

A PEDAGOGICAL INTEGRATION OF DEEP LEARNING AND REFLECTIVE MATERNAL METHOD FOR DEVELOPING VERBAL COMMUNICATION IN DEAF AND HARD OF HEARING (DHH) STUDENTS

Dwi Septiani¹, Totok Bintoro², Yumna Rasyid³

Universitas Negeri Jakarta, Indonesia

Email: dwi.septiani@mhs.unj.ac.id¹, totokbintoro@unj.ac.id², yumna.rasyid@unj.ac.id³

ABSTRACT

Verbal communication development for deaf and hard-of-hearing (DHH) students often relies on mechanical drill-based tasks that fail to generalize into functional spoken interaction. This study aims to conceptualize a pedagogical integration of deep learning principles and the Reflective Maternal Method (RMM) to address this gap by promoting authentic verbal communication. As a preliminary needs-analysis phase of a Research and Development (R&D) framework, this qualitative study used semi-structured interviews with three experienced teachers at a public special elementary school in Jakarta, supported by document reviews, yielding 160 coded quotations for analysis. Thematic analysis, following Miles, Huberman, and Saldaña, was conducted using ATLAS.ti 24. Co-occurrence analysis using Jaccard coefficients also quantified relationships among pedagogical practices. Findings reveal that teachers implicitly enacted deep learning principles (mindful, meaningful, joyful learning) and RMM practices (contextual conversation, linguistic reflection) to foster verbal communication. Co-occurrence analysis confirmed the strongest integration between phonological teaching and strategies to elicit verbal communication skills (coefficient 0.10) and between joyful learning and verbal elicitation (0.10). The proposed pedagogical integration model links technical phoneme practice with authentic, meaningful verbal communication, supported by multisensory (VAKT) approaches, total communication, cooperative-communicative environments, and tripartite collaboration (teacher-peer-parent). This conceptual model offers a systematic evidence-based framework to guide verbal communication development in special education settings. This study offers a novel contribution by integrating deep learning and RMM into a coherent pedagogical framework for DHH verbal communication education, an area previously underexplored in Indonesian special education contexts.

Keywords: *reflective maternal method; verbal communication development; deaf and hard-of-hearing*

INTRODUCTION

Verbal communication is a fundamental component in the education of students with hearing disabilities because it plays a direct role in the development of verbal communication as the primary means of social interaction and academic participation (Antia et al., 2020; Ching & Cupples, 2015; Marschark & Spencer, 2016; Moores, 2001; Werfel et al., 2022). Verbal communication skills depend on articulatory accuracy and mastery of the phonological system, including detecting, discriminating, identifying, and

integrating phonemes into production (Baker, 2022; Bunawan & Yuwati, 2000; Waqar et al., 2023). Therefore, verbal communication is ideally designed as a comprehensive, context-based process that connects phonological exercises with language use in real, meaningful communication situations (Ching & Cupples, 2015; Nittrouer et al., 2020; Rotfleisch & Martindale, 2023; Werfel et al., 2022). However, current practices for developing verbal communication still rely on a dominant mechanistic approach (drill-based instruction) and remain fragmented (Cannon et al., 2022; Couvee et al., 2024; Marschark & Spencer, 2016; Moores, 2001). This approach tends to treat sound production as the ultimate goal without adequately integrating it into communicative and contextual language use (Aanondsen et al., 2023; Lederberg et al., 2019; Rotfleisch & Martindale, 2023). As a result, even though students can imitate sounds in isolation, this ability does not always translate into effective verbal communication intelligibility in everyday interactions (Ching & Cupples, 2015; Nittrouer et al., 2020; Waqar et al., 2023; Werfel et al., 2022). This condition indicates a gap between form-focused learning practices and the need for functional, meaningful, and contextual communication (Antia et al., 2020; Marschark & Spencer, 2016). This gap demands a shift toward deep learning, which emphasises meaning construction, cognitive-emotional engagement, and knowledge transfer to real-world contexts (Biggs & Tang, 2011; Fullan & Quinn, 2020; Hattie, 2009; Hilton & Pellegrino, 2012; Marton & Säljö, 1976; Habibah et al., 2026), principles highly relevant to verbal communication development, which integrates cognitive, social, and linguistic dimensions (Lederberg et al., 2019; Marschark & Spencer, 2016; Werfel et al., 2022).

Similarly, the Reflective Maternal Method (RMM) offers a naturalistic, communicative approach through meaningful interaction and linguistic reflection (Aini & Handriani, 2024; Bunawan & Yuwati, 2000; Purbaningrum & Rofiah, 2020; Tomasello, 2005; Vygotsky, 1978) (Bunawan & Yuwati, 2000; Purbaningrum & Rofiah, 2020), while multisensory approaches such as VAKT (Visual, Auditory, Kinesthetic, Tactile) strengthen phoneme perception and production (Baker, 2022; Couvee et al., 2024; Massaro, 2008; Waqar et al., 2023). However, these various approaches are generally still implemented partially and have not been integrated into a systematic and operational pedagogical framework (Lederberg et al., 2019; Purbaningrum & Rofiah, 2020; Rotfleisch & Martindale, 2023). Research Bintoro et al. (2023) In a special school in Jakarta, research confirmed that the effectiveness of this communicative approach depends heavily on the teacher's strategy for combining the oral method, which involves observing lip movements and facial expressions, with the manual method, which uses hand and finger movements to represent letters and words. Philosophically, limited auditory access in deafness impacts language and thought development (Wittgenstein, 1953; Vygotsky, 1986), requiring ongoing special education services even with hearing aid use Bintoro, 2023).

Effective verbal communication development also requires tripartite collaboration among teachers, peers, and parents (Fajri et al., 2024). Although various approaches have been developed, previous research tends to discuss phonological training, communicative interaction, and reflective learning separately rather than as a unified pedagogical framework (Aanondsen et al., 2023; Couvee et al., 2024; Rotfleisch & Martindale, 2023; Werfel et al., 2022). Furthermore, the concept of immersive learning has been primarily studied in general education contexts and has limited application in verbal communication instruction for students with hearing impairments (Fullan & Quinn, 2020; Lederberg et al., 2019). This breakdown has the potential to hinder the development of

functional verbal communication, because students do not optimally connect phonological skills with meaningful language use in multiple contexts (Ching & Cupples, 2015; Werfel et al., 2022).

Therefore, this study aims to conceptualize the pedagogical integration between deep learning and the Reflective Maternal Method (RMM) in verbal communication development for DHH students, with an emphasis on developing segmental phoneme mastery and functional verbal communication. The proposed model is expected to make a conceptual contribution by providing a coherent instructional framework that bridges phonological practice, meaningful learning, and language use in real communication contexts in special elementary schools.

To address this gap, the present study poses the following research question: How can deep learning principles and the Reflective Maternal Method be pedagogically integrated to support verbal communication development for DHH students? More specifically, this study aims to: (1) identify current instructional practices for developing verbal communication used by teachers in a special elementary school; (2) examine the extent to which deep learning principles and RMM practices are implicitly enacted; and (3) propose a conceptual model that systematically integrates these approaches into a coherent pedagogical framework. This study is a preliminary needs-analysis phase within a broader Research and Development (R&D) project, intended to inform the subsequent design and validation of a verbal communication learning model.

LITERATURE REVIEW

1. Phonology as the Foundation of Verbal Communication in Students with Hearing Impairments

Verbal communication development for students with hearing impairments serves as a foundation for developing verbal communication, enabling broader engagement in social interactions and academic activities (Antia et al., 2020; Marschark & Spencer, 2016; Moores, 2001). From a psycholinguistic perspective, verbal communication is determined by articulation skills and mastery of the phonological system, which encompasses the hierarchical stages of phoneme detection, discrimination, identification, and production (Bunawan & Yuwati, 2000; Waqar et al., 2023). Mastery of segmental phonemes at these stages is a prerequisite for verbal communication intelligibility in real communication (Ching & Cupples, 2015; Nittouer et al., 2020; Werfel et al., 2022).

In the Indonesian context, segmental phonemes include six vowels and consonants classified by place and manner of articulation (Chaer, 2021; Kushartanti et al., 2024). Indonesian's relatively consistent grapheme-phoneme relationships support systematic phoneme-based learning (Bintoro, 2023). Segmental phoneme development in DHH students follows a predictable sequence: sound detection, discrimination, word identification, word production, and use in simple sentences (Bintoro, 2023; Boothroyd, 1982). Teaching priorities begin with visually accessible phonemes (bilabial /p/, /b/, /m/) and gradually move to more abstract phonemes such as velar consonants (/k/, /g/, /ŋ/) and high-frequency fricatives (/s/, /f/, /h/) (Bintoro, 2023; Boothroyd, 1982). A multisensory approach allows students to access phonological features through various sensory channels, making phoneme internalization a holistic linguistic experience (Couvee et al., 2024; Werfel et al., 2022). Recent research by Septiani, Koebanu, and Lustyantie (2025)

further highlights that while cochlear implants enhance auditory input and phonemic awareness in DHH students, dysgraphia, a specific learning disability affecting writing, can significantly hinder writing skills, manifesting in irregular letter formation, inconsistent spacing, and poor spelling. This finding reinforces the argument that phonological development alone is insufficient without addressing the associated cognitive and motor challenges that affect written language production.

Research by Tomblin et al. (2020) and Walker et al. (2025) found that phonological deficits in DHH children have long-term effects on reading skills. Rotfleisch & Martindale (2023) emphasize the distinction between audible and comprehensible; an audiogram indicates sound detection capacity but does not ensure quality of perception, discrimination, or meaningful sound identification. Limited auditory access hampers DHH students' ability to develop stable phonological representations, impairing sound differentiation and speech production or verbal communication (Ching & Cupples, 2015; Lederberg et al., 2019; Nittrouer et al., 2020). The mechanistic approach, in which phonetic exercises are repeated in isolation from communicative context (Couvee et al., 2024; Marschark & Spencer, 2016; Rotfleisch & Martindale, 2023), results in isolated sound mastery that is difficult to transfer to real-life language use (Waqar et al., 2023; Werfel et al., 2022). A systematic, hierarchical phonological approach connected to communicative goals is needed.

2. Deep Learning and Reflective Maternal Methods in the Context of Verbal Communication Development

Deep learning emphasizes that effective learning occurs when learners actively construct meaning, connect knowledge with experience, and reflect on the learning process (Biggs & Tang, 2011; Fullan & Quinn, 2020; Hattie, 2009; Marton & Säljö, 1976). This approach focuses on cognitive and emotional engagement, enabling knowledge transfer into broader contexts (Hilton & Pellegrino, 2012). In verbal communication development, deep learning is crucial because verbal communication involves both technical articulation and complex cognitive, social, and affective processes (Lederberg et al., 2019; Marschark & Spencer, 2016; Werfel et al., 2022). Meaningless learning results in sound imitation without understanding, hindering functional language use (Ching & Cupples, 2015; Nittrouer, 2020). Therefore, the principles of mindful, meaningful, and joyful learning are essential for designing verbal communication development that increases active student engagement (Fullan & Quinn, 2020).

The Reflective Maternal Method (RMM) offers a communicative approach that positions language as a tool for interaction through meaningful conversation and linguistic reflection (Bunawan & Yuwati, 2000; Purbaningrum & Rofiah, 2020; Aini & Handriani, 2024). Rooted in social constructivism (Vygotsky, 1978; Tomasello, 2005), RMM enables students to construct contextual understanding of language and develop awareness of linguistic structures. Within the deep learning framework, the teacher's role shifts from technical instructor to facilitator of linguistic experiences (Kementerian Pendidikan Dasar dan Menengah & Republik Indonesia, 2025). Teachers become learning architects who design multisensory experiences, facilitate collaboration with parents, and build learning communities responsive to students' segmental phoneme development profiles.

Four holistic dimensions of deep learning- thinking (olah pikir: conceptual understanding), feeling (olah hati: emotional connectedness), sensing (olah rasa:

articulatory sensation), and moving (olah raga: speech motor coordination)- are operationalized simultaneously in each learning cycle (Arif et al., 2025). This integration ensures verbal communication development becomes an internalized, transformative experience (Fauziah et al., 2025; Sari & Arta, 2025). Research by Curtin et al. (2021) found that parental behaviors such as joint engagement and language stimulation are positively correlated with DHH children's language development. Within the RMM framework, home-school collaboration strengthens mindful, meaningful, and joyful learning. Fajri et al. (2024) emphasized the role of parents in inclusive schools, including paying attention to children's cognitive health and communicating with teachers about academic challenges.

Verbal communication development in special education is a pedagogical process aimed at developing oral verbal communication through articulation, breath control, resonance, and integration of language reception, expression, and social use (Bernstein & Tiegerman, 1993; Andres et al., 2021; Paul & Whitelaw, 2010). In Indonesia, the Communication and Language-Based Curriculum (KBKB) (Bintoro, 2011) assumes that if children with special needs have communication and language skills, curricular objectives will be achieved. Operationally, verbal communication development is implemented through PKPBI (Communication, Perception, Sound, and Rhythm Development), which develops students' sensitivity to sound and systematically trains verbal communication skills (Aini & Handriani, 2024). Cooperative and communicative principles have proven effective in improving speaking skills, with think-pair-share and role-play creating a cooperative-communicative learning environment (Budiarto et al., 2023). Multisensory strategies such as VAKT utilise multiple sensory modalities (Baker, 2022; Massaro, 2008), while total communication approaches combining verbal and non-verbal communication have proven effective in overcoming language barriers for DHH students (Mursita et al., 2025; Winarsih et al., 2023).

3. Pedagogical Integration as a Foundation for Model Development

Pedagogical integration is understood as a systematic effort to unite linguistic, cognitive, and communicative dimensions within a coherent learning framework (Fullan & Quinn, 2020; Werfel et al., 2022). Although phonology, communicative learning, and deep learning have developed extensively, previous research has addressed these aspects separately, resulting in fragmented and ineffective learning practices (Rotfleisch & Martindale, 2023; Couvee et al., 2024; Aanondsen et al., 2023). fragmentation prevents phoneme mastery from automatically developing into functional verbal communication skills.

Several studies have attempted to integrate various approaches. Bergeron et al. (2020) indicated that effective verbal communication interventions require multidisciplinary approaches, realistic listening environments, and active parental involvement. Wainscott & Spurgin (2024) developed an evidence-based framework for differentiating auditory and visual support for DHH students. Aldemir et al. (2023) demonstrated through meta-analysis that explicit multimodal instruction resulted in higher articulation accuracy and phonological memory retention than unimodal approaches. These findings reinforce the argument that systematic pedagogical

integration between deep learning, multisensory approaches, and communicative-reflective methods is essential.

The application of deep learning within special education contexts, especially in verbal communication development, remains very limited and has not been widely associated with phonological therapies or communicative techniques such as RMM (Fullan & Quinn, 2020; Lederberg et al., 2019). This conceptual gap calls for learning models capable of systematically combining these components. Septiani, Rafli, Murtadho, and Tryana (2024) further argue that deaf students' language acquisition is characterized by a dominance of concrete nouns (37.4%) and verbs (22.4%), with significantly lower frequencies of pronouns (7.5%), conjunctions (4.5%), and prepositions (1.2%). The study emphasizes the need for explicit instruction in function words to help students develop more complex sentence structures. The study also recommends bilingual interventions integrating sign and spoken language, visual and contextually relevant instruction, and interactive experiential learning environments to enhance language mastery and communication skills.

The pedagogical integration of deep learning with RMM aligns the learning process with communication practice: deep learning provides a cognitive-affective paradigm emphasizing meaningfulness, reflection, and student participation, while RMM provides space for authentic communicative connection through discussion and linguistic reflection. This integration creates opportunities for verbal communication development by connecting sound perception, phoneme generation, and language use in authentic conversation. Thus, the deep learning-based verbal communication development model proposed in this study addresses fragmentation to build a coherent, systematic, and evidence-based instructional framework.

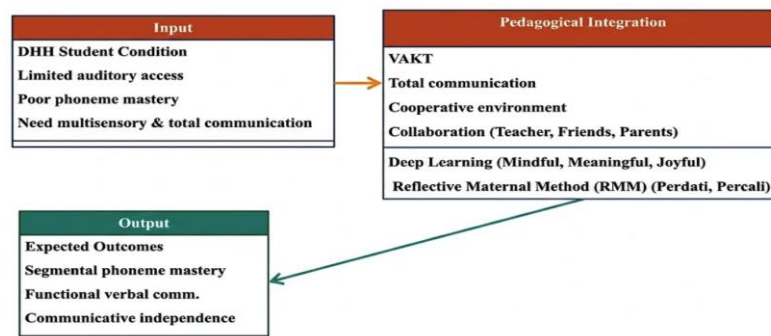


Figure 1. Pedagogical integration framework of deep learning and RMM for DHH students' verbal communication development

METHOD

This research employed a qualitative approach with an instructional analysis design as part of the initial phase of the Research and Development (R&D) framework, focusing on a preliminary study (needs analysis) to identify learning needs and pedagogical gaps as a basis for developing a learning model (Borg & Gall, 2003; Creswell & Poth, 2016). This research was conducted at a public special elementary school (SDLB) in Jakarta, Indonesia, which provides educational services for students with hearing disabilities. A qualitative approach was chosen because it allows for in-depth exploration of learning practices in a natural context and provides a contextual understanding of the dynamics of pedagogical interactions in verbal communication development (Tisdell et al., 2025; Yin, 2017). Specifically, this research aimed to examine existing learning practices to identify opportunities to integrate deep learning principles and the Reflective Maternal Method (RMM) into verbal communication development.

The research participants consisted of three classroom teachers who integrated verbal communication instruction into their daily teaching. They were purposively selected based on professional experience (more than 20 years), direct involvement in verbal communication development, and teaching experience in the early grades (grades 1–3), a critical period for phonological and verbal communication development. The participants were considered information-rich cases (Patton, 2002) and were coded as T1, T2, and T3 to maintain confidentiality. Table 1 summarises participant characteristics.

Table 1. Characteristics of Research Participants

Participant Code	Teaching Experience	Teaching Level	Field
T1	34 years	1st grade	Homeroom teacher (Integrated with verbal communication development)
T2	31 years	2nd grade	Homeroom teacher (Integrated with verbal communication development)
T3	29 years	3rd grade	Homeroom teacher (Integrated with verbal communication development)

Data collection involved in-depth, semi-structured interviews conducted over two to three sessions for each participant, each lasting approximately 45–60 minutes. Interviews were conducted in person and recorded with the participants' consent to ensure data accuracy and completeness (Creswell & Poth, 2016; Kvale & Brinkmann, 2009). The interview guide was developed based on a theoretical framework encompassing three main dimensions: students' phonological understanding, verbal communication practices, and pedagogical needs related to meaningful, reflective, and communicative learning. Table 2 summarizes the dimensions and focus of the interviews.

Table 2. Dimensions and Focus of the Interview Guide

Dimension	Focus Questions
Phonology	Phoneme detection, discrimination, identification, production
Learning Practice	Verbal communication practices, Media, and Strategies
Deep Learning	Conscious, Meaningful, and Enjoyable

The selection of participants in this study also took into account the diverse characteristics of the students served by the teachers, as recommended in ecological studies (Calderon & Greenberg, 2010) on the development of children with hearing impairments. Factors such as student readiness, hearing aid use, student psychological condition, family support, and teacher competence interact in a complex manner and influence learning outcomes. Research by Bat-Chava & Deignan (2001) reported that

peer support and social acceptance are important protective factors for the psychological development of children with hearing aids.

On the other hand, Antia et al. (2009), in their study on the social competence of children with hearing impairments, found that interventions that integrate socio-emotional aspects through joyful learning are more effective in increasing social participation. Therefore, the interviews in this study explored the technical aspects of verbal communication development as well as teacher strategies in creating a learning environment that supports students' socio-emotional well-being, including how teachers manage classroom dynamics with varying phonological abilities and hearing aid use status.

All interview data were transcribed verbatim before analysis. Interviews were the primary data source, although document review was used as a secondary data source to increase the validity of the findings (Bowen et al., 2009). The studied papers were Lesson Implementation Plans, students' progress notes, and verbal communication assessment instruments. The document analysis explored learning processes to determine the degree of integration of deep learning concepts and the phonological approach and to evaluate the consistency of planning, implementation, and evaluation of learning.

Thematic data analysis was performed following (Miles & Huberman (2020) and Braun & Clarke, (2021), which involves data reduction, open coding, categorization, and theme extraction. The analysis approach was iterative and reflective, using constant comparison across data, codes, and categories to develop meaningful and representative themes. ATLAS.ti software was used to support data analysis to improve transparency and uniformity in coding (Frieze, 2019). To further validate the relationships among instructional practices, a co-occurrence analysis was performed using ATLAS.ti 24's co-occurrence tool. Jaccard coefficients were calculated for all code pairs, with a minimum threshold of 0.05 considered for meaningful relationships. This analysis identified which pedagogical approaches tended to appear together in teachers' narratives, revealing systemic patterns of integration. Table 3 shows the data analysis methodology.

Table 3. Data Analysis Procedure

Stage	Activity
Data reduction	Data selection, simplification, and focus
Coding	Open coding of data
Categorization	Grouping codes into categories
Theme extraction	Identification of key patterns and themes

Data validity was ensured using trustworthiness criteria such as believability, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was established through using triangulation of sources and methodologies, and member verification to confirm the researcher's interpretations were consistent with the participants' experiences (Creswell & Poth, 2016). The audit trail recorded the analysis process, and peer debriefing was used to ensure dependability and confirmability (Tisdell et al., 2025). The research process followed ethical research principles. This included obtaining informed consent from participants, maintaining confidentiality by using pseudonyms, and using the data responsibly for academic purposes and the development of learning models.

RESULTS

Analysis of 160 coded quotations from interviews, classroom observations, and document reviews generated four interrelated themes.

Overview of Thematic Findings

Thematic analysis was based on ATLAS.ti. Research confirmed that deaf and hard-of-hearing (DHH) pupils acquired verbal communication through interrelated pedagogical characteristics: verbal communication orientation, multimodal instructional approaches, deep learning principles, and intensive phonological scaffolding. The process of coding contributed to four primary themes: (1) orientation to verbal communication, (2) multisensory and reflective instructional techniques, (3) principles of deep learning in verbal communication development, and (4) phonological scaffolding and verbal communication development.

The results reveal that verbal communication development was not only articulation training but also a communicative and contextual learning process that involved the senses, reflective engagement, emotional participation, and phonological awareness. ATLAS.ti supported the analysis and helped interpret the findings. Several visualizations, including a coding network diagram and a word cloud.

ATLAS.ti Coding Network Analysis

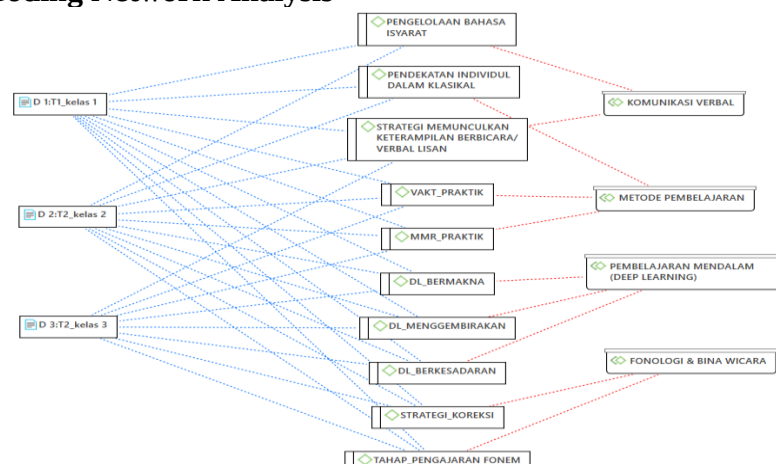


Figure 2. ATLAS.ti Coding Network of Verbal Communication Practices

Figure 2 presents the interactions among instructional strategies, phonological learning, multisensory activities, and deep learning features identified in the thematic analysis. The coding network revealed that verbal communication was the main instructional focus, linking numerous educational elements. The data indicate that teachers consistently encouraged students to give oral verbal responses even when students still used gestures and natural indicators in classroom engagement. Oral communication was set as the main communicative aim in verbal communication development activities.

One teacher explained:

“Students may still use gestures, and that is acceptable, but they still have to speak. I always encourage them by saying, ‘Come on, where is your voice? You

can speak.' We continuously try to build students' confidence, so they become accustomed to expressing themselves orally little by little." (T1)

Another participant emphasized the importance of verbal participation:

"The most important thing is that students want to speak, want to express ideas, and want to communicate their opinions. Even if the pronunciation is not fully accurate yet, the important thing is that they are willing to communicate verbally." (T2)

Teachers also implemented individualized scaffolding within classical classroom settings. Different students received varying levels of assistance according to their communication readiness and phonological development.

One participant stated:

"Even during whole-class instruction, we still approach students individually. Sometimes, while other students are writing, we call one student and provide additional verbal communication practice separately." (T1)

The results show that verbal communication was the main instructional orientation guiding interaction, involvement, and verbal communication practice.

Multisensory and Reflective Instructional Practices

The coding network also shows strong links between instructional approaches and multisensory practices, reflected in *VAKT_praktik* and *MMR_praktik*. Teachers used lip-reading observation, tactile vibration awareness, repetitious pronunciation, contextual discourse, and visual media to include visual, aural, kinesthetic, and tactile modalities.

One teacher described:

"Students first need to observe carefully. They look first, observe repeatedly, and only after that do they try listening and imitating the sound." (T1)

Another teacher explained the use of tactile stimulation:

"When students still have difficulty distinguishing sounds, we sometimes use a tambourine so they can directly feel the vibration pattern." (T1)

Reflective interaction also emerged as an important component of classroom instruction. Teachers embedded verbal communication practice within contextual communication and conversational interaction.

One participant explained:

"What students talk about during conversation activities is later written on the board. Then we read it together again so students understand the meaning contextually." (T2)

Another participant stated:

"We do not teach isolated letters first. We teach meaningful words and sentences so students understand language globally and intuitively." (T2)

These results suggest that verbal communication development is a multisensory interaction with contextual and reflective communication strategies.

Deep Learning Principles in Verbal Communication Development

Another major conclusion relates to the development of deep learning aspects, represented by meaningful learning, happy learning, and mindful learning.

Meaningful Learning

Meaningful learning occurred when teachers linked language teaching to students' real-life experiences and contextualized classroom activities.

One teacher described:

"We focus on one contextual word repeatedly throughout the day. For example, when learning the word 'ball', students color the ball, cut pictures of the ball, talk about the ball, and continue hearing and using the same word until the end of the school day." (T1)

Another participant explained:

"Students understand better when learning comes from real experiences close to their daily life." (T2)

Joyful Learning

Learning was joyful through fun engagement, emotional support, and game-based activities to reduce students' fear of verbal communication practice.

One teacher explained:

"We try to make learning enjoyable so students do not feel pressured or stressed. Sometimes articulation practice becomes a game so students laugh while learning." (T1)

Another participant described:

"Sometimes we pretend to be airplanes while repeating sounds together. The children enjoy learning more when it feels like playing." (T2)

Teachers also emphasized positive reinforcement during correction processes.

One teacher stated:

"We should not directly say that students are wrong because it can reduce their confidence" (T1)

Mindful Learning

Students demonstrated mindful learning through their knowledge of articulation and careful observation of verbal communication output.

One participant explained:

"Students need to observe our mouth movement so they become aware of how the sound is produced." (T3)

Another teacher stated:

"Students gradually realize, 'Oh, this is how I speak.'" (T1)

Overall, the findings suggest that deep learning is underpinned by an environment of involvement, emotion, and reflection in acquiring verbal communication.

Phonological Scaffolding and Verbal Communication Development

The results also show that phonology and verbal communication development remained the focus of instruction. Teachers applied hierarchical phoneme instruction, starting with articulatory flexibility, breathing exercises, vowel production, and repetitive syllable practice before moving to more complex phonological combinations.

One participant explained:

“At the beginning, verbal communication training focuses on relaxing the speech organs and breathing exercises. After students become more prepared, we gradually move toward phoneme formation.” (T1)

Another teacher described:

“Students practice syllables repeatedly, such as ‘BA BA BA,’ before moving to more complex sound combinations.” (T2)

Teachers also used repetition, immediate feedback, and positive reinforcement to correct errors.

One participant stated:

“When pronunciation is incorrect, we immediately help students repeat it again.” (T2)

Another teacher explained:

“Students repeat the sound many times until the pronunciation becomes clearer.” (T3)

Despite these approaches, teachers also noted instructional obstacles linked to irregular verbal output and students’ reliance on gestures.

One participant explained:

“Some students still have difficulty distinguishing similar vowel sounds, such as /i/ and /e/.” (T3)

Another teacher stated:

“For students who are not yet spontaneous, we first need to stimulate or prompt them repeatedly before they are willing to speak independently.” (T2)

The results suggest that verbal communication orientation, multi-sensory engagement, reflective interaction, emotional participation, and systematic phonological scaffolding are interconnected pedagogical principles applied in implementing verbal communication development for DHH students.

Thematic Categorization

Table 4. Major Themes Generated from ATLAS.ti Analysis

Major Theme	Codes Identified	Pedagogical Meaning
Verbal Communication Orientation	Pengelolaan _Bahasa_Isyarat; Strategi_Memunculkan_ Keterampilan_Berbicara Pendekatan_Individual_dalam	Oral verbal communication was positioned as the primary communicative goal



_Klasikal

Multisensory and Reflective Practices	MMR_Praktik; VAKT_Praktik	Learning integrated reflective interaction and multisensory engagement
Deep Learning Principles	DL_Bermakna; DL_Menggembirakan; DL_Berkesadaran	Learning emphasized contextual meaning, emotional engagement, and awareness
Phonological Scaffolding and Verbal Communication Development	Tahap_Pengajaran_Fonem; Strategi_Koreksi	Phonological learning was implemented hierarchically through gradual scaffolding

Co-occurrence Analysis of Instructional Practices

To further validate the relationships among the identified pedagogical practices, we conducted a co-occurrence analysis using ATLAS.ti 24. The analysis computed Jaccard coefficients for all code pairs, indicating how frequently two pedagogical approaches appeared together in the same quotation. Table 5 displays the strongest co-occurrence pairs (coefficient ≥ 0.05).

Table 5. Co-occurrence coefficients among pedagogical practice codes (coefficient ≥ 0.05)

Code A	Code B	Coefficient	Interpretation
Tahap_Pengajaran_Fonem	Strategi_Memunculkan_Keterampilan_Berbicara	0.10	Phonological teaching strongly co-occurs with strategies to elicit verbal skills
VAKT_Praktik	DL_Berkesadaran	0.06	Multisensory practice co-occurs with mindful learning awareness
VAKT_Praktik	DL_Menggembirakan	0.05	Multisensory practice co-occurs with joyful learning
DL_Bermakna	Strategi_Memunculkan_Keterampilan_Berbicara	0.05	Meaningful learning co-occurs with strategies to elicit verbal skills
MMR_Praktik	Strategi_Memunculkan_Keterampilan_Berbicara	0.08	RMM practice co-occurs with strategies to elicit verbal skills
Pendekatan_Individual_Dalam_Klasikal	DL_Menggembirakan	0.06	Individual approach in classical setting co-occurs with joyful learning

DL_Berkesadaran	VAKT_Praktik	0.06	Mindful learning co-occurs with multisensory practice
Pengelolaan_Bahasa_Isyarat	All other codes	0.00	No meaningful co-occurrence with any other code; sign language was managed as a separate system

Note: Gr = Groundedness (number of quotations coded for each code). Coefficients are Jaccard coefficients computed by ATLAS.ti 24, indicating the strength of co-occurrence between two codes within the same quotation.

The co-occurrence analysis reveals several significant relationships. First, the strongest link (0.10) between *Tahap_Pengajaran_Fonem* and *Strategi_Memunculkan_Keterampilan_Berbicara* indicates that phonological instruction is closely integrated with strategies that encourage students to speak spontaneously. This confirms that teachers do not teach phonemes in isolation but connect them to communicative goals. Second, the coefficient of 0.10 between *DL_Menggembirakan* and *Strategi_Memunculkan_Keterampilan_Berbicara* demonstrates that joyful learning is perceived as a key factor in motivating students to produce verbal output. The absence of fear and the presence of emotional safety appear to facilitate students' willingness to speak.

Third, the moderate coefficient (0.06) between *VAKT_Praktik* and *DL_Berkesadaran* suggests that multisensory engagement contributes to students' conscious awareness of articulatory processes. This supports the theoretical claim that sensory experiences enhance phonological awareness. Fourth, the link between *MMR_Praktik* and *Strategi_Memunculkan_Keterampilan_Berbicara* (0.08) indicates that the Reflective Maternal Method, through its emphasis on contextual conversation and linguistic reflection, is strongly associated with developing verbal skills. Notably, *Pengelolaan_Bahasa_Isyarat* (sign language management) showed no co-occurrence with any other code, suggesting that teachers treat sign language as a separate communicative system rather than an integrated component of verbal communication development. This finding highlights a potential gap in pedagogical integration.

Instructional Dominance Word Cloud Visualization



Figure 3. Deep Learning Principles in Verbal Communication Development

The word cloud graphic also verifies the thematic findings, indicating the lexical dominance that emerges from the interview data. Common words include *lihat* (see), *bunyi* (sound), *kata* (word), *bicara* (say), *bahasa* (language), *ulang* (repeat), *gambar* (picture), *belajar* (learn), and *vokal* (vowel). The emphasis on visual and articulatory vocabulary underscores the importance of sensory monitoring, phonological repetition, and verbal interaction in speech and language acquisition activities. The image further underscores the relevance of classroom instruction to multimodal engagement and communicative participation throughout the learning process.

DISCUSSION

The results revealed that verbal communication development for DHH pupils was implemented within an integrated pedagogical orientation comprising phonological teaching, multisensory engagement, reflective communication, and meaningful interaction. As illustrated in Figure 2, the coding network indicates that verbal communication was the main instructional orientation linking different pedagogical dimensions. This conclusion aligns with prior work emphasizing the need to develop verbal communication to promote real communication, rather than simply practicing discrete articulation skills (Ching & Cupples, 2015; Werfel et al., 2022). In this study, teachers consistently framed verbal creation as part of communicative engagement, not merely as an exercise in technical articulation. This shows that language learning is socially and functionally focused and helps students gain confidence in using the language in real classroom engagement.

This study makes an important contribution by showing that teachers implicitly enacted deep learning principles in classroom practice, even though they did not think explicitly about their instructional methods in terms of deep learning terminology. Contextual contact, emotional involvement, sensory awareness, and reflective communication were the natural pathways to meaningful, pleasant, and mindful learning. This study supports Fullan and Quinn's (2020) notion that deep learning is about meaningful participation, student engagement, reflective understanding, and authentic learning experiences. In this study, deep learning was defined as recurrent contextual immersion, emotional safety, communicative participation, and conscious articulatory awareness. Thus, deep learning in DHH education should be conceptualized not only as cognitive mastery but also as a comprehensive pedagogical process that encompasses linguistic, sensory, emotional, and communicative elements.

The results further demonstrate that multisensory training did not serve only as a compensatory aid for hearing restrictions, but also as a teaching tool to enhance phonological awareness and communicative involvement simultaneously. Visual observation, tactile stimulation, and repeated articulation and contextual interaction reinforced students' understanding of how sounds are produced and how language is used. Teachers promoted steady observation of lip movements, sensation of vibration patterns, attention to articulatory gestures, and imitation of phonological structures through repetitious multimodal experiences. This result is consistent with Massaro's (2008) multimodal speech perception theory, which emphasizes the role of visual and auditory integration in verbal communication processing. Similarly, Waqar et al. (2023)

stated that multimodal methods promote phonological acquisition and verbal participation among learners with hearing impairments. The current study builds on previous findings by showing that multimodal training also promotes emotional involvement and communicative confidence in DHH learners.

The co-occurrence analysis provides quantitative validation for the qualitative findings. The strongest link between *Tahap_Pengajaran_Fonem* and *Strategi_Memunculkan_Keterampilan_Berbicara* (0.10) confirms that teachers systematically connect phonological instruction with communicative goals. Unlike mechanical drill-based approaches that treat sound production as an end in itself, the teachers in this study consistently embedded phoneme practice within activities designed to elicit spontaneous verbal responses. This finding supports the argument that effective verbal communication development must bridge the gap between form-focused practice and functional communication (Ching & Cupples, 2015; Werfel et al., 2022). The co-occurrence findings align with international research on effective DHH pedagogy. The strong link between phonological teaching and verbal elicitation strategies (0.10) echoes Ching & Cupples (2015) and Werfel et al. (2022), who emphasized that phonological instruction must be embedded in communicative contexts to enhance generalization. Similarly, the integration of joyful learning with verbal elicitation (0.10) supports the socio-emotional perspective advocated by Aanondsen et al. (2023) and Fajri et al. (2024), which posits that emotional safety is a prerequisite for communicative risk-taking. The moderate link between multisensory practice and mindful learning (0.06) supports Massaro's (2008) multimodal verbal communication perception theory and Bintoro et al.'s (2023) classroom-based observations. These cross-study convergences strengthen the validity of our proposed pedagogical integration model and suggest that the model is not only contextually relevant but also theoretically grounded in established international evidence.

The substantial coefficient (0.10) between *DL_Menggembirakan* and *Strategi_Memunculkan_Keterampilan_Berbicara* provides empirical evidence for the role of emotional engagement in verbal communication development. Students who experience learning as enjoyable and emotionally safe are more willing to take communicative risks, which is essential for developing verbal confidence (Aanondsen et al., 2023; Fajri et al., 2024). This finding reinforces the principle that joyful learning is not merely a motivational add-on but a pedagogical necessity in DHH education, where students often face anxiety about pronunciation errors.

The link between *VAKT_Praktik* and *DL_Berkesadaran* (0.06) aligns with the theoretical premise that multisensory engagement enhances conscious phonological awareness (Massaro, 2008; Bintoro et al., 2023). When students use multiple sensory modalities to perceive and produce sounds, they develop a deeper, more reflective understanding of articulatory mechanisms. This suggests that multisensory approaches should be conceptualised not only as compensatory strategies but also as tools for fostering metacognitive awareness in verbal communication development. Finally, the absence of co-occurrence between *Pengelolaan_Bahasa_Isyarat* and other codes suggests a pedagogical tension. Teachers appear to manage sign language as a separate system rather than as an integrated component of verbal communication development. While sign language serves as a communicative bridge for students who are not yet ready to rely solely on spoken language, its separation from verbal communication instruction may limit the development of a cohesive communicative framework. This finding indicates the need for further research into how sign language and spoken language can



be integrated pedagogically to support both communication access and verbal development.

Another significant conclusion is the application of Reflective Maternal Method (RMM) practices through contextual dialog and reflective interaction. Teachers always associated phonological activities with communicative meaningful experiences rather than mechanical teaching of separate phonemes. Verbal communication production activities evolved naturally from conversation, classroom interaction, narrative, and contextual vocabulary immersion. This finding closely reflects Vygotsky's sociocultural view that language emerges through mediated social interaction and collaborative meaning-making. The findings also provide support for Halliday's functional perspective on language learning, suggesting that language learning is most effective when learners engage in language in meaningful communicative situations rather than in decontextualized structural drills. Through reflective engagement, pupils were not just instructed to reproduce sounds but were encouraged to correlate verbal communication with communicative intention and social participation.

The findings also show a pedagogical tension between gesture use and the development of oral verbal communication. Teachers permitted the use of natural gestures and contextual signs as communicative support, but they consistently pushed students to use spoken language. This conclusion mirrors the continuing arguments in deaf education about the balance between visual communication accessibility and the development of oral-verbal language. Teachers in this study, in actual practice, did not see sign language and oral language as systems that exclude each other. Rather, gestures served as a transitional communicative scaffolding that supported students' participation as spoken communication evolved gradually. This suggests that verbal communication acquisition for DHH pupils is an ongoing pedagogical negotiation between accessibility, involvement, and verbal growth goals.

The analysis also showed that the customized educational approach was apparent as teachers modified the tempo, phoneme targets, corrective procedures, and scaffolding techniques according to students' communication readiness and phonological profiles. Even in traditional classroom instruction, teachers consistently offered tailored interventions based on each student's articulatory flexibility and verbal responsiveness. This conclusion demonstrates differentiated pedagogy and ecological responsiveness, both of which are necessary within DHH schooling contexts characterized by varied auditory and linguistic contexts. The evidence confirms Tomlinson's theory of differentiated teaching, which is premised on the notion that effective education should be tailored to learners' readiness levels, interests, and developmental profiles.

The phonological results indicate the hierarchical implementation of the verbal communication learning, through gradual stages of teaching phonemes that involve articulatory flexibility, breathing exercises, generation of vowels, repetition of syllables, and phonological combination. Teachers began with visually accessible phonemes, then progressed to increasingly difficult articulatory goals. Repetitive syllable exercises such as "BA BA BA" served as preliminary articulatory scaffolding, which facilitated phonological consistency and verbal communication fluency. This method is consistent with Boothroyd's concept for development, which emphasizes the sequential growth from perception and discrimination of sounds to identification and verbal production. The

findings are also in agreement with phonological awareness theory, which postulates that recurrent exposure, articulatory awareness, and sensory reinforcement play a crucial role in the development of verbal communication intelligibility among DHH learners.

Educators typically eschewed punitive correction, focusing instead on encouragement, repetition, playful engagement, and positive reinforcement during instructional tasks. Emotional safety and communication confidence were deemed crucial requirements for pupils' readiness to engage vocally. This discovery corresponds with affective learning theories that underscore the substantial impact of emotional engagement on language learning motivation, communicative involvement, and students' willingness to undertake linguistic risks. Emotional support is crucial in DHH circumstances, since students often encounter worry, reluctance, and fear of making pronunciation mistakes during oral communication tasks. Consequently, emotionally supportive classroom environments enhance both speech output and students' communicative self-confidence and social engagement.

The word cloud representation depicted in Figure 3 further substantiates these findings. The lexical prevalence of terms like *lihat* (see), *bunyi* (sound), *kata* (word), and *ulang* (repeat) underscores the importance of visual observation, phonological repetition, and verbal interaction in classroom learning. The prevalence of sensory and articulatory terminology suggests that verbal communication acquisition was firmly rooted in multimodal engagement and iterative communicative practice. This indicates that verbal communication acquisition in DHH kids was not predominantly fostered through solitary mechanical exercises, but rather through sensory-enriched, contextual, and interactive educational experiences.

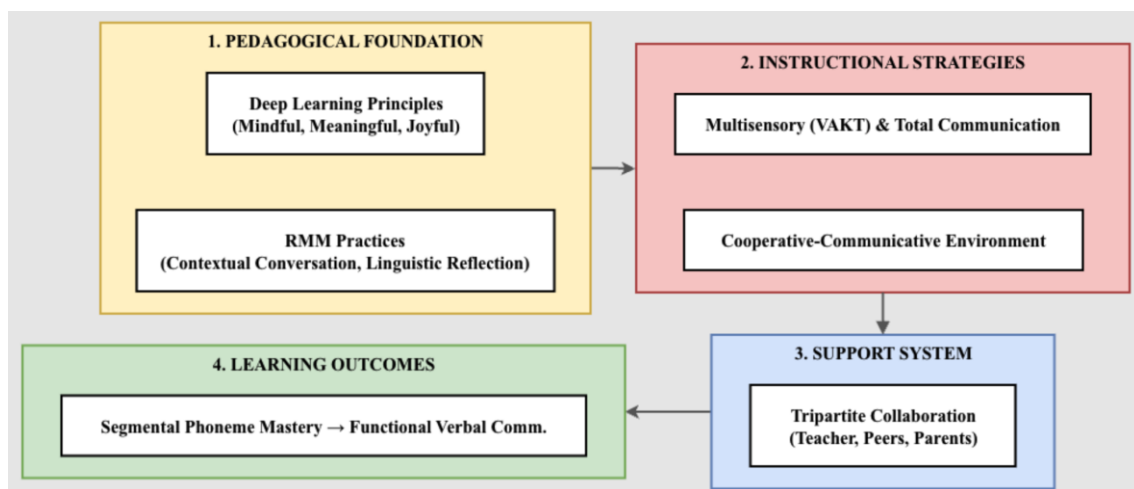


Figure 4. Summary model of pedagogical integration for verbal communication development in DHH students

Figure 4 encapsulates the proposed educational integration model derived from the topic findings. The approach demonstrates the transformation of fragmented verbal communication activities into a cohesive educational framework by integrating deep learning principles and Reflective Maternal Method (RMM) practices. Multisensory engagement, reflective communication, collaborative learning environments, and tripartite collaboration among educators, peers, and parents jointly facilitate the mastery of segmental phonemes and functional verbal communication.



The findings indicate that verbal communication acquisition for DHH students should be viewed not solely as phonetic correction, but as a multifaceted process encompassing communication, cognition, sensory engagement, reflection, and socio-emotional development. Effective verbal communication arises from the interplay of phonological awareness, multisensory learning, reflective discourse, emotional engagement, and contextual interpretation. These elements operate interdependently and collectively establish a comprehensive educational environment for verbal communication development.

The findings underscore the significance of teacher professional development programs that incorporate phonological instruction, multimodal techniques, reflective engagement, and principles of deep learning in verbal communication education. Educators require competencies in both articulation training and the facilitation of meaningful communication experiences that enhance students' cognitive engagement, emotional involvement, linguistic awareness, and vocal confidence. Moreover, curriculum creation in DHH education must integrate contextual communication activities, multimodal instructional resources, reflective conversational practices, and personalized phonological scaffolding as essential elements of verbal communication acquisition.

This study presents a conceptual framework indicating that effective verbal communication acquisition for DHH students necessitates the pedagogical integration of deep learning principles, multisensory strategies, reflective communication, emotional support, and systematic phonological development within a cohesive instructional model. The findings enhance contemporary discourse in DHH pedagogy by framing verbal communication development as a multimodal, communicative, and meaning-centric process rooted in genuine interaction and active engagement, rather than merely as separate articulation training.

This study has several limitations. First, it was conducted at a single special school in Jakarta with only three teacher participants, limiting generalisability. Second, the study relied primarily on teacher self-reported accounts, which may be subject to social desirability bias. Third, the proposed pedagogical integration model has not yet been empirically tested in classroom interventions. Future research should focus on validating the model through intervention studies with larger samples, developing teacher training modules based on the proposed framework, and examining the model's effectiveness across different educational contexts in Indonesia.

CONCLUSION

The study concludes that the present instructional practices used in verbal communication for deaf and hard-of-hearing (DHH) students contain important elements of multisensory approaches, reflective interaction, and phonological scaffolding, but are fragmented and do not have a systematic pedagogical framework to support them. Based on the preliminary study at a public special elementary school in Jakarta, the teachers implicitly adopt the principles of deep learning, mindful, meaningful, and joyful learning, and practices aligned with the Reflective Maternal Method (RMM), such as contextual conversation and linguistic reflection. But these components are not yet operationalized in a consistent evidence-based paradigm.

The suggested educational integration of deep learning and RMM provides a framework linking mechanical phoneme drills with functional, communicative language use. This integration is enhanced by multisensory (VAKT) approaches, comprehensive communication, cooperative-communicative learning environments, and a tripartite partnership among teachers, peers, and parents. The concept links cognitive, affective, sensory, and social factors to close the persistent gap between form-focused articulation practice and meaningful verbal communication in everyday interactions. This study thus provides a conceptual base for the development of a systematic instructional framework for verbal communication development in DHH students. Future research needs to focus on data-driven validation of the proposed model through intervention studies and on the development of teacher training modules and evaluation tools that operationalize deep learning and RMM principles in special education settings.

This study contributes a conceptual framework that can serve as a blueprint for developing and testing a systematic verbal communication learning model in Indonesian SDLB contexts. The proposed integration of deep learning, RMM, VAKT, and collaborative partnerships offers a practical pathway to transform fragmented articulation drills into meaningful communicative experiences. Future research should focus on: (1) operationalising the model into a teacher-friendly module and lesson plans; (2) validating the model through intervention studies with larger samples; and (3) developing assessment tools that capture both phonological accuracy and functional communication outcomes. Such efforts will be crucial for translating this conceptual framework into sustainable pedagogical practice in special education.

ACKNOWLEDGMENT

The authors like to thank Universitas Negeri Jakarta for the institutional assistance and the academic supervision in conducting this research. Special thanks go to the principal, teachers, and staff of the public special elementary school (SDLB) in Jakarta for their willingness to engage in this study and share their essential experiences and views. The authors are also grateful to colleagues and research assistants for their help in data collection and analysis. This work was not supported by any grant from any funding agency in the public, commercial, or not-for-profit sectors. However, the authors would like to thank the moral and intellectual support from the Faculty of Education, Universitas Negeri Jakarta, which has made the preliminary study possible as part of an ongoing Research and Development (R&D) Project.

BIBLIOGRAPHY

- Aanondsen, C. M., Jozefiak, T., Lydersen, S., Heiling, K., & Rimehaug, T. (2023). Deaf and hard-of-hearing children and adolescents' mental health, quality of life and communication. *BMC Psychiatry*, 23(1), 297. <https://doi.org/10.1186/s12888-023-04787-9>
- Aini, S. N., & Handriani, P. (2024). *Panduan Guru Pengembangan Wicara bagi Peserta Didik dengan Hambatan Pendengaran untuk SDLB, SMPLB, SMALB*. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Aldemir, H., Solís-Campos, A., Saldaña, D., & Rodríguez-Ortiz, I. R. (2023). A Systematic Review and Meta-Analysis of Vocabulary Interventions for Deaf/Hard of Hearing Children and Adolescents. In *Journal of Speech, Language, and Hearing Research* (Vol. 66, Number 8, pp. 2831–2857). American Speech-Language-Hearing Association. https://doi.org/10.1044/2023_JSLHR-22-00570.

- Andres, E. M., Earnest, K. K., Zhong, C., Rice, M. L., & Raza, M. H. (2021). Family-based whole-exome analysis of specific language impairment (SLI) identifies rare variants in BUD13, a component of the retention and splicing (RES) complex. *Brain sciences*, 12(1), 47. <https://doi.org/10.3390/brainsci12010047>.
- Antia, S. D., Jones, P. B., Reed, S., & Kreimeyer, K. H. (2009). Academic status and progress of deaf and hard-of-hearing students in general education classrooms. *Journal of Deaf Studies and Deaf Education*, 14(3), 293–311. <https://doi.org/10.1093/deafed/enp009>.
- Antia, S. D., Lederberg, A. R., Easterbrooks, S., Schick, B., Branum-Martin, L., Connor, C. M., & Webb, M. Y. (2020). Language and Reading Progress of Young Deaf and Hard-of-Hearing Children. *Journal of Deaf Studies and Deaf Education*, 25(3), 334–350. <https://doi.org/10.1093/deafed/enz050>.
- Arif, M. N., Parawansyah, M. I., Huda, F. H., & Zulfahmi, M. N. (2025). Strategi menumbuhkan minat belajar siswa melalui pendekatan deep learning. *Jurnal Muassis Pendidikan Dasar*, 4(1), 8–16. <https://doi.org/10.55732/jmpd.v4i1.989>.
- Bagaskorowati, R., Bintoro, T., & Winarsih, M. (2023). Teacher's understanding, and experience of socio-emotional learning (SEL) in strengthening of student character education curriculum during new-normal era in pandemic Covid-19: A phenomenological study in the Islamic boarding school in Indonesia. *AIP Conference Proceedings*, 2805(1), 020002. <https://doi.org/10.1063/5.0149489>.
- Baker, J. R. (2022). Investigating the effects of signal words on the readability of writing centre self-access library materials. *The Language Learning Journal*, 1–11. <https://doi.org/10.1080/09571736.2022.2099958>.
- Bat-Chava, Y., & Deignan, E. (2001). Peer relationships of children with cochlear implants. *Journal of Deaf Studies and Deaf Education*, 6(3), 186–199. <https://doi.org/10.1093/deafed/6.3.186>.
- Bergeron, F., Berland, A., Demers, D., & Gobeil, S. (2020). Contemporary speech and oral language care for deaf and hard-of-hearing children using hearing devices. *Journal of Clinical Medicine*, 9(2), 378. <https://doi.org/10.3390/jcm9020378>.
- Bernstein, D. K., & Tiegerman, E. (1993). *Language and communication disorders in children*.
- Biggs, J., & Tang, C. (2011). Train-the-trainers: Implementing outcomes-based teaching and learning in Malaysian higher education. *Malaysian Journal of Learning and Instruction*, 8, 1–19.
- Bintoro, T. (2011). Kemampuan komunikasi anak tunarungu. *Perspektif Ilmu Pendidikan*, 23(XIV), 12–40.
- Bintoro, T. (2023). *Kurikulum Berbasis Komunikasi dan Bahasa untuk Pendidikan Anak Berkebutuhan Khusus (Orasi Ilmiah Pengukuhan Guru Besar Bidang Ilmu Pendidikan Bahasa untuk Anak Berkebutuhan Khusus Fakultas Ilmu Pendidikan Universitas Negeri Jakarta)*. UNJ Press.
- Bintoro, T., Fahrurrozi, Kusmawati, A. P., & Dewi, R. S. (2023). The teacher strategies in teaching sign language for deaf students in special schools Jakarta. *Cogent Education*, 10(2), 2258294. <https://doi.org/10.1080/2331186X.2023.2258294>.
- Birsh, J. R. (2011). *Multisensory teaching of basic language skills*. ERIC.

- Boothroyd, A. (1982). *Hearing Impairments in Young Children*. Prentice Hall, Inc. Englewood Cliffs.
- Borg, W., & Gall, M. D. (2003). *Educational Research: An Introduction Seventh Edition Boston*. Pearson Education, Inc.
- Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., Bakken, S., Kaplan, C. P., Squiers, L., & Fabrizio, C. (2009). How we design feasibility studies. *American Journal of Preventive Medicine*, 36(5), 452–457. <https://doi.org/10.1016/j.amepre.2009.02.002>.
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*.
- Budiarto, Rasyid, Y., & Lustyantje, N. (2023). Creating cooperative-communicative learning environment in speaking class through think-pair-share and roleplay: An action research at STIBA IEC Jakarta. *AIP Conference Proceedings*, 2621(1), 060008. <https://doi.org/10.1063/5.0142505>.
- Bunawan, L., & Yuwati, C. S. (2000). Penguasaan Bahasa Anak Tunarungu. In *Jakarta: Yayasan Santi Rama*.
- Cacciato, K., & Reed, C. M. (2022). Visual Phonics: An Effective Instructional Tool for d/Deaf and Hard of Hearing students. *TCNJ Journal of Student Scholarship*, 24, 1–6.
- Calderon, R., & Greenberg, M. (2010). 13 Social and Emotional Development of Deaf Children: Family, School, and Program Effects. *The Oxford Handbook of Deaf Studies, Language, and Education, Volume 1*, 188.
- Cannon, J., Guardino, C., & Paul, P. (2022). *Deaf and hard of hearing multilingual learners: Foundations, strategies, and resources*. Routledge.
- Chaer, A. (2021). *Linguistik Umum*. Jakarta: Rineka Cipta.
- Ching, T. Y. C., & Cupples, L. (2015). Phonological awareness at 5 years of age in children who use hearing aids or cochlear implants. *Perspectives on Hearing and Hearing Disorders in Childhood*, 25(2), 48–59. <https://doi.org/10.1044/hhdc25.2.48>.
- Couvee, S., Wauters, L., Knoors, H., Verhoeven, L., & Segers, E. (2024). Predicting variation in word decoding development in deaf and hard-of-hearing children. *Reading and Writing*, 37(5), 1317–1339. <https://doi.org/10.1007/s11145-023-10444-0>.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Curtin, M., Dirks, E., Cruice, M., Herman, R., Newman, L., Rodgers, L., & Morgan, G. (2021). Assessing parent behaviours in parent–child interactions with deaf and hard of hearing infants aged 0–3 years: A systematic review. *Journal of Clinical Medicine*, 10(15), 3345. <https://doi.org/10.3390/jcm10153345>.
- Fajri, H. M., Supena, A., & Bintoro, T. (2024). Implementation of Inclusive Education for Students with Hearing Impairment (Deaf): A Study in Elementary School. *JIP Jurnal Ilmiah PGMI*, 10(1), 27–36.
- Fauziah, U. N., Arman, A., Ramadani, S., Mahfuroh, L., Adetia, M. F., & Sutari, D. (2025). Implementasi Prinsip-prinsip Deep Learning dalam Pembelajaran di Sekolah Dasar. *Edukasi Tematik: Jurnal Pendidikan Sekolah Dasar*, 6(3), 171–176.
- Fernald, G. M. (1943). *Remedial techniques in basic school subjects*.
- Friese, S. (2019). *Qualitative data analysis with ATLAS. ti*.
- Fullan, M., & Quinn, J. (2020). How Do Disruptive Innovators Prepare Today's Students to Be Tomorrow's Workforce?: Deep Learning: Transforming Systems to Prepare

- Tomorrow's Citizens. *Inter-American Development Bank*.
<http://dx.doi.org/10.18235/0002959>.
- Graham, P., Kurz, C., & Batamula, C. (2023). Finding Vygotsky in early childhood deaf education: Sociocultural bodies and conversations. *American Annals of the Deaf*, 168(1), 80–101. <https://doi.org/10.1353/aad.2023.a904168>.
- Habibah, S. M., Usmi, R., Sari, B. I., & Istianah, A. (2026). *PENDEKATAN DEEP LEARNING DALAM PENDIDIKAN: Landasan Teoretis, Strategi, dan Praktik Pembelajaran Abad 21*. CV. Ruang Tentor.
- Hattie, J. (2009). The black box of tertiary assessment: An impending revolution. *Tertiary Assessment & Higher Education Student Outcomes: Policy, Practice & Research*, 259, 275.
- Hilton, M. L., & Pellegrino, J. W. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. National Academies Press.
- Kart, A. N. (2022). Systematic review of studies on visual phonics. *Communication Disorders Quarterly*, 43(4), 261–271. <https://doi.org/10.1177/15257401211024536>.
- Kementerian Pendidikan Dasar dan Menengah, & Republik Indonesia. (2025). Naskah akademik pembelajaran mendalam menuju pendidikan bermutu untuk semua. *Pusat Kurikulum Dan Pembelajaran Badan Standar, Kurikulum, Dan Asesmen Pendidikan Kementerian Pendidikan Dasar Dan Menengah Republik Indonesia*.
- Kronenberger, W. G., Xu, H., & Pisoni, D. B. (2020). Longitudinal development of executive functioning and spoken language skills in preschool-aged children with cochlear implants. *Journal of Speech, Language, and Hearing Research*, 63(4), 1128–1147. https://doi.org/10.1044/2019_JSLHR-19-00247.
- Kushartanti, B., Yuwono, U., & Lauder, M. R. M. T. (2024). *Pesona Bahasa Edisi Kedua: Langkah awal untuk memahami linguistik*. Gramedia Pustaka Utama.
- Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. Sage.
- Lederberg, A. R., Branum-Martin, L., Webb, M.-Y., Schick, B., Antia, S., Easterbrooks, S. R., & Connor, C. M. (2019). Modality and interrelations among language, reading, spoken phonological awareness, and fingerspelling. *The Journal of Deaf Studies and Deaf Education*, 24(4), 408–423. <https://doi.org/10.1093/deafed/enz011>.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Marschark, M., & Spencer, P. E. (2016). *The Oxford Handbook of Deaf Studies in Language* (M. Marschark & P. E. Spencer, Eds.). Oxford University Press.
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I—Outcome and process. *British Journal of Educational Psychology*, 46(1), 4–11. <https://doi.org/10.1111/j.2044-8279.1976.tb02980.x>.
- Massaro, D. W. (2008). Just in time learning: implementing principles of multimodal processing and learning for education of children with special needs. *WOCCI*, 9. <https://doi.org/10.1145/1322192.1322195>.
- Miles, H., & Huberman, A. M. (2020). Saldana.(2014). *Qualitative data analysis: A methods sourcebook*. New York: Sage Publications, Inc.
- Moore, D. F. (2001). *Educating the deaf: Psychology, principles, and practices*. Houghton Mifflin Company.

- Mursita, R. A., Bintoro, T., Winarsih, M., & Nuraini, S. (2025). Pengaruh pelaksanaan pembelajaran berbasis proyek dalam Profil Pelajar Pancasila (P5) terhadap kemandirian dan kemampuan komunikasi peserta didik disabilitas rungu. *Jurnal Pendidikan Kebutuhan Khusus*, 9(1), 22–37.
- Nittrouer, S., Lowenstein, J. H., & Antonelli, J. (2020). Parental language input to children with hearing loss: Does it matter in the end?. *Journal of Speech, Language, and Hearing Research*, 63(1), 234–258. https://doi.org/10.1044/2019_JSLHR-19-00123.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods 3rd. ed.* Sage publications.
- Paul, P. V., & Whitelaw, G. M. (2010). *Hearing and Deafness*. Jones & Bartlett Publishers.
- Pinker, S. (2003). *The language instinct: How the mind creates language*. Penguin uK.
- Purbaningrum, E., & Rofiah, K. (2020). *Bina Bicara Bagi Anak Berkebutuhan Khusus*. Jakad Media Publishing.
- Rotfleisch, S., & Martindale, M. (2023). *Listening and spoken language therapy for children with hearing loss: A practical auditory-based guide*. Plural Publishing.
- Sari, A. W., & Arta, D. J. (2025). Implementasi deep learning: Suatu inovasi pendidikan. *WASPADA (Jurnal Wawasan Pengembangan Pendidikan)*, 13(1), 121–126. <https://doi.org/10.61689/waspada.v13i1.727>.
- Septiani, D., Koebanu, S., & Lustyantje, N. (2025). Exploring Writing Challenges in Deaf and Hard of Hearing Students with Cochlear Implants: The Role of Dysgraphia. *JURNAL EDUSCIENCE*, 12(3), 874–885. <https://doi.org/10.36987/jes.v12i3.7208>.
- Septiani, D., Rafli, Z., & Murtadho, F. (2024). The Acquisition of Word Classes in the Indonesian Language by Students with Hearing Impairments. *Jurnal Sastra Indonesia*, 13(3), 252–263. <https://doi.org/10.15294/h6f1as93>.
- Tisdell, E. J., Merriam, S. B., & Stuckey-Peyrot, H. L. (2025). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
- Tomasello, M. (2005). *Constructing a language: A usage-based theory of language acquisition*. Harvard university press.
- Tomblin, J. B., Oleson, J., Ambrose, S. E., Walker, E. A., & Moeller, M. P. (2020). Early literacy predictors and second-grade outcomes in children who are hard of hearing. *Child Development*, 91(1), e179–e197. <https://doi.org/10.1111/cdev.13158>.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.
- Wadnerkar Kamble, M., Lam-Cassettari, C., & James, D. M. (2020). Communication skills and communicative autonomy of prelinguistic deaf and hard-of-hearing children: Application of a video feedback intervention. *Frontiers in Psychology*, 11, 1983. <https://doi.org/10.3389/fpsyg.2020.01983>.
- Wainscott, S. D., & Spurgin, K. (2024). Differentiating language for students who are deaf or hard of hearing: a practice-informed framework for auditory and visual supports. *Language, Speech, and Hearing Services in Schools*, 55(2), 473–494. https://doi.org/https://doi.org/10.1044/2023_LSHSS-22-00088.
- Walker, K. A., Shah, J. K., Alexander, L., Stiell, S., Yoshinaga-Itano, C., & Uhler, K. M. (2025). The Role of Phoneme Discrimination in the Variability of Speech and Language Outcomes Among Children with Hearing Loss. *Behavioral Sciences*, 15(8), 1072. <https://doi.org/10.3390/bs15081072>.



- Waqar, F., Fatima, G., & Riaz, S. (2023). Role of Speech Language Therapy in Academic Achievements of Students with Hearing Impairment at Special Education Schools and Centers. . *Pakistan Languages and Humanities Review*, 7(3), 526–536. [https://doi.org/10.47205/plhr.2023\(7-III\)45](https://doi.org/10.47205/plhr.2023(7-III)45).
- Werfel, K. L., Reynolds, G., & Fitton, L. (2022). Oral language acquisition in preschool children who are deaf and hard-of-hearing. *Journal of Deaf Studies and Deaf Education*, 27(2), 166–178. <https://doi.org/10.1093/deafed/enab043>.
- Winarsih, M., Bintoro, T., Bagaskorowati, R., & Nanik, U. (2023). Student Performance Application in the Practice of Teaching Deaf Students Based on Reflective Maternal Method (RMM). *Mimbar Ilmu*, 28(2), 231–239. <https://doi.org/10.23887/mi.v28i2.59979>.
- Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage Publications.