; Logic or intuition? *Journal of Multilingual and Multicultural Development*, 1.

- Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In California State Department of Education (Ed.) *Schooling and language minority students; A theoretical framework*. Evaluation, Dissemination, and Assessment Center, California State University.
- Cummins, J. (1996). *Negotiating identities; Education for empowerment in a diverse society*. California Association for Bilingual Education.
- Cummins, J. (2000). *Language, power and pedagogy; Bilingual Children in the Crossfire*, Multilingual Matters.
- Cummins, J. (2005). A Proposal for Actions; Strategies for Recognizing Heritage Language Competence as a Learning Resource within the Mainstream Classroom, *Modern Language Journal*, 89.
- Daculan, M. D., Tan, A. J. O., & Ceniza-Canillo, A. M. (2022). The Development and Assessment of Pattern Matching Algorithms Used by ZEE; A Filipino Sign Language (FSL) Dictionary and English-Learning App. *Proceedings of the 36th Pacific Asia Conference on Language, Information and Computation*.
- Davidson, K, Lillo-Martin, D. & Chen Pichler, D. (2014). Spoken English language development among native signing children with cochlear implants. *Journal of Deaf Studies and Deaf Education*, 19(2).
- Dillard, L. K., Der, Laplante-Lévesque, A., Swanepoel, D. W., Thorne, P. R., McPherson, B., de Andrade, V., Newall, J., Ramos, H. D., Kaspar, A., Nieman, C. L., Clark, J. L., Chadha, S. (2024). Service delivery approaches related to hearing aids in low- and middle-income countries or resource-limited settings; A systematic scoping review. *PLOS Global Public Health*, 24;4.
- The European Association of Service Providers for Persons with Disabilities. (2015). *Towards More Inclusive Learning Environments in Europe*.
- Emmorey, K., & Corina, D. (1990). Lexical recognition in sign language; Effects of phonetic structure and morphology. *Perceptual and Motor Skills*, 71(3, Pt 2).
- Emmorey, K. (1991). Repetition priming with aspect and agreement morphology in American Sign Language. *Journal of Psycholinguistic Research*, Volume 20.
- Enfield, N. J. (2008) Lao Linguistics in the 20th Century and Since. In: Goudineau, Y. & Lorrillard, M. (eds.) *Recherches nouvelles sur le Laos*. EFEO.
- Engberg-Pedersen, E. (2022). *Signed languages in the Nordic countries*. Nordics. Info., <https://nordics.info/show/artikel/signed-languages-in-the-nordic-countries>
- Fuente, J. A. D. (2021). Implementing inclusive education in the Philippines; College teacher experiences with deaf students. *Issues in Educational Research*, 31(1).
- Friend, M. & Cook, L. (2010). *Interactions; Collaboration Skills for School Professionals*. Pearson.

- Gibson, H., Small, A. & Mason, D. (1997). Deaf bilingual bicultural education. In Cummins, J. and Corson, D. (eds.) *Encyclopedia of language and education, Volume 5; Bilingual Education*. Springer.
- Hall, M. L., Eigsti, IM, Bortfeld, H. & Lillo-Martin, D. (2017). Auditory deprivation does not impair executive function, but language deprivation might. *The Journal of Deaf Studies and Deaf Education, 22*(1).
- Han, D. Y. & Wang, C. C. (2013). The Current Status and Focus of Cochlear Implantation. *Chinese Scientific Journal of Hearing and Speech Rehabilitation, 2013; 5*.
- Hassanzadeh, S. (2012). Outcomes of cochlear implantation in deaf children of deaf parents; comparative study. *The Journal of Laryngology & Otology, 126*.
- Hualanda, H. & Holmström, I. (2019). When language recognition and language shaming go hand in hand – sign language ideologies in Sweden and Norway. *Deafness & Education International, 21*(2).
- Hauser, P. C., O’Hearn, A., McKee, M, Steider, A. & Thew, D. (2010). Deaf Epistemology; Deafhood and Deafness. *American Annals of the Deaf, Volume 154, Number 5*.
- Heiling, K. (1995). Bilingual vs. oral education; a comparison of academic achievement levels in deaf eighth-graders from two decades. *Paper presented at the International Congress on Education of the Deaf*.
- Henner, J., Caldwell-Harris, C. L., Novogrodsky, R. & Hoffmeister, R. (2016). American sign language syntax and analogical reasoning skills Are Influenced by Early Acquisition and Age of Entry to Signing Schools for the Deaf. *Frontiers in Psychology, 7* (2016).
- Hergis, L. (2009). Analysis of measurements from the first Swedish universal neonatal hearing screening program. *International Journal of Audiology, 2007, Vol. 46, No. 11*.
- Hermans, D., Ormel, E. & Knoors, H. (2010). On the relation between the signing and reading skills of Deaf bilinguals. *International Journal of Bilingual Education and Bilingualism, 13*.
- Hermans, D., Wauters, L., de Klerk, A. & Knoors, H. (2014). Quality of instruction in bilingual schools for deaf children; Through the children’s eyes and the camera’s lens. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Hintermair, M. (2008). Self-esteem and Satisfaction With Life of Deaf and Hard-of-Hearing People - A Resource-Oriented Approach to Identity Work. *Journal of Deaf Studies and Deaf Education, 13;2*.
- Hoffmeister, R. J. (2000). A piece of the puzzle; ASL and reading comprehension in Deaf children. In Chamberlain, C., Morford, J. P. & Mayberry, R. I. (eds.) *Language Acquisition by eye*. Psychology Press.
- Hollowell, J. L. & Takagi, A. (2022). The status of newborn hearing screening in Japan; Past, present

- and the Future. *Cureus*, 14(9).
- Humphries, T., Kushalnagar, P., Mathur, G., Jo Napoli, D., Padden, C. & Rathmann, C. (2014). Ensuring language acquisition for deaf children; What linguists can do. *Language*, Volume 90, Number 2.
- Hurlbut, H. M. (2008). *Philippine Sign Language Survey; A Rapid Appraisal*. SIL international.
- Imperial, M. F. (2015). Kinds of sign languages in the Philippines. VERA files, <https://verafiles.org/articles/kinds-of-sign-language-in-the-philippines>
- Jepsen, J. B., DeClerck, G., Lutalo-Kiingi, S. & McGregor, W. B. (eds.) (2015). *Sign Languages of the World; A Comparative Handbook*. Walter de Gruyter, Inc./Ishara Press.
- Johnson, R., Liddell, S. & Erting, C. (1989). *Unlocking the Curriculum; Principles for Achieving Access in Deaf Education*. Gallaudet Research Institute Working Paper.
- Kenney, C. R., McCann, D. C., Campbell, M. J., Law, C. M., Mullee, M., Petrou, S., Watkin, P., Worford, S., Yuen, H. M. & Stevenson, J., (2006). Language ability after early detection of permanent childhood hearing impairment. *The New England Journal of Medicine*, Vol. 354, No. 20.
- Kilag, O. K., Torres, J. L., Mira, J. P., Ramos, G. P. & Peranco, R. (2025). The State of Special Education in the Philippines; Challenges and Opportunities for Inclusive Practices. *International Multidisciplinary Journal of Research for Innovation, Sustainability and Excellence*, Volume 2, Issue no. 2.
- Knors, H. & Marschark, M. (2014). *Teaching Deaf Learners; Psychological and Developmental Foundations*, Oxford University Press.
- Karchmer, M. & Mitchell, R. (2003). Demographic and achievement characteristics of deaf and hard-of-hearing students. In Marschark & Spencer (Eds.), *Oxford handbook of deaf studies, language, and education*. Oxford University Press.
- Kirchner, C. J. (2019). TRIPOD; Answer to the seeds of discontent. In Marschark, M., Antia, S. & Knors, H. (eds.), *Co-enrollment in deaf education*, Oxford University Press.
- Knors, H., Brons, M. and Marschark, M. (eds.) (2019). *Deaf Education beyond the Western World*. Oxford University Press.
- Kreimeyer, K. H., Crooke, P., Drye, C., Egbert, V. & Klein, B. (2000). Academic and social benefits of co-enrollment model of inclusive education for deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education*, 5.
- Kyle, J. G., & Woll, B. (1985). *Sign Language; The Study of Deaf People and Their Language*. Cambridge University Press.
- Langga, M. M., Sabandal, K. N., Datu-Ulama, R. T., Guimba, W. D., Sialana-Nalla, A. N. & Alico, J. C. (2021). Communication Approaches of Hearing-Impaired Students in an English Language Learning Classroom; The Case of a Public Elementary School. *International Journal of English*

Language Studies, Volume 3, Issue 4.

- Lange, C. M., Lane-Outlaw, S., Lange, W. E. & Sherwood, D. L. (2013). American sign language/English bilingual model; a longitudinal study of academic growth. *Journal of Deaf Studies and Deaf Education, 18;4.*
- LaSasso, C. & Lollis, J. (2003). Survey of Residential and Day Schools for Deaf Students in the United States That Identify Themselves as Bilingual-Bicultural Programs, *Journal of Deaf Studies and Deaf Education, Vol.8, No.1.*
- Lee, Y. & Outhaithany, S. (2011). *Inclusive education*, 2nd Annual Forum for High Officials of Basic Education of SEAMEO Member Countries and Associate Members.
- Leigh I. W. (2009). *A Lens on Deaf Identities*, Oxford University Press.
- Leigh, I. W. & Bat-Chava, Y. (2009). Correlates of psychosocial adjustment in deaf adolescents with and without cochlear implants; A preliminary investigation. *Journal of Deaf Studies and Deaf Education, 14;2.*
- Lou, M. W. (2012). The history of language use in the education of the Deaf in the United States, In Strong, M. (ed.) *Language Learning and Deafness*. Cambridge University Press.
- Marschark, M. (2009). *Raising and educating a deaf child; A comprehensive guide to the choices, controversies, and decisions faced by parents and educators*. Oxford University Press.
- Marschark, M. & Spencer, P. E. (eds.) (2010). *The Oxford handbook of deaf studies, language, and education*. Oxford University Press.
- Marschark, M. Lang, H. G. & Albertini, J. A. (2012). *Educating Deaf Students; From Research to Practice*. Oxford University Press.
- Marschark, M., Tang, G. & Knoors, H. (eds.) (2014). *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Martin, M. P., Balanzategui, M. V. & Morgan, G. (2014). Sign bilingual and co-enrollment education for children with cochlear implants in Madrid, Spain. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Mason, D. G. (1994). Bilingual/Bicultural deaf education is appropriate, *Occasional Monograph Series, Number 2*, Association of Canadian Educators of the Hearing Impaired.
- Maxwell-McCaw, D. & Zea, M. C. (2011). The Deaf Acculturation Scale (DAS); development and validation of a 58-item measure. *Journal of Deaf Studies and Deaf Education, 16;3.*
- Mayberry, R. & Fischer, S. (1989). Looking through phonological shape to lexical meaning; The bottleneck of non-native sign language processing. *Memory and Cognition, 17.*
- Mayberry, R. I. & Eichen, E. B. (1991). The long-lasting advantage of learning sign language in childhood. Another look at the critical period for language acquisition. *Journal of Memory and Language, 30.*
- Mayberry, R. I. & Kluender, R. (2018). Rethinking the critical period for language; New insights

- into an old question from American Sign Language. *Bilingualism; Language and Cognition*, Volume 21, Issue 5.
- Mayberry, R. I. & Lock, E. (2003). Age constraints on first versus second language acquisition; Evidence for linguistic plasticity and epigenesis. *Brain and Language*, Volume 87, Issue 3.
- Mayer, C. & Wells, G. (1996). Can the linguistic interdependence theory support a bilingual-bicultural model of literacy education for deaf students? *The Journal of Deaf Studies and Deaf Education*, 1 (2).
- Mayer, C. & Akamatsu, C. T. (1999). Bilingual-Bicultural Models of Literacy Education for Deaf Students; Considering the Claims. *Journal of Deaf Studies and Deaf Education*, 4.
- Mayer, C. & Leigh, G. (2010). The changing context for sign bilingual education programs; issues in language and the development of literacy. *International Journal of Bilingual Education and Bilingualism*, 13.
- McCain, K. G. & Antia, S. (2005). Academic and Social Status of Hearing, Deaf, and Hard of Hearing Students Participating in a Co-enrolled Classroom. *Communication Disorders Quarterly*, 27(1).
- Mendoza, A. (2018). The sign language unique to Deaf Filipinos. *CNN Philippines* (October 29, 2018), <https://web.archive.org/web/20221010011356/https://www.cnnphilippines.com/life/culture/2018/10/29/Filipino-Sign-Language.html>
- Metila, R. A., Pradilla, L. A., & Williams, A. (2016). The challenge of implementing mother tongue education in linguistically diverse contexts; The case of the Philippines. *The Asia-Pacific Education Researcher*, 25(5-6).
- Miles, S. & Singal, N. (2010). The Education for All and inclusive education debate; Conflict, contradiction or opportunity? *International Journal of Inclusive Education*, Volume 14.
- Mitler, P. (2000). *Working Towards Inclusive Education; Social Contexts*. David Fulton Publishers.
- Moore, D. (2001). *Educating the deaf; Psychology, principles, and practices*. Houghton Mifflin.
- Mugnier, S. (2021). Plurilingualism in Deaf Education in France; Language Policies, Ideologies and Practices for the Bimodal Bilingual Skills of Deaf Children. In Snoddon, K. & Weber, J. (eds.) *Critical Perspectives on Plurilingualism in Deaf Education*. Multilingual Matters.
- Murray, J. J., Hall, W. C. & Snoddon, K. (2019). Education and health of children with hearing loss; The necessity of signed languages. *Bulletin of the World Health Organization*, 97(10).
- Murray, J. J., Hall, W. C. & Snoddon, K. (2020). The importance of signed languages for deaf children and their families. *The Hearing Journal*, 7(3).
- Ndegwa, S., Pavlik, M., Gallagher, E. R., King'e, M., Bocha, M., Mokoh, L. W., Macharia, I., Stringer, P., Njuguna, I., Wamalwa, D. & Benki-Nugent, S. (2024). Hearing Loss Detection and Early Intervention Strategies in Kenya. *Annals of Global Health*, Volume 90, Issue 1.

- Neuman, S. B. & Dickinson, D. K. (eds.) (2006). *Handbook of early literacy research*. The Guilford Press.
- Newal, J., Biddulph, R., Ramos, H. & Kwok, C. (2019). Hearing aid or “band aid”? Evaluating large scale hearing aid donation programmes in the Philippines. *International Journal of Audiology*, Vol. 58, No. 12.
- Newal, J. P., Martinez, N., Swanepoel, D. W. & McMahon, C. M. (2020). A National Survey of Hearing Loss in the Philippines. *Asia Pacific Journal of Health*, 32(5).
- Newport, E. L. (1990). Maturation constraints on language learning. *Cognitive Science*, 14.
- Nolasco, R. M. (2008). The prospects of multilingual education and literacy in the Philippines. *SEAMEO Presentation Document*.
https://www.seameo.org/_ld2008/documents/Presentation_document/NolascoTHE_PROSPECTS_OF_MULTILINGUAL_EDUCATION.pdf
- Noschese, E. J. (2023). The Positioning of WH Words in Modern Laos Sign Language. *Sign Language Studies*. Vol. 23, No. 2.
- Oh, J. (2025). The Filipination; Philippine governmental efforts towards nation-building through national language policies. *Journal of Multilingual and Multicultural Development*. Advance online publication. <https://doi.org/10.1080/01434632.2025.2571455>
- Olusanya, B. O. (2015). Screening for neonatal deafness in resource-poor countries; challenges and solutions. *Research and Reports in Neonatology*, 2015;5.
- Padden, C. & Ramsey, C. (2000). American Sign Language and reading ability. In Chamberlain, C., Morford, J. P. & Mayberry, R. I. (eds.) *Language Acquisition by eye*. Psychology Press.
- Paludneviene, P. & Harris, R. L. (2011). Impact of cochlear implants on the deaf community, In Paludneviene, P. & Leigh, I. W. (eds.) *Cochlear implants; Evolving Perspectives*. Gallaudet University Press.
- Paul, P. (1998). *Literacy and deafness; The development of reading, writing, and literate thought*. Allyn & Bacon.
- Paul, P. & Moores, D. (2012). *Deaf Epistemologies – Multiple Perspectives on the Acquisition of Knowledge*. Gallaudet University Press.
- Pedersen, H. F. & Beste-Guldborg, A. (2019). The Impact of a Collaborative Consultation Service Delivery Model for Rural Deaf/Hard of Hearing Students. *Journal of Education and Learning*; Vol. 8, No. 5.
- Pickersgill, M. and Gregory, S. (1998). *Sign bilingualism; A model*. Adept Press.
- Pizarro, L. (n.d.). *What inclusive education means for d/Deaf learners in the Philippines; Considerations in designing a deaf-inclusive education model*. Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc.
- Plaza-Pust, C. & Morales-Lopez, E. (eds.) (2008). *Sign Bilingualism; Language development*,

- interaction, and maintenance in sign language contact situations.* John Benjamin.
- Priestley, K., Enns, C. & Arbuckle, S. (2017). Altering Practices to Include Bimodal-bilingual (ASL-Spoken English) Programming at a Small School for the Deaf in Canada, *Journal of Deaf Studies and Deaf Education*, 2017.
- Proske, S., Hermann, A., Hosemann, J. & Steinbach, M. (2020). A Grammar of German Sign Language (DGS). <https://www3.thesignhub.eu/grammar/dgs/pdf>
- Punch, R. & Hyde, M. B. (2011). Communication, Psychosocial, and Educational Outcomes of Children with Cochlear Implants and Challenges Remaining for Professionals and Parents. *International Journal of Otolaryngology*, Volume 2011.
- Raeve, L. D. & Hardeveld, R. V. (2013). Prevalence of Cochlear implants in Europe; What do we know and what can we expect? *Journal of Hearing Science*, Vol. 3, No. 4.
- Raeve, L. D., Archbold, S., Lehnhardt-Gorjian, M. & Kemp, T. (2020). Prevalence of cochlear implants in Europe: trend between 2010 and 2016. *Cochlear Implants International*, 21(5).
- Raine, C. (2013). Cochlear implants in the United Kingdom; Awareness and utilization. *Cochlear Implants International*, Volume 14.
- Ramos, H., Baguyo, B. & Martinez, N. (2018). Improving access to hearing care and hearing rehabilitation in the Philippines. *Community Ear & Hearing Health*, Volume 15, Issue 19.
- Richter, M. M., Lewis, T. J. & Hagar, J. (2012). The relationship between principal leadership skills and school-wide positive behavior support; an exploratory study. *Journal of Positive Behavior Interventions*, 2012, 12; 69.
- Rinaldi, P., Caselli, M. C., Onofrio, D. & Volterra, V. (2014). Language acquisition by bilingual deaf preschoolers; Theoretical and methodological issues and empirical data. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Robles, A. C., Chiong, C. M., Velasco, K. J., Dela Cruz, A. P., Ombao, J. C., Tantoco, M. L., Ricalde, R., Labra, P. J. & Laganao, C. R. (2024). Auditory outcomes of cochlear implantation among pediatric patients under the Philippine National Cochlear Implant Program. *ACTA Medica Philippina*, Volume 59, Issue 16.
- Rogers, A. (2020). The Filipino Sign Language Act in the Philippines; Policy Analysis. *Gallaudet University, Honors Capstones*, 73.
- Ruben, R. J. (2005). Sign language; Its history and contribution to the understanding of the biological nature of language, *Acta Oto-Laryngologica*, 2005, 125.
- Shaver, D., Marschark, M., Newman, L., & Marder, C. (2014). Who is where? Characteristics of deaf and hard-of-hearing students in regular and special schools. *Journal of Deaf Studies and Deaf Education*, 19 (2).
- Silvestri, J. A. & Hartman, M. C. (2022). Inclusion and Deaf and Hard of Hearing Students; Finding

- Asylum. *Education Science*, 12.
- Singleton, J. L., Morgan, D., DiGello, E., Wiles, J., & Rivers, R. (2004). Vocabulary Use by Low, Moderate, and High ASL-Proficient Writers Compared to Hearing ESL and Monolingual Speakers. *Journal of Deaf Studies and Deaf Education*, 9(1).
- Small, A. & Mason, D. (2008). American Sign Language (ASL) bilingual bicultural education. In Cummins, J. & Hornberger. (eds.) *Encyclopedia of language and education, 2nd edn, Volume5; Bilingual Education*. Springer.
- Snoddon, K. (2008). American Sign Language and early intervention. *The Canadian Modern Language Review*, 64.
- Spencer, P. E. & Marschark, M. (2010). *Paradigm shifts, difficult truths, and an increasing knowledge base in deaf education*. In Marschark, M. & Spencer, P. E. (eds.) *The Oxford handbook of deaf studies, language, and education*. Oxford University Press.
- Stepanchak, M. A. (2017). Factors Affecting DHH-Specific Quality of Life in Deaf/HH Adolescents Attending Mainstream Schools. *A thesis submitted in partial fulfillment of the requirements for the degree of Master of Public Health, University of Washington*.
- Stinson, M. S. & Antia, S. D. (1999). Considerations in educating deaf and hard-of-hearing students in inclusive settings. *Journal of Deaf Studies and Deaf Education*, 4; 3.
- Stokoe, W. C. (1960/1978). Sign language structure; An outline of the visual communication systems of the American Deaf, *Journal of Deaf Studies and Deaf Education*, 10(1).
- Stringer, P. (2022). Helping Children with Hearing Loss in Developing Countries Listen, Talk, and Thrive, *The Hearing Journal*, April 2022.
- Strong, M. & Prinz, P. (2000). Is American Sign Language Skill Related to English Literacy? In Chamberlain, C., Morford, J. P. & Mayberry, R. I. (eds.) *Language Acquisition by eye*. Psychology Press.
- Svartholm, K. (2014). 35 years of Bilingual Deaf Education – and then? In *Educar em Revista*.
http://www.scielo.br/scielo.php?pid=S0104-40602014000600004&script=sci_arttext&tlng=en
- Swanson, B., Vaelen, E. V., Jassens, M., Goorevich, M., Nygard, T. & Herck, K. V. (2007). Cochlear implant signal processing ICs. Institute of Electrical and Electronics Engineers, 2007, Custom Intergrated Circuits Conference Paper.
- Swanwick, R. (1998). The teaching and learning of literacy within sign bilingual approach, In Gregory, S., Knight, P., McCracken, W. Powers, W., & Watson, S. (eds.) *Issues in deaf education*. David Fulton Publishers.
- Swanwick, R. & Gregory, S. (2008). *Sign Bilingual Education; Policy and Practice*, Douglas McLean.
- Swanwick, R. (2010). Policy and practice in sign bilingual education; Development, challenges and directions. *International Journal of Bilingual Education and Bilingualism*, 13(2).

- Swanwick, R. (2016). Deaf Children's Bimodal Bilingualism and Education. *Language Teaching*, 49(01).
- Swanwick, R., Hendar, O., Dammeyer, J., Kristoffersen, A., Satler, J. & Simonsen, E. (2014). Shifting contexts and practices in sign bilingual education in Northern Europe; Implications for professional development and training. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Tabingo, S. D. & Lovitos, A. H. R. (2025). Analyzing Filipino Sign Language through Systemic Functional Linguistics. *International Journal of Research and Innovation in Social Science*, IX(II).
- Tadeo, P. (2017). How the deaf use social media for their advocacies, Rappler (September 8, 2017), <https://www.rappler.com/moveph/social-good-summit/181503-how-deaf-use-social-media-advocacies/>
- Tang, G., Lam, S. & Yiu, K.C. (2014). Language development of Deaf and hard-of hearing students in a sign bilingual and co-enrollment environment. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Tang, G. (2016). Sign Bilingualism in Deaf Education; From Deaf Schools to Regular School Settings. In O. García, O., Lin, A. M. Y. & May, S. (eds.), *Bilingual and Multilingual Education*. Springer Nature.
- Thomazet, S. (2009). From integration to inclusive education; does changing the terms improve practice? *International Journal of Inclusive Education*, Volume 13, Issue 6.
- Tucci, D., Merson, M. G. & Wilson, B. S. (2010). A summary of the literature on global hearing impairment; current status and priorities for action. *Otology & Neurotology*, 31.
- UNESCO. (2005). *Guidelines for Inclusion; Ensuring Access to Education for All*.
- UNESCO. (2008). *Global Monitoring Report 2008; Education for All by 2015; Will we make it?*
- UNICEF ESARO. (2021). *Sign Language for Deaf Children's Education and Guidance on its Use in Accessible Digital Teaching & Learning Materials*.
- Vislie, L. (2003). From integration to inclusion; focusing global trends and changes in the Western European societies. *European Journal of Special Needs Education*, Volume 18, Issue 1.
- Waterworth, C. J., Marella, M., Bhutta, M. F., Dowell, R., Khim, K. & Annear, P. L. (2022). Access to ear and hearing care services in Cambodia; a qualitative enquiry into experiences of key informants. *The Journal of Laryngology & Otology*, 138.
- Wauters, L.N., Van Bon, W. H. J. and Tellings, A. E. J. M. (2006). Reading Comprehension of Dutch Deaf Children. *Reading and Writing*, Vol 19.
- West, N. C., Kressner, A. A., Bauingard, L. H., Sandvej, M. G. Bille, M. & Caye-Thomasén, P. (2020). Nordic results of cochlear implantation in adults; speech perception and patient reported outcomes. *Acta Oto-Laryngologica*, 140(11).

- WHO. (2021). World Report on Hearing. <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- Wilbur, R. (2001). Sign language and successful bilingual development of deaf children. *Journal of the Institute for Social Research*, 56.
- Winston, E. A. (2004). Interpretability and Accessibility of Mainstream Classrooms. In Winston, E. A. (ed.) *Educational Interpreting; How It Can Succeed*. Gallaudet University Press.
- de Wit, M. (2017). Sign language interpreter use in inclusive education. In Reuter, K. (ed.), *UNCRPD Implementation in Europe – A Deaf Perspective*. European Union of the Deaf.
- Wolfensberger, W. (1972). *The Principle of Normalization In Human Services*. National Institute on Mental Retardation.
- Wood, S. (2007). Degrees of resiliency in acquisition of language. *Nanzan Linguistics (Special issue 3)*, 1.
- Wood, S. (2011). Acquisition of topicalization in very late learners of LIBRAS; Degrees of resilience in language. In Mathur, G. & Napoli, D. J. (eds.) *Deaf around the world: The impact of language*, Oxford University Press.
- Woodward, J. (1996). Modern Standard Thai Sign Language, Influence from ASL, and Its Relationship to Original Thai Sign Varieties. *Sign Language Studies*, 92 (1).
- Wong, J. T. & Alcantara-Doroja, E. C. (2015). General education and special education; Harmonization of inclusive education towards K-12 system in the Philippines. *Proceedings of the International Conference on Special Education, Vol.1*.
- Yiu, K. C. & Tang, G. (2014). Social integration of deaf and hard-of-hearing students in a sign bilingual and co-enrollment environment. In Marschark, M., Tang, G. & Knoors, H. (eds.) *Bilingualism and Bilingual Deaf Education*. Oxford University Press.
- Yiu, K. C. (2024). Measuring academic attainment and progress of deaf and hard of hearing students in Sign Bilingualism and Co-enrollment (SLCO) classrooms; A case study. *Deafness & Education International, Volume 26, Issue 1*.
- Yoshinaga-Itano, C. (2004). From screening to early identification and intervention. In Power, D. & Leigh, G. (eds.) *Educating deaf students; Global Perspectives*, Gallaudet University Press.
- Japanese
- Abe, T. (2021). How Japanese Sign Language/Written Japanese bilingual Deaf children read any books in Japanese? *Journal of the Faculty of Human Sciences, Kyushu Sangyo Univ. 2021*; 3.
- Kanazawa, T. (2023). Sociolinguistic considerations in the definition of sign language. *Japanese Journal for Sign Language Studies*, 32(2).
- Kuroda, K. (2022). Inclusive kyoiku no global governance to Tokubetsu shien kyoiku: sono soukokuto renkei kanosei. In Kawaguchi, J. (ed.), *SDGs jidai no Inclusive education: Global*

South no chosen. Akashi Shoten.

- Minei, M. (2021). Confirming the origin of inclusive education: 25 years since the Salamanca Statement. *The Journal of Senshu University for Teaching Profession Studies, Volume 1.*
- Mori, N. (2015). Current trends of cochlear implant in Japan. *Journal of Allied Health Sciences, Volume 6, Issue 1.*
- Moriya, K. (2025). Rouji no gengo kakutoku kankyo ni okeru Nihon no genjo to kadai. *Liberal Arts & Minority, vol.2.*
- Nakajima, T. (2018). *Rou kyoiku to Kotoba no shakai gengogaku.* Seikatsu Shoin.
- Saito, K. (2007). *Shosu gengo to shiteno shuwa.* University of Tokyo Press.
- Sasaki, M. (2008). Nihon ni okeru Bilingual rou kyoiku: Nani wo dou susumeru bekika. In Zenkoku rouji wo motsu oya no kai (ed.) *Bilingual de rouji ha sodatsu.* Seikatsu shoin.
- Sasaki, M. (2018). Koremade no Nihon ni okeru Bilingual rou kyoiku to sono rironteki haikai. *Studies in mother tongue, heritage language, and bilingual education, Preparatory workshop paper.*
- Sano, A., Masutani, A. & Abe, Y. (2018). The Use of Japanese Sign Language in Teaching Writing to Deaf Childre, *Studies in mother tongue, heritage language, and bilingual education, Volume 14.*
- Suzuki, T. (2022). *Rousha to Chosha no kakehashi ni.* Otsuki Shoten.
- Takashima, Y. (2020). Japanese Sign Language as an Endangered Language. *National Institute for Japanese Language and Linguistics Research Paper, Volume 18.*
- Takashima, Y. & Sugimoto, A. (2020). Linguistic Human Rights for Deaf and Hard of Hearing Children in the Era of Cochlear Implants: To Prevent Language Deprivation. *Language Policy, Volume 16.*
- Torigoe, T. (2009). Development and modification of bilingual deaf education in Sweden: An analysis of narratives by teachers of the schools for the deaf and hard-of-hearing children. *Hyogo University of Teacher Education, The Journal of School Education, Volume 19.*
- Ueno, M. (1977). Manual Method of the Education for the Deaf and Dumb from the 1840's to the 1850's in America. *Bulletin of defectology, Vol.1.*
- Uenou, S. (2003). Literacy mondai wo giron suru sai no zentei joken. Uenou, S. *Tatta hitori no Creole: Chokaku shogaiji kyoiku ni okeru gengoron to shogai ninsiki.* Pot Shuppan.