

ABSTRACT

Title of Capstone: ENSURING AN INCLUSIVE COMMUNITY FOR STUDENTS WHO ARE DEAF OR HARD OF HEARING THROUGH TARGETED, CONSISTENT TRAINING FOR TEACHERS OF THE DEAF AND HARD OF HEARING

Amanda Haislip Krieger, Doctor of Education
in Special Education Leadership, 2025

Capstone directed by: Professor Carolyn Molden Fink, University of Maryland,
College of Education

This capstone project explores the pedagogy and cultural awareness required when educating students who are Deaf and Hard of Hearing (D/HH) in inclusive settings. The identified problem of practice is that there is often a lack of consistent and targeted training for Teachers of the Deaf and Hard of Hearing (TDHH). A comprehensive literature review was conducted to examine current research on the specific needs of D/HH students, current preparatory and training practices for TDHH, and the impact of collaboration on creating inclusive environments. All of which influence the outcomes for the growing population of D/HH students educated in the general education environment. Findings revealed that D/HH students have unique needs that require support from qualified and trained TDHH. There is a gap between the research and practice of providing this training to TDHH. A proposed plan for implementing a training framework for district-level personnel aims to build their knowledge of

Deaf education and increase their confidence in making informed decisions regarding resource allocation for TDHH training. This Capstone concludes that to effectively support the population of D/HH students served in general education settings, district-level personnel need the pedagogy and cultural awareness that is required when educating D/HH students. The awareness can be used to provide consistent and targeted training for TDHH, supporting the creation of inclusive educational communities for students who are D/HH.

ENSURING AN INCLUSIVE COMMUNITY FOR STUDENTS WHO ARE DEAF OR HARD
OF HEARING THROUGH TARGETED, CONSISTENT TRAINING FOR TEACHERS OF
THE DEAF AND HARD OF HEARING

by

Amanda Haislip Krieger

Capstone submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment of
the requirements for the degree of Doctor of Education
in Special Education Leadership
2025

Advisory Committee:

Dr. Carolyn Fink, Chair

Dr. Paula Beckman

Dr. Philip J. Burke

Dr. Agnesanne Danehey

Dr. Victoria Page-Voth

Dr. Nan Bernstein Ratner, Dean's Representative

© Copyright by
Amanda Haislip Krieger
2025

Dedication

To my incredible husband, Adam—Your unwavering love, patience, and belief in me have been my steadying force, affirming our unity through every challenge and triumph. Your presence transformed obstacles into opportunities, and I am forever grateful for the love that carried me through.

To my two amazing sons, Jeffrey and Levi—You are my heart and my greatest inspiration. Simply having you in my life gives purpose to everything I do, and your love drives me forward. You are the center of my world, the reason behind every step I take. This journey, and all that I have achieved, has been for you.

To my parents, Michael and Pauline—You gave me the foundation to dream, the courage to pursue those dreams, and the strength to keep going when the path was hard. Your wisdom continues to guide me, and your belief in me has been a quiet force behind everything I have achieved. I carry your love with me in all that I do.

To my sister, Melissa—Thank you for being a constant source of calm and encouragement. Your friendship, support, and belief in me have meant more than words can express.

This work is dedicated to you—with love and gratitude.

Acknowledgements

I would like to express my deepest gratitude to Dr. Fink, my advisor, for her invaluable guidance, encouragement, and expertise throughout this doctoral journey. Her mentorship and belief in my work gave me the confidence to persevere through every challenge.

I am profoundly thankful to Dr. Compton, my undergraduate professor, whose early belief in my potential sparked the passion that led me to pursue this path. Her influence not only set me on this path but also opened my eyes to the richness and complexity of Deaf Education.

My sincere appreciation goes to Dr. Page-Voth and Dr. Burke for their leadership and dedication in bringing this program to life and guiding us every step of the way. I am honored to have been part of the journey they helped shape. I gratefully acknowledge the financial support provided through the scholarship funded by the Department of Education, which made this opportunity possible.

To my cohort, thank you for the camaraderie, collaboration, and shared resilience. The journey was made more meaningful and insightful because of your support and friendship.

To my family and friends, your unwavering love, patience, and encouragement have been my foundation and my greatest source of strength. I am endlessly grateful for your support.

This accomplishment is a reflection of the collective strength, wisdom, and kindness of all those who stood by me.

Table of Contents

Dedication.....	ii
Acknowledgements.....	iii
Table of Contents.....	iv
List of Figures.....	vii
List of Tables	vii
List of Abbreviations	viii
Section 1: Introduction and Identifying the Problem.....	1
Conventions of Expression.....	1
History.....	2
Start of Deaf Education.....	3
Deaf Education in the United States	5
Deaf Culture.....	8
Communication Approaches.....	8
Hearing.....	8
Amplification	9
Communication abilities	10
Language Modes.....	11
Problem of Practice.....	11
Scope of Problem.....	12
Section 2: Comprehensive Research Review	14
Search Criteria	14
Research Synthesis.....	17

Specific Needs for D/HH Students in Inclusive Settings.....	17
Present Practices for Teachers of the Deaf and Hard of Hearing	30
Pedagogy and Training Topics	50
Collaboration for Inclusivity.....	59
Conclusions.....	71
Significance.....	75
Section 3: Plan	78
Phases.....	79
Phase One: Connect.....	84
Phase Two: Equip	87
Phase Three: Empower	88
Benchmarks.....	89
Knowledge Acquisition	89
Participant Perceptions.....	90
Feedback and Satisfaction.....	90
Long-Term Impact	90
Measurement Strategies	91
Short-Term Measurement Indicators	91
Mid-Term Measurement Indicators	92
Long-Term Measurement Indicators	92
Anticipated Outcomes.....	93
Section 4: Summary of Results.....	95
Section 5: Product.....	99

Appendices..... 101

Bibliography 107

List of Figures

Figure 1 Quantity of Low Incidence Sensory Disability Program Distribution	36
Figure 2 Topics Identified by Research for TDHH Increased Training	81
Figure 3 Deaf Education In-Service Flowchart	85

List of Tables

Table 1 Low Incidence Sensory Disability Program Distribution.....	37
Table 2 Areas for Increased TDHH Training	82

List of Abbreviations

D/HH	Deaf and Hard of Hearing
TDHH	Teacher of the Deaf and Hard of Hearing
IDEA	Individuals with Disabilities Education Act
ASL	American Sign Language
TC	Total communication
SimCom	Simultaneous Communication
SEE	Signed Exact English
MCE	Manually Coded English
SSRS	Social Skills Rating System
CIC	Completely-in-the-canal
ITC	In-the-canal
ITE	In-the-ear
BTE	Behind-the-ear
NLTS2	National Longitudinal Transition Survey 2
D/HH-CLD	D/HH from culturally and/or linguistically diverse backgrounds
RID	Registry of Interpreters for the Deaf, Inc
QRI	Qualitative Reading Inventory
MARSI	Metacognitive Awareness of Reading Strategies Inventory
LRE	Least Restrictive Environment
TATIS	Teacher Attitudes Toward Inclusion Scale
CC	Collaborative Consultation

STASK-D/HH	School Team Assessment of Self-Efficacy and Knowledge-Deaf/Hard of Hearing
CAST	Center for Applied Special Technologies
UDL	Universal Design for Learning
IEP	Individualized Education Plan
QSH	Qualitative Similarity Hypothesis
NRP	Report of the National Reading Panel: Teaching Children to Read
TDHH-ELA	TDHH English Language Arts
LSL	Listening and Spoken Language
LSLS	Listening and Spoken Language Specialist
LISD	Low-incidence sensory disabilities
CDC	Centers for Disease Control and Prevention
O&M	Orientation and Mobility
HI	Hearing Impaired
VI	Vision Impaired
DB	Deaf Blind
KWL	Know, Want to Know, Learned
NAD	National Association of the Deaf
ASDC	American Society for Deaf Children
ANSI	American National Standards Institute
HVAC	Heating, ventilation, and air conditioning
NTID	National Technical Institute for the Deaf

Section 1: Introduction and Identifying the Problem

Deafness and hearing impairment are often viewed through the lens of the medical or legal definition. Under the Individuals with disabilities Education Act (IDEA), these categories are defined as: “Deafness: A hearing impairment so severe that a child is unable to process linguistic information through hearing, with or without amplification, and which adversely affects educational performance.” (2018)

“Hearing Impairment: An impairment in hearing, whether permanent or fluctuating, that adversely affects a child’s educational performance but is not included under the definition of deafness.” (2018)

While these definitions are critical in determining eligibility for the categories under special education, they do not encompass the history, cultural impact, and scope of needs for these individuals. Understanding the history of how this population was able to access education is crucial in understanding their needs and serving these students effectively.

Conventions of Expression

For the purpose of this Capstone, the researcher made decisions regarding the choice of terminology, language, style, and structure to ensure cultural respect and consistency in communication. A capital “D” will be used for Deaf to honor Deaf culture and the Deaf community. A lower-case “d” will be used for deaf when referring to the medical condition of hearing loss and for those involved with the Oralism/Listening and Spoken Language approach. “Oralism” and “oral method” will be used to clarify pedagogy, which emphasizes speech and lip-reading and discourages the use of sign language. In the field of special education, it is customary to use people-first language to highlight the importance of the person rather than the condition. For this capstone, “Deaf-first” or “Identity-First” language will be used when relevant

to respect the Deaf community's culture and pride. The term “Hard of Hearing” will also be used and will replace references to “Hearing impaired” when applicable. This is due to the views on the term being perceived as offensive and its implications regarding deficiency.

History

The roots of education in schools can be traced back to around 3500 BCE, when the Sumerians established schools attached to temples to train scribes (Mark, 2023). From 350 BCE until the 1500s, the widely accepted belief that individuals who were Deaf or Hard of Hearing (D/HH) could not learn was primarily attributed to the interpretation of Aristotle's teachings. Aristotle believed that in order to learn or be educated, individuals must have sensory input, especially through the sense of hearing. This widespread inaccuracy would hinder educational opportunities for this population until the 1500s. In the 1500s, an Italian physician, Geronimo Cardano, had a son who was deaf. He defended the belief that individuals who are Deaf have the capacity to learn and could learn to read and write, despite not being able to speak or hear. (Today, 2022). This thought process shifted the views of individuals who were D/HH and paved the way for formal education.

More individuals all over the world continued this momentum. Dom Pedro Ponce de Leon, a monk in the early 1500s who is credited as being the first Deaf educator, focused on educating Deaf students to speak. Manuel Ramírez de Carrión also used methods to teach the children of nobles who were deaf. In 1620, Juan Pablo Bonet published the first book on using hand signs to represent the alphabet. In his methods, this way of learning the alphabet was used as a stepping stone to the ultimate goal of teaching lip reading and spoken language. Étienne de Fay, who is considered to be the first Deaf educator in France. He was born deaf, and his family placed him with monks in an abbey; he was then educated by other children who were deaf,

utilizing signs (Pyfers, 2020). Throughout this time, the Deaf communities all over began sharing their manual communication methods with others. This act of spreading knowledge advanced the idea of educating individuals who were D/HH.

Start of Deaf Education

Charles-Michel de l'Epee, also known as the “Father of Deaf,” aided this effort in revolutionizing society’s thinking about individuals who were D/HH. He started on his journey by tutoring twin girls who were deaf by using hand signals to represent the sounds from the letters in the alphabet. This is thought to be knowledge he obtained from the Deaf communities within Paris, who had been utilizing a manual approach for communication. This approach to using the alphabet had achieved success, so he began taking on more students, sharing the knowledge through demonstrations in his home. As his passion and dedication for educating individuals who were D/HH grew, he started the Institution Nationale des Sourds-Muets de Paris (Royal Institution for the Deaf and Mute of Paris), which is credited as the world's first free school for the Deaf, in Paris in 1755. Charles-Michel de l'Épée continued to utilize a hand signal alphabet along with spoken language techniques. This school was later renamed to Institut National de Jeunes Sourds de Paris (National Institute for Young Deaf People in Paris) (1791). Historically, individuals who were Deaf were labeled as “mute” or “dumb.” While historically these terms were used, it is now known to be not only inaccurate but also a harmful stereotype. Through his understanding of his students’ challenges with the French language, Charles-Michel de l'Épée incorporated manual signs using Latin roots for word endings and vocabulary, evolving his educational method from the alphabet to words through signs. Later, this would continue to develop and play a part in the evolution of French Sign Language.

Charles-Michel de l'Épée, through his experience and knowledge, sought to change the view and rights of individuals of the Deaf community. He advocated for their rights and condemned prior treatment. In his book, *La véritable maniere d'instruire les sourds et muets, confirmee par une longue experience* (The True Method of Educating the Deaf and Mute, Confirmed by Much Experience),” he states:

Religion and humanity inspire me with such a great interest in a truly destitute class of persons who, though similar to ourselves, are reduced, as it were, to the condition of animals so long as no attempts are made to rescue them from the darkness surrounding them, that I consider it an absolute obligation to make every effort to bring about their release from these shadows. (Charles Michel de l'Épée, n.d.)

This book, along with his shared educational methods, spread the belief that individuals who are D/HH are capable of learning and should be educated. After his death, his work continued as others came from all over Europe to the Institution Nationale des Sourds-Muets to learn methods for educating individuals who were D/HH. One of those was another prominent figure in the history of Deaf education, Abbe Roch-Ambroise Sicard. Sent by a Bishop to learn under Charles-Michel de l'Épée, he completed the initiated work of Charles-Michel de l'Épée on the *Dictionnaire général des signes* of recording signs. The purpose of this text was to publish a common documented language that could be used in educating individuals who were D/HH. He also succeeded Charles-Michel de l'Épée as leader of the Institution Nationale des Sourds-Muets. Abbe Sicard was dedicated to spreading the successes of Deaf Education and manual communication (Pyfers, 2020). In the early 1800s, he traveled to the United Kingdom with two other Deaf educators, Laurent Clerc and Jean Massieu. They were there to collaborate on the topic of Deaf Education, and while there, they had a chance meeting and inspired Thomas

Hopkins Gallaudet. Rev. Gallaudet was an American who was in Europe to learn about Deaf education methods. (“Deaf history” n.d.)

Deaf Education in the United States

Thomas Hopkins Gallaudet was sent to Europe by Mason Fitch Cogswell, a doctor in America. Dr. Cogswell had a personal connection to the Deaf community due to his daughter, Alice Cogswell, who became deaf from an illness at a young age. This connection inspired his passion for educating this population of students. He advocated for support and funding to send Thomas Hopkins Gallaudet to Europe to learn about their advancements in educating Deaf individuals. Rev. Gallaudet originally went to London to learn about the oral methods. After meeting Abbe Sicard, Laurent Clerc, and Jean Massieu, Thomas Gallaudet was inspired by their successes with the manual (use of sign language) approach and traveled with them back to the Institution Nationale des Sourds-Muets to learn more about educating Deaf students. While there, his funding ran out, and he needed to return to the United States with what he had learned. He convinced Laurent Clerc to return with him, and together they established the first official school for the Deaf in the United States that would eventually be named American School for the Deaf in Hartford, Connecticut. (“Gallaudet’s 150-year history”, 2024)

This was the start of formal education for D/HH students in the United States. While the oral method was still strong during this time period, the establishment of this school and Laurent Clerc’s use of French Sign Language are believed to have impacted the development of American Sign Language. The mindset for providing educational opportunities to D/HH individuals in the United States continued to grow throughout the 1800s. In 1864, President Abraham Lincoln signed a Charter for the establishment of Gallaudet University. This University is unique in that it is devoted to providing higher education to D/HH individuals.

(Cordano, 2023) This university, over the years, has provided and continues to provide opportunities for D/HH students to receive not only bachelor's degrees but also graduate-level degrees. This was and continues to be a massive triumph for D/HH communities (“Gallaudet’s 150-year history”, 2024).

With the increase of educational opportunities for D/HH students, controversy arose over which method should be used for educating D/HH students. The overarching view of the time was that the oral method was best, and the use of manual communication should be discontinued. The Gallaudet family was considered to support the use of manual communication in the form of sign language but also utilized the oral method for the education of D/HH students. Alexander Graham Bell promoted the “pure oral method.” While both methods promoted the education of D/HH students, they differed in how they provided instruction. In 1867, schools focusing on the Oral method, such as the *Clark School for the Deaf / Center for Oral Education*, were established. These schools believed that the use of manual communication isolated D/HH individuals and slowed their development (“Language and identity,” 2022). However, sign language was always permitted at Gallaudet University (“Gallaudet’s 150-year history”, 2024).

Until 1919, the majority of schools for the Deaf in the United States had solely utilized the oral method. As researchers began to research American Sign Language and the manual approach to Deaf Education, a clearer understanding was brought to the public. The work of William Stokoe in *Sign Language Structure* gave way to the understanding of ASL being a true language (“American Sign Language,” 2022).

Deaf President Now

From the establishment of Gallaudet University until 1988, the university's president had always been a hearing individual. D/HH individuals of this time are cited as feeling

discriminated against and expressed discontent that hearing people were tasked with making decisions for D/HH individuals. The unrest felt by the deaf community came to a head 124 years following the establishment of Gallaudet University with the Deaf President Now movement.

The University had three candidates for the vacant position of President. Two of the three candidates were Deaf, and the hearing candidate was selected. Past and present students, faculty, and community members were upset with the decision and decided to protest by shutting down the campus until four demands were met. Those included “Elisabeth Zinser must resign and a deaf person be selected as president; Jane Spilman must step down as chairperson of the Board of Trustees; Deaf people must constitute a 51% majority on the Board; and there would be no reprisals against any student or employee involved in the protest.” (“Events leading up to DPN,” 2022) This week-long protest ended with all demands being met and Dr. I. King. Jordan became Gallaudet University's first Deaf President.

Following the protest, Dr. I. King. Jordan is quoted as saying, "Deaf people can do anything that hearing people can, except hear” to a reporter who was inquiring about his honest belief on his deafness as an obstacle. This statement encompasses the importance of providing education and opportunities for individuals who are D/HH (“I King Jordan,” 2022). This protest created lasting effects not only on the Deaf community but also on the nation and world as a whole. Following the protest, legislation was passed securing rights for individuals who are D/HH. Other nations established collegiate programs for D/HH individuals. It brought aspects of the Deaf community to the public, such as Deaf storylines in movies, Deaf Actors, and the benefits of sign language. (The Impact of the Deaf President Now, 2022)

Deaf Culture

Some Deaf individuals do not see Deafness as a disability but as a part of their identity. They report that their identity is connected to American Sign Language and participation in the Deaf community. Cultural affiliation is typically identified with the use of a capital D when writing the word Deaf or stating, “big D Deaf.” In contrast, the lowercase d is used to denote medical affiliation or lack of association with Deaf culture. The National Deaf Center on Postsecondary Outcomes (NDC) highlights that Deaf Culture is made up of unique “Values, behaviors, and traditions” (“Deaf awareness,” 2025). The National Association for the Deaf (NAD) explains that individuals who consider themselves part of Deaf Culture will do so by using a capital letter "D" when noting their Deafness. In contrast, when discussing the medical definition or if an individual does not consider themselves to be involved in Deaf culture, they will use a lowercase letter d when discussing their deafness. (“Community and Culture,” 2025).

Communication Approaches

The history of Deaf education highlights the diverse communication approaches employed in Deaf education. This is critical to understand as the D/HH population of students is unique in their hearing, amplification, communication abilities, and language modalities. Teachers of the Deaf and Hard of Hearing (TDHH) must be versed in the differing modes and history in order to serve this population of students effectively.

Hearing

The World Health Organization defines hearing loss as

“A person who is not able to hear as well as someone with normal hearing – hearing thresholds of 20 dB or better in both ears – is said to have hearing loss.” [Highlighting that] “Hard of Hearing refers to people with hearing loss ranging from mild to severe.”

[and] “Deaf people mostly have profound hearing loss, which implies very little or no hearing.” (2025, February 26)

The degree of hearing loss and cause are unique to the individual, as is the time of onset and decision for amplification.

Amplification

The choice to use amplification, as well as the types that are beneficial, are unique to the individual and their level of hearing loss. Amplification is a choice; not every individual who is able to receive amplification decides to use it. Different types of amplification are beneficial to different forms of hearing loss. TDHH must be familiar with these in order to assist and support their diverse population of students.

Hearing aids. Hearing aids are devices that amplify sound by bringing sounds from outside the ear into the ear at an increased volume. The forms of hearing aids can include open fit, which are not custom-fitted and leave the ear canal open. These are usually used for those who need amplification for high-frequency sounds but can hear low-frequency sounds. Behind-the-ear (BTE) aids, which are utilized for the majority of levels of hearing loss, are known for increased processors that are housed behind the ears, giving the most significant increase in volume. In-the-ear (ITE) aids are created so that the entire device can fit in the outer “bowl” of the ear. These are used for those with moderate to more severe hearing impairment. In-the-canal (ITC) aids are fitted to the ear and fit deeper in the canal. Due to their small size, they are less powerful and are used for mild to moderate forms of hearing loss. The smallest hearing aid is the completely-in-the-canal (CIC) aid, which is concealed in the ear canal. CICs typically target mild to moderate losses. (Hearing Aids, 2025)

Bone Conduction Hearing aids. Some individuals with hearing loss require amplification that bypasses the outer ear entirely. One of the options is to use vibrations to vibrate the bones of the skull to create sound through the Cochlea. These can be surgically placed or non-surgically, depending on the needs of the individual. (Bone conduction hearing aid 2022)

Cochlear Implants. Cochlear implants are surgically placed devices that are utilized for individuals who have minimal benefit from hearing aids and/or have damaged inner ears. These are typically used for those who are identified as having severe hearing loss. They can be unilaterally or bilaterally implanted. The sound is not acoustic but stimulates the cochlea, sending signals of sound to the brain. Cochlear implantation is a surgical procedure and requires time to heal and rehabilitation for learning how to process sound with it. (Cochlear implants, 2024)

Communication abilities

Individuals who are D/HH differ so much in their access to sound and form of language that it affects their communication abilities. While early identification in babies has increased access to early intervention and allowed for increased access to early language, it is not a foolproof solution. The population of individuals who are D/HH all have different origin stories. They could be Deaf, born to Deaf parents, growing up in a home using fluent American Sign Language (ASL). They could be the first child who was deaf, born to hearing parents who chose to amplify and use the oral method. They could have been hearing until illness altered their hearing later in life. The differences are limitless, but all impact the individuals' access to language, thus their communication ability. TDHH need to understand their unique history and apply strategies that will support their individual communication development.

Language Modes

The mode or language selected by D/HH individuals is a personal choice that can evolve over time. This is a highly controversial topic within the Deaf community. While there is no correct choice, the decision between the manual and oral approach brings strong beliefs on both sides. There are combined approaches to communication that are often utilized when there are groups of mixed hearing abilities that incorporate both manual communication and the oral approach. Examples would be Total communication (TC) or Simultaneous Communication (SimCom), but these are often deemed as less effective as they combine two different languages incompletely (Hands & Voices, 2023).

Manual Method. American Sign Language (ASL) is a manual form of communication. While ASL has been documented as used since the 1800s, it was not until the 1960s that ASL gained recognition in the United States as an official language. ASL has its own grammar and syntax and is completely independent of English. There are other modalities of manual communication, but it is important to note that they are not languages. They are modes of communication through established languages. This includes modes such as Signed Exact English (SEE), Manually Coded English (MCE), and Cued Speech.

Oral Method. Since the very beginning of Deaf Education, there has been a focus on the oral approach. The Oral approach is teaching oral language to an individual who is D/HH. This could be utilizing visual supports such as lip reading and/or learning language through residual hearing by listening.

Problem of Practice

Teachers of the Deaf and Hard of Hearing (TDHH) work with a population of students who are considered to be a low-incidence disability due to their relatively small population. The

varying degrees of hearing loss, amplification, and language access create differentiated needs that require specific interventions. There is often a lack of understanding of the pedagogy and cultural awareness required when educating students who are Deaf and Hard of Hearing (D/HH) in an inclusive setting.

Consistent and targeted training is often not provided for TDHH. This creates a lack of opportunities to increase knowledge of current inclusive practices at the school level, hindering the creation of an inclusive educational community for students who are D/HH.

Scope of Problem

With the advancement of technology and the increase in inclusion practices, the demand for students with hearing impairments to be educated in inclusive settings has increased dramatically. It is reported that in 2021, 70,000 children in the United States were identified as hearing impaired, and 80% of those “spend the majority of the school day in traditional school settings” (Nagle et al., 2016; OSERS, 2021, as cited in Orndorf et al., 2022). Data from 1975 detailed that the majority of students with hearing loss were “typically educated at a school for the deaf,” in contrast to the 2021 data of 20% (Moore, 2001, as cited in Miller, 2015; Nagle et al., 2016; OSERS, 2021, as cited in Orndorf et al., 2022). This has increased the need for educators who are specifically trained in this field (Engler & MacGregor, 2018). TDHH are educated in the specific pedagogies that are required to educate this population of students. The lack of targeted training and professional development supplied to this population of educators often creates gaps in concept knowledge following their initial training to become educators. This hinders access to current best practices and pedagogy at the school level for students.

There is often a lack of targeted, relevant training that affects the knowledge base of the TDHH population. This creates inconsistent access to or the unavailability of current knowledge

and pedagogy that TDHH can provide at the school level, which hinders the effectiveness and inclusivity for students who are D/HH.

TDHH are often in itinerant positions and are thus isolated in their knowledge base (Bullard & Luckner, 2013; Johnson, 2013, as cited in Miller, 2015). TDHH typically must seek out training and professional development content for themselves, and many times these occur online as “district-sponsored workshops and district staff meetings proved less attractive options for meeting (Teachers' for students who are deaf or hard of hearing) professional development needs” (Miller, 2015, p. 20). The training that is provided for TDHH is generally targeted for special education or the general education curriculum as a whole.

Research Questions

RQ1: What are the identified specific needs for D/HH students in inclusive settings that impact successful outcomes of academic achievement and post-secondary success?

RQ2: What makes up the current training/ professional development practices provided for TDHH for enhancing their ability to create inclusive environments for students who are D/HH?

RQ3: What are the most critical pedagogy and training topics for TDHH serving D/HH students that impact successful outcomes?

RQ4: How does effective collaboration between TDHH and other school staff affect outcomes for the successful inclusion of students who are D/HH?

Section 2: Comprehensive Research Review

Deafness and hearing impairment are often defined by medical perspectives and by the context within special education laws such as IDEA. While these definitions provide a focus and criteria components, they fail to depict the broader social, educational, and cultural identities of D/HH individuals. Recognizing the cultural dimension of Deafness and the various factors that can impact the educational needs of D/HH students is vital in serving these students effectively. School districts across the United States rely on TDHH to provide quality instruction for this population of students. TDHH are required to have a vast understanding of historical and personal contexts, in addition to the ability to utilize flexible approaches with diverse language modalities, amplification technology, and specialized pedagogical strategies.

The purpose of this literature review is to evaluate current research on the provided training for TDHH and its impact on creating inclusive environments that lead to successful outcomes for the growing population of D/HH students. This literature review was conducted to better understand the four identified research questions.

Search Criteria

The PRISMA framework was utilized as a guide while conducting the research to ensure validity and a thorough understanding of the research topic. The process included identification, screening, eligibility, and inclusion. In the identification phase, the researcher selected key terms to initiate searches. Databases utilized included ERIC, Professional Development Collection, Teacher Reference Center, and Education Source. When the researcher initially put search terms into the database, additional suggested alternative terms populated and were selected based on their applicability. Boolean operators were used to broaden or focus the searches. Exclusionary criteria were utilized to narrow down the results. To identify more trustworthy articles, research

needed to be peer-reviewed. In an effort to keep research current, the date parameters were set from 2014 to 2024.

Direct searches were initially conducted using three different sets of terms. Initial terms were: “deaf or hard of hearing or hearing impaired or d/ D/HH AND inclusion or inclusive education or mainstreaming AND methods or techniques or strategies or best practices.” This search yielded 639 results. By limiting the language to English and publications to academic journals, the results were reduced to 478. The primary researcher then read through the titles to determine if they initially met the criteria for inclusion. Articles were excluded because they were not in an inclusive setting, had a primary focus on working with post-secondary students, were not geographically relevant to the study's purpose, or were not relevant to the target participants' age. Articles involving only vision or deaf blindness were also excluded as they have similarities but require interventions from a differently qualified professional. Studies that were found to meet this criterion were 32.

The same process was applied to subsequent search terms. The second set of terms were “professional development or professional learning or professional training or professional education AND effects or impact or consequences or influence or outcomes or effectiveness or efficacy or benefits or improvement AND deaf/ hard of hearing teacher.” This produced 80 results, with 16 being included from the initial screening by title. The third set included the terms “teacher of the Deaf or hearing-impaired teacher or deaf and hard of hearing teacher AND professional development or training or education or development or learning AND outcomes or benefits or effects or impact or effectiveness.” With the addition of geographic limitations to the United States, this search yielded 27 results. Following screening by the researcher based on titles, nine were included, but two were duplicates from previous searches.

From the results of the direct searches, backward searches were also utilized in compiling research to ensure a thorough understanding of the topic. When doing backwards searches from identified articles, the date parameters were expanded to as early as 2006 due to the relevance and applicability. This added nine articles.

When screening the results, the inclusion criteria were established to focus the results on the research questions. Inclusionary criteria included “students who are d/Deaf or Hard of Hearing” and “Teachers of the Deaf” as they are those who are directly impacted, “inclusive communities” as that is the primary outcome, and “training” / “professional development” as that is the primary means for training educators. This research focused specifically on TDHH and the educational needs of D/HH students. The scope of this study was intentionally narrowed by not including students with multiple disabilities and training for special education teachers. Though commonalities exist between the disciplines of special education in general and teaching D/HH students in specific particularly with regard to instructional methods, there are important distinctions with how services are delivered. This distinction forms the basis of the concentration on D/HH and TDHH with the understanding that multi-disciplinary teams are critical when developing individualized education plans. Titles and abstracts for studies with relevant titles were read to ensure they were appropriate and contributed to answering the research questions. Once studies were collected from the first screening, the researcher read the abstracts to determine if they were relevant to the research questions. Articles were excluded due to the focus of research within the articles, geographical location, and program of services (local school vs. residential). This narrowed the articles to 34. Reading the full text of identified articles completed the final screening for inclusion. Articles were excluded due to locations outside the United States. While the value of international studies is exponential, the rationale for this

exclusion is to ensure findings remain applicable to educational settings that are governed by U.S. laws. Additionally, exclusionary criteria for directly addressing D/HH students in schools were applied. This narrowed focus excludes parental viewpoints, other preparatory program participants, and age groups outside of the scope served under IDEA. Finally, non-study articles were excluded, ensuring research-based findings were used to contribute to the analysis, reinforcing the applicability of the study's conclusions. Following the full read of the articles, 18 were selected. Critiques were conducted for all that were selected for inclusion.

The analysis of the research identified four themes that directly contribute to the identified research questions, which impact the success of inclusivity in the least restrictive environments for students who are D/HH. The first of which is understanding the specific needs of students who are D/HH and what they need to be successful in an inclusive environment. The next step is to describe the present practices and training for TDHH. Identifying pedagogy and strategies that are successful for students who are D/HH was a third area. The essential final thematic area is collaboration with other professionals, as it is essential for all staff to work as a team to address the academic, social, and communication needs of D/HH students.

Research Synthesis

Specific Needs for D/HH Students in Inclusive Settings

Increased numbers of D/HH students are being educated in their least restrictive environments. These students' needs are different from those of their general education peers and other students with special needs. Research highlights that students who are D/HH, due to differing hearing abilities, often exhibit expressive and receptive language delays. When identifying and understanding the unique needs of D/HH students, it is important to consider

what is essential throughout their lives. Lessons in communication and social skills taught by TDHH can affect every stage of life.

In a study by Cawthon et al. (2015), social skills were examined at the high school level and their impact on postsecondary education, employment, independent living, and self-belief. Data from the National Longitudinal Transition Survey 2 (NLTS2) was used to review the data from 2001 through 2009. The NLTS2 used sampling schemes that included stratification and weighting, ensuring better representation and generalizability as well as increasing reliability and validity. Data for the NLTS2 was collected in five waves; for this study, they utilized data from waves one, two, and five. The independent variables were identified as social skill ratings from parents, family language contacts, and the interaction term between these two. The dependent variables were identified as education outcomes (attendance and graduation), independent living (self-efficacy and life satisfaction), and employment outcomes (working for pay, hourly wage, and job satisfaction). Covariates and auxiliary variables were identified in order to control for confounding variables. These included demographic information, Woodcock-Johnson III subtest scores, grades, and household characteristics. This article explained missing data procedures, including multiple imputations, to control for Type 1 (false positive) error rates. Researchers emphasized that adding auxiliary variables increases the analysis's credibility due to the missing at random assumption (Cawthon et al., 2015).

The 610 participants included in the study were identified as deaf or hearing impaired (terms used in the study) by parents, were aged 13-16 by December 2000, and were aged 22-25 at the end of the study. They also had to have completed the final wave of the NLTS2. Logistical regression was used for binary outcomes, and ordinary least squares regression was used for continuous outcomes. The Social Skills Rating System (SSRS) was not normed for D/HH

students; it had to be verified to ensure its validity for the study. The first step for checking validity was to ensure internal validity for parent ratings. A measure of child language modality and educational setting did this. Findings were consistent across variables, and the internal consistency across groups was low-moderate for parents' measure of social skills. Validation also included checking convergent and divergent validity for both teacher and parent rating skills. The details in which the analysis was described provided strength and competence of the findings and the reliability and validity of the study (Cawthon et al., 2015).

The key findings highlight the significant impact of social skills on post-secondary graduation. This includes degree completion for two-year, technical, and four-year colleges/universities. The study illuminated the possible impact of social skills on self-advocacy, particularly in the area of communication, confronting challenges, and transitioning from more educationally structured to more broadly focused settings. The researchers noted that social skills were statistically predictive. While it was not identified as predictive for other outcomes, such as post-secondary enrollment and retention, where academic achievement was notably predictive, it was noted that social skills indeed play a role in academic achievement (Cawthon et al., 2015).

It was discussed that the data that NLTS2 provides is intended for a wide variety of students with differing primary and secondary disabilities. This could have impacted the results because the wording of the questions may not have been applicable or accurate for D/HH individuals, especially for the questions regarding communication. Considerable impact is possible from the wording, especially for families with differing language modalities and the measurement of social skills, which lacks the advantage of peer or self-report for social skills. The teacher scales created an additional limitation in that they were not equally representative of school settings. Additionally, the ratings for parents and teachers were not comparable. Due to

this study's longitudinal nature, the design was not intended to draw inferences between hearing and Deaf individuals. The findings, while limited in some areas, highlight the need for further research and development of social skills for high school D/HH students. The conclusions emphasize the difference in perspectives that parents and teachers have of D/HH students. Promoting communication between parents and teachers could foster needed interventions for communication strategies, social experiences, and role models (Cawthon et al., 2015).

TDHH must address the communication needs of D/HH students to support their learning and development. This is especially true for the notably increasing population of D/HH students who are culturally or linguistically diverse. This population faces increased challenges due to their sensory disability and multilingual/cultural background. It is essential that service providers recognize and connect with the linguistic background (heritage language) and support the development of the students' academics and their cultural identity. A comprehensive understanding of this population and what enables them to be successful is crucial for TDHH. Catherine Adekemi Ayantoye and John Luckner (2016) conducted a study of this sub-population of D/HH students in inclusive settings. This qualitative case study focused on identifying factors that contribute to the success of students who are D/HH from culturally and/or linguistically diverse backgrounds (D/HH-CLD). Participants were selected from two school districts in a western state in the United States and included four (two female, and two male) D/HH high school students, who met the six criteria for inclusion. Their ages ranged from 14 to 19; they were identified as having severe-profound hearing loss, had culturally and/or logistically diverse backgrounds, were attending high school, displayed age-appropriate academic skills in most subjects, demonstrated successful social relationships with peers, and exhibited positive self-perceptions. There were three adult participants: one TDHH, one educational interpreter, and one

general education teacher. While the case study approach yields a small sample size, it is to be expected when researching a subgroup within an already smaller portion of the population. Qualitative findings are applicable even if the small sample size could impact the generalizability (Ayantoye & Luckner, 2016).

The researchers collected data through in-depth semi-structured interviews, observations, and raw field notes. These data forms were transcribed and coded using cross-case and within-case analysis to find themes. The constant comparison method was also used to find patterns and identify relationships. The authors employed triangulation, member checking, peer checking, expert checking, and audit trail to strengthen the reliability and validity of the results. This reinforces confidence in the findings and their contributions to understanding the specific needs of D/HH-CLD students (Ayantoye & Luckner, 2016).

The data revealed seven themes to indicate successful outcomes for D/HH-CLD students. First, human resources as a concept was described as including parental affection to provide support and motivation in a loving way. Also, the support and help provided by staff (TDHH, interpreters, counselors, speech pathologists) at the school, who targeted vocabulary, were available for support, built relationships, and aided with transitions. General education staff were also described as part of this theme due to their application of needed accommodations such as preferential seating, extra time, a copy of teacher notes, alternative reading assignments, vocabulary support, graphic organizers, and sentence stems. The second theme, technology resources that were reported as supporting D/HH-CLD students across settings. These were identified as sound field systems, closed captioning, computers, and hearing devices such as cochlear implants. The third theme was extracurricular involvement, noting that providing D/HH-CLD students with opportunities to participate in sports, summer camps, and development

programs strengthened skills that were believed to have contributed to their overall success. Social skills were a fourth theme that enabled success by ensuring D/HH-CLD were understood, could understand others, had opportunities for social interaction, and developed listening skills. D/HH-CLD students were also described as having positive interpersonal relationship skills. The theme of taking responsibility was explained as D/HH-CLD students having internal motivation, abiding by the same rules with equal treatment, and demonstrating a non-reliance on accommodations. The final theme that emerged from the data was utilizing organizational skills in the form of agendas, time management, and consistent homework completion (Ayantoye & Luckner, 2016).

The researchers within this study displayed potential bias for inclusion settings by promoting inclusion and assimilation within a hearing society rather than depicting the impact of cultural development as it relates to Deaf culture. However, the emphasis of this study is on inclusion settings, spotlighting the specific needs of D/HH-CLD students in a setting that is primarily hearing (Ayantoye & Luckner, 2016). Despite these limitations, the conclusions that indicate successful outcomes for D/HH-CLD students are essential in understanding the diverse needs of the D/HH population of students, especially for communication and academics.

Reading comprehension is an area where communication, language, and academics come together. This is also a well-known area that is targeted across special education, but specifically by TDHH. Much of the research on strategies takes place for students at schools for the Deaf. This body of research was extended in a descriptive study conducted by Vicki Donne and Natalie Rugg (2015), who investigated reading perception and strategies used with informational texts in public school settings.

The participants were 26 D/HH students in grades four through eight. These students were spread across 16 districts and educated in general education, resource rooms, and self-contained settings. Students were provided with a 30-question survey developed on QuestionPro, in which they responded regarding their reading perceptions, habits, and use of strategies. The questionnaire had accessibility options that allowed the participant to choose to read the questions independently, watch a video of read aloud (to read lips or use their access to sound), or watch a video of signed transliteration from a Registry of Interpreters for the Deaf, Inc. (RID) certified interpreter. The research was conducted at the local schools, using individual students' textbooks as visual aids. The researchers collected demographic information through teacher record reviews. The researcher sat with participants and introduced the survey through a provided school computer or the researcher's iPad. The survey took an average of 30 minutes to complete. Following the survey, students who did not have a reading assessment at school within the last year were given the Qualitative Reading Inventory (QRI) (Donne & Rugg, 2015).

Reliability ratings were presented in the study from Cronbach's coefficient alpha, indicating a rating of 0.74. Procedural fidelity was also calculated at 95%. A limitation was noted for students' varying knowledge about different graphic organizers. Twelve were adapted from the Metacognitive Awareness of Reading Strategies Inventory (MARSII). While this is not normed for D/HH students, the reliability rating was .90. This provided information that strengthened confidence in the findings (Donne & Rugg, 2015). The results revealed that 57.7% of the students reported that they like to read, with 65.4% describing it as "fun." In contrast, 0% responded "no" and 23.1% described reading as "boring". Further analysis showed that 76.9% of participants rated themselves as good readers. Interestingly, 42.3% of respondents reported

spending 15 minutes or less reading in school, and 46.2% reported reading longer at home than at school. When investigating the use of reading comprehension strategies, the factors that were found to influence how students used them were communication mode, the presence of additional disabilities, reading instruction placement (general education classroom, specialized setting), and instructional/curriculum reading levels. A small number of respondents indicated use of support strategies in content areas such as science and social studies, where problem-solving strategies were more frequently used. For the section of the survey that was concerned with graphic organizer use, students identified the Venn diagram as the most preferred and familiar, followed by the KWL chart (Know, Want to Know, Learned). The Frayer models and word maps were lesser-known graphic organizers. A surprising result from the data is that pre-reading strategies were used inconsistently or inappropriately (Donne & Rugg, 2015).

While many of the conclusions aligned with previous research about this topic, there were findings from this study that did not align. One example is that the data did not correlate age with increased strategy use. Unlike in previous research, respondents associated good reading with active reading behaviors and strategies rather than with hearing ability, speech, or grades. An increased number of participants indicated using more independent reading strategies, such as context clues and dictionaries, than in previous studies (Donne & Rugg, 2015). The implications from the findings of this study relate directly to the needs of D/HH students. One of the issues that emerges from these findings is that many students were regularly exposed to or reading text above their reading level or considered at frustration level, which can directly correlate to the increased use of repair strategies. These results may further indicate that D/HH students would benefit from direct instruction in pre-reading strategies, comprehension strategies, and various forms of graphic organizers (Donne & Rugg, 2015).

Although there were noted limitations, the valuable results from the study extended the body of research on instructional reading for D/HH students. This is evident in the focus on informational text rather than narratives and D/HH students in the various educational settings of public school rather than specialized environments like schools for the Deaf (Donne & Rugg, 2015).

Increasing numbers of D/HH students are being educated in general education settings. A key indicator of the success of an inclusive setting is the participation of these students in general education classrooms. Studies indicate that the shared knowledge from TDHH facilitates the inclusion of D/HH students (Alasim, 2018). Positive opportunities for communication with hearing peers and teachers are another area that research recognizes as a need for D/HH students to be successfully included. A study conducted by Khalid Alasim in 2018 investigated the barriers to participation of students with hearing impairment in inclusive settings and the strategies that have been observed to overcome these challenges. The research took place at a public elementary school in Ohio, which was reported to have 17 TDHH, 15 general education teachers, and three sign language interpreters. The school serves 50 D/HH students in grades kindergarten through fifth. While the design yields a small sample, the research provides valuable insight that could be generalized to other settings. The study's ethnographic design used semi-structured interviews and classroom observations for data collection. The multiple sources of data strengthen confidence in the findings. Interviews consisting of five questions were conducted with two general education teachers and one sign language interpreter to gain insight into participants' experiences. Interviews were recorded to develop themes to assist researchers in conducting classroom observations. Classroom observations were conducted in third and fifth grades, three times each. Two observations were

video recorded; the others were not. However, detailed field notes on interactions and participation were collected. This varied approach to data collection limits the consistency with which the observations could be analyzed. The focus of the 50-minute observation was to observe: the participation and interaction of the D/HH students, the effect of the general education teachers' attitude, knowledge, strategies, and collaboration on participation, the role of the sign language interpreter for communication interactions, and the hearing peers' acceptance and interaction with D/HH students (Alasim, K, 2018).

While the interview analysis had limited explanation within the study, the interview data revealed two themes: issues related to school (general education teachers and sign language interpreters) and issues related to students (D/HH and hearing peers). For issues related to school data, it was indicated that some general education teachers lack knowledge and skills for working with students who are D/HH, such as strategies for accessible instruction. Another identified barrier was teacher attitude; participants attributed the reportedly negative attitude displayed by some general education teachers, which led hearing peers to adopt the view that D/HH students are unimportant. This view of a negative attitude was also attributed to a lack of collaboration with TDHH and interpreters, limiting the general education teacher's knowledge of characteristics and strategies needed to work with D/HH students. This view of attitude was also contrasted, noting that a positive attitude provided increased opportunities for D/HH student involvement in the classroom. Another finding was the importance of the relationship between the general education teacher and sign language interpreter, noting that they are responsible for encouraging the full participation and communication interactions that are occurring between DHH students and their hearing peers (Alasim, K, 2018).

For the barriers related to students, communication was highlighted as an area that created a challenge for the integration of D/HH students. A solution that was reported was to provide sign language classes/lessons for hearing students. It was noted that hearing peers are generally curious and eager to learn, which would create increased interaction opportunities. Another identified barrier was the inability to fully participate due to the level of engagement needed for D/HH students to participate in general education classes. This level of required engagement was described as watching the interpreter and teacher while working on assigned tasks. A reported solution included general education teachers purposefully following up with D/HH students or creating opportunities within the lesson for the D/HH student to respond or ask questions (Alasim, K, 2018).

There is a detailed description of the program, setting, and individuals used for observations. Limitations included a lack of information on how the observations were coded and conducted to develop themes and conclusions. Observational data from the fifth-grade classroom depicted one D/HH student with preferential seating. This D/HH student was described as having limited interaction, occurring only with the interpreter, due to the student's required level of engagement during lessons. This was further emphasized in the description of their inclusion, stating the student rarely engaged in classroom discussions, and the classroom teacher reportedly did not look at the student or call on them for input. However, when the class transitioned to a small group activity, the participation of the D/HH student increased. In this situation, the D/HH student attempted to increase use of verbal language rather than use sign language, highlighting the difficulty with communication with peers when primary modes of communication differ (Alasim, K, 2018).

The observation from the third-grade classroom indicated that while the D/HH students were only in that environment for math, they were able to participate in class activities and interact with peers. This was attributed to the teacher and interpreter's encouragement, who intentionally created opportunities for the inclusion of the D/HH students. The teacher allowed hearing peers with knowledge of sign language to sit and work with D/HH students to enhance inclusion in the classroom. The teacher was observed using various strategies to increase engagement and interactions specifically for D/HH students. Collaboration between the teacher and the interpreter provided many opportunities for enhanced communication interactions between the D/HH students, their hearing peers, and general education teachers. The staff's use of strategies to increase participation through opportunity and encouragement created more opportunities for participation (Alasim, K, 2018).

While the study had a clear purpose, defined the setting, and selection process for participants, there was a limitation in the vagueness of the analysis that diminished the reliability of the findings. Despite this, the findings are still considered valuable in understanding barriers to full inclusion for D/HH students and the strategies needed for increased participation and interaction. The findings from this study highlighted the need for collaboration between staff to create an inclusive environment that increases involvement and interaction between D/HH students, teachers, and peers. The results emphasize the responsibility of teachers to improve awareness among hearing peers of the characteristics of D/HH students. The majority of the identified barriers had solutions that could be implemented through increased knowledge about Deafness and collaboration of professionals (Alasim, K, 2018).

From this literature, it is clear that D/HH students have distinctive needs from their hearing peers. The study by Cawthon et al. (2015) examined the need for D/HH students to develop social skills. It concluded that social skills had a significant impact on the postsecondary graduation of students who are D/HH. Still, results revealed that social skills alone were not statistically significant predictors of post-secondary enrollment or retention. However, conclusions describe that the development of social skills impacts academic success through the development of areas such as self-advocacy, navigating communication challenges, and transitioning between settings (Cawthon et al., 2015).

Examining the factors necessary for the success of D/HH-CLD students, Ayantoye & Luckner (2016) identified seven themes. Human support was highlighted as a need from parents, TDHH, and school staff. For D/HH students to successfully build relationships, the study emphasized the need for social skills along with the availability and use of technology resources, as well as access to extracurricular activities. Academic success with independence and motivation was found to be impacted by skills in organization and taking responsibility. These themes have identified areas of need for D/HH students that contribute to their success.

The specific literacy needs of students who are D/HH were confirmed by the results in the literature, highlighting the need for tailored literacy support. The findings suggested that D/HH students demonstrated a need for direct instruction in pre-reading and comprehension strategies and diverse use of graphic organizers (Donne & Rugg, 2015). With the increase in students participating in inclusive settings, identified barriers to inclusion were reviewed. The results indicated the importance of staff collaboration and purposeful interaction opportunities to mitigate the barriers identified to inclusion (Alasim, K, 2018). All of these conclusions from the literature demonstrate areas of need to support D/HH students and increase successful

outcomes. These findings suggest that these needs can be addressed by TDHH, who are trained in updated and current practices.

Present Practices for Teachers of the Deaf and Hard of Hearing

D/HH students come with a specific set of needs that are addressed by teachers specializing in the field of Deaf education. Students with hearing loss vary in their mode and level of language, culture, and ability to hear (Moores, 2001; Holden-Pitt & Diaz, 1998; Mitchell & Karchmer, 2006; National Center for Education Statistics, 2012, as cited in Engler & MacGregor, 2018). Due to the specific needs of the population served by TDHH, the preparatory programs for these teachers are unique from those of generalized special education in their intentional focus on communication and accessibility. This profession requires a vast amount of knowledge to meet the varied needs of the students. Preparatory programs need to educate and qualify these teachers for this profession effectively.

From the fall of 2011 to 2014, Karen Engler and Cynthia MacGregor (2018) conducted a phenomenological case study researching Deaf education teacher preparation programming. The objective of their case study was to investigate the criteria used by the selected preparatory program to certify candidates as quality teachers. Their definition of quality was adapted from the Missouri Department of Elementary and Secondary Education's professional education pillars. These pillars consisted of commitment to the Deaf education profession, proficiency in practice with students who are D/HH, creating a learning impact on students who are D/HH, and program improvement. Students (active and former), program faculty, and preceptors from a Midwestern University program comprised 28 participants. While this participant size is small, within the field of Deaf education, it would be acceptable and would not limit confidence in the findings. Of this population, 87.5% completed the study, which indicated low attrition, further

strengthening the confidence that the findings would provide valuable insight into present practices for TDHH (Engler & MacGregor, 2018).

Data was collected through surveys, interviews, and archival documents. A thorough data analysis was conducted, increasing reliability by triangulation of data sources, using member checking, typological analysis, and survey software. The survey software provided respondent anonymity, increasing the validity of responses. Researchers carefully controlled for variables by clearly articulating data collection and analysis methods through multiple means, as well as transparency with participant selection for inclusion. The study provided clarity in including background on the researcher, noting that they have hearing loss and 30 years of experience in the profession of Deaf education. However, the study identified limitations, including variability in the participants' hearing ability and the students' levels within the program, which could impact their views and responses (Engler & MacGregor, 2018).

The key findings from this study yield valuable insights into Deaf education preparation and present practices for training TDHH. Results indicated that the program instilled commitment in candidates to the Deaf education profession that went beyond the classroom. It was shown that the candidates internalized and celebrated the diversity of d/Deafness, including the diversity of communication modes and meeting students' needs using a variety of methods. The program's coursework and practice instilled flexibility within candidates' instruction through differentiation skills and proficiency. Collaborative learning practices afforded participants the ability to provide learning opportunities connected to varied student needs through the environment, connections, and academics. A standard view amongst participants was the need to integrate topics such as navigating the public-school systems, working with

interpreters, and integrating subject-specific areas into preparatory training, as they are critical in the role of a Deaf educator (Engler & MacGregor, 2018).

These results lead to the conclusion that while Deaf education programs developed committed and proficient candidates, there is a broad spectrum of expertise that is required for TDHH. Improvements to programming could be implemented by incorporating additional topics into coursework. While a few were universally agreed upon by respondents, such as working within public school systems, additional individualized issues, such as behavior management, were identified. These individualized issues were inconsistent across participants, so researchers determined that they were not considered as a theme. However, it was noted that these topics could be examined in more detail in future investigations. Within the discussion, it was noted that while these programs are valuable, program sustainability is a growing concern. Reduced resources and program reduction have contributed to the availability and quality of future services for this population of students.

In a study conducted in Ohio, it was noted that only 50% of states offer higher-level education programs for areas of low-incidence sensory disabilities (LISD). LISD was depicted to include Hearing Impaired (HI), Vision Impaired (VI), and Deaf Blind (DB) (Howley & Howley, 2016). This lack of programming negatively impacts the availability of services for these students. Furthermore, the credentialing for this area is not equitable nationwide, thus providing varied services to LISD, including the D/HH population of students.

Howley and Howley (2016) conducted a mixed-methods research design study with WordFarmers Associates. Qualitative and quantitative methods were used to provide information for Ohio policy discussions related to improving education and services for students identified with low-incidence sensory disabilities (LISD). The research was conducted in two phases.

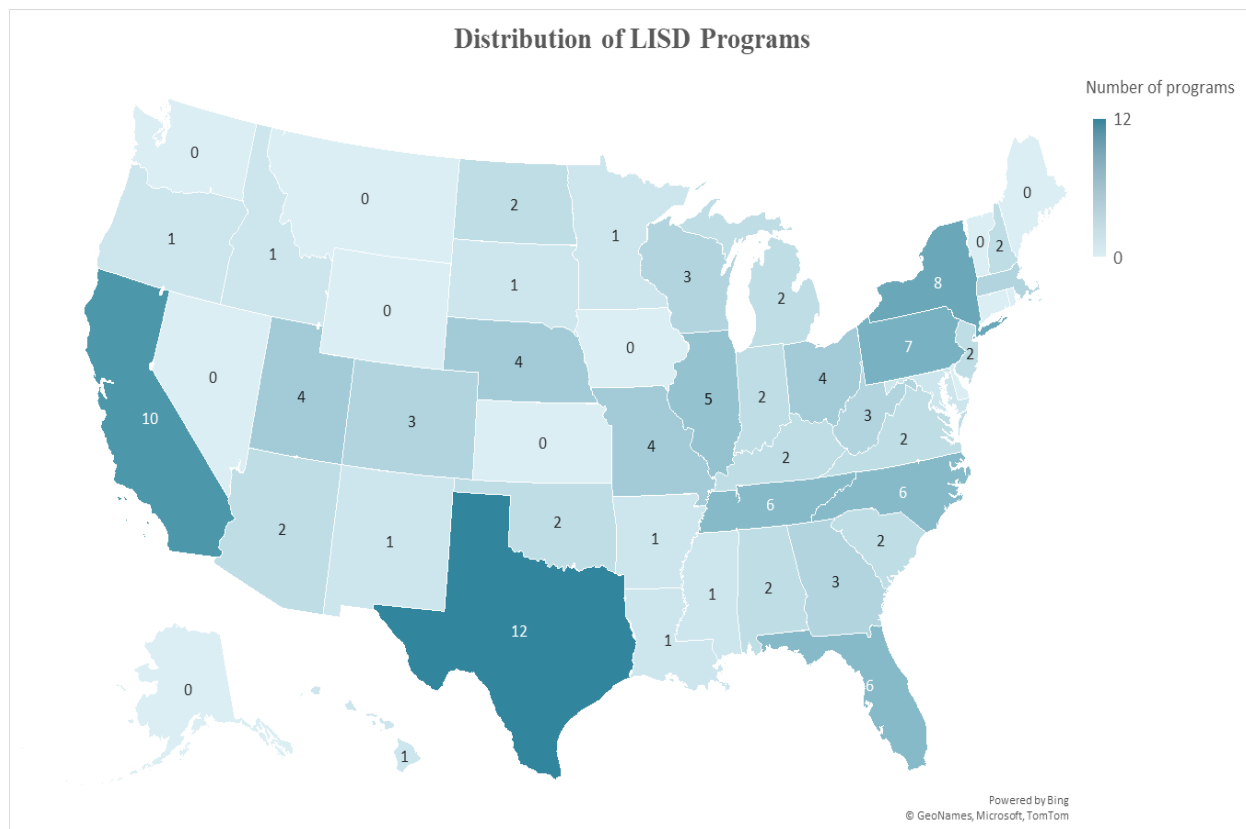
Phase one focused on the current preparation and licensing of educational professionals in LISD across the United States. This was done through reviewing official state websites and interviewing educational officials. Phase two focused on how the districts within Ohio were providing services. The mixed method design enabled comprehensive insights that led to a more complete analysis of services for the student population identified as LISD. Incorporation of multiple perspectives and data sources contributed to increased validity and reliability of the findings. The establishment and description of the statistical analysis, multi-tiered approach for survey development, and multi-factor data input provided the opportunity to triangulate results. These analysis techniques ensure that the results provide valuable insight into the current practices of TDHH (Howley & Howley, 2016).

During phase one, all 50 states' educational websites were reviewed for information relevant to the preparation and certification of teachers for LISD. A six-step protocol was created and used to increase validity. Due to websites not providing consistent, updated, or complete information, structured interviews with special education officials or designees were conducted. There was a series of eight questions that referenced: teacher preparatory programs for LISD areas, licensing, alternative licensure, highly qualified statuses for HI, VI, and DB teachers, emergency licensing, the number of students served by under-credentialed teachers, and sign language/Braille ability. While structured interviews were necessary, scheduling and access to special education directors for all states across the United States were predictably not possible. The researchers requested that the unavailable state directors nominate qualified designees. This created an opportunity for a limitation within the research concerning the position held by interviewees. While the limitation is noted, it is not believed to disrupt findings as it is assumed

that nominees were selected based on expertise and knowledge on LISD (Howley & Howley, 2016).

During Phase two, researchers reviewed the current state of the literature on providing services for students identified as LISD. To create the survey questions that would be provided to district leaders in the state of Ohio, researchers wanted to conduct a focus group. Due to scheduling constraints, this was not possible, so individual interviews were conducted by telephone for six of the seven recommended individuals. Interview questions were used to gain an understanding of concerns for districts for LISD, the questions they felt were important for district leaders, areas the survey should address, which district leaders should be involved in, possibilities for a reasonable timeframe for surveys, possible improvements to LISD services, and alterations to state policy/special education regulations. These responses, the literature review, and input from consultation with 17 relevant sources yielded the 10 proposed questions for the survey. These proposed questions were reviewed by the team members and Vision Project leaders, then again by 28 stakeholders from various relevant state organizations. This elaborate process ensured the validity and applicability of the results by ensuring the survey provides the information needed for understanding current practices for serving the population with LISD. The survey was provided via SurveyMonkey for 595 individuals identified from Ohio as local special education directors (or in an equal position). Initially, 131 responses were received, and up to 5 attempts were made to obtain responses by telephone follow-ups, yielding 185 additional responses and totaling 305 responses. While this level of response seems low, the response rate exceeded the 95% confidence level with less than a 5% margin of error, further building confidence in the results yielded by the responses (Howley & Howley, 2016).

Data from both phases were used to create an interpretive synthesis of findings. As displayed in Figure 1, key findings indicated that 50% of states offered higher education preparatory HI and VI programs, vs. 25% that do not have any, 15% have only HI, and 8% have only VI programs. This study reinforces the disproportionate distribution of LISD preparatory programming across the United States. Through multiple regression analysis, only the total population remained a statistically significant predictor of program numbers. As shown in Table 1, the data revealed that one-third of the states have more than two LISD programs. States with populations above the median often provide limited programming; for example, Michigan has one program despite a larger population. Uniquely, Florida, North Carolina, and Texas offer HI, VI, DB, and Orientation and Mobility (O&M) programs. Overall results indicate that the national average for program intensity is inadequate and insufficient (Howley & Howley, 2016).

Figure 1:*Quantity of Low Incidence Sensory Disability Program Distribution*

Note. Figure created from data on Table 1, Howley & Howley (2016)

Table 1*Low Incidence Sensory Disability Program Distribution*

State	Total Programs	LISD Program Distribution					
		HI	VI	DB	OM	BRL	ASL
Texas	12	✓	✓	✓	✓	✓	✗
California	10	✗	✓	✗	✓	✓	✗
New York	8	✓	✓	✓	✓	✓	✓
Pennsylvania	7	✓	✓	✓	✓	✓	✓
Florida	6	✗	✓	✗	✓	✓	✗
North Carolina	6	✓	✓	✓	✓	✓	✓
Tennessee	6	✗	✗	✗	✗	✗	✗
Illinois	5	✓	✗	✗	✗	✗	✗
Missouri	4	✗	✗	✗	✗	✗	✗
Nebraska	4	✗	✗	✗	✗	✗	✗
Ohio	4	✓	✗	✗	✗	✗	✓
Utah	4	✗	✗	✓	✓	✓	✗
Colorado	3	✓	✓	✓	✗	✗	✓
Georgia	3	✓	✓	✗	✗	✓	✓
Massachusetts	3	✗	✗	✗	✗	✓	✗
West Virginia	3	✗	✓	✗	✗	✗	✗
Wisconsin	3	✗	✗	✗	✗	✓	✗
Alabama	2	✓	✗	✗	✗	✓	✓
Arizona	2	✗	✗	✗	✗	✗	✗
Indiana	2	✓	✗	✗	✗	✗	✗
Kentucky	2	✗	✗	✗	✗	✓	✗
Michigan	2	✓	✗	✗	✗	✗	✓
New Hampshire	2	✗	✗	✗	✗	✓	✗
New Jersey	2	✓	✓	✗	✗	✗	✗
North Dakota	2	✓	✓	✓	✗	✗	✗
Oklahoma	2	✓	✗	✗	✗	✗	✗
South Carolina	2	✓	✗	✓	✓	✓	✓
Virginia	2	✓	✗	✗	✓	✗	✗
Arkansas	1	✓	✗	✗	✗	✗	✓
Hawaii	1	✓	✗	✗	✗	✗	✗
Idaho	1	✓	✗	✗	✗	✗	✗
Louisiana	1	✓	✗	✗	✗	✗	✓
Maryland	1	✗	✗	✗	✗	✗	✗
Minnesota	1	✓	✗	✗	✗	✓	✗
Mississippi	1	✗	✗	✗	✗	✗	✓
New Mexico	1	✓	✗	✗	✗	✗	✗
Oregon	1	✗	✓	✗	✗	✗	✓
South Dakota	1	✗	✗	✗	✓	✓	✗
Alaska	0	✗	✗	✗	✗	✗	✗
Connecticut	0	✓	✗	✗	✗	✗	✗
Delaware	0	✗	✗	✗	✗	✗	✗
Iowa	0	✓	✗	✗	✗	✗	✗
Kansas	0	✗	✗	✗	✗	✗	✗
Maine	0	✓	✗	✗	✗	✗	✗
Montana	0	✓	✗	✗	✗	✗	✗
Nevada	0	✓	✗	✗	✗	✓	✗
Rhode Island	0	✓	✗	✗	✗	✗	✓
Vermont	0	✗	✗	✗	✗	✓	✗
Washington	0	✗	✓	✗	✗	✓	✓
Wyoming	0	✗	✗	✗	✗	✓	✓

Note. Table created from data from Howley & Howley (2016). States are listed in order by the frequency of programs.

When results were examined, licensure (stand-alone credentials) and endorsement (the LISD credentials are added on to an existing primary license) revealed 29 endorsement states and 21 licensure states. Nearly all states reportedly offer certification in both HI and VI. The state of New Mexico reportedly does not provide certification in HI. DB certification is reportedly offered in three states, although many states indicated possible future programs. O&M certification was national, so individual credentialing was not indicated by individual states (Howley & Howley, 2016).

When examining preparatory programs, states with licensure are often at the undergraduate level, having four years of schooling, while those with endorsement for graduate level have two years. Endorsements are generally used in states with smaller populations, having more rural areas, and lower incomes; however, this is not universally true with consistency in all three areas. An example is Ohio, which would be in the licensure area when comparing population and the number of rural areas, but would be in the endorsement area regarding income. This demonstrates the inconsistency with applicability as it relates to credentialing. Strategic considerations often dictate the state's decision due to shortages of LISD professionals and the reality that endorsement options are at times more efficient (Howley & Howley, 2016).

This research supports evidence from previous findings that there is a need for program revisions across the country to increase program intensity. It confirms the previous literature that there is a staffing shortage and programming for LISD nationwide. The study suggested solutions such as growing preparatory programs for LISD and possibly looking into community colleges and regional universities. Hence, it could be hypothesized that with the need for credentialed LISD teachers, states could expand or shift policy towards endorsement in LISD and increase outreach efforts for resources and support for general education teachers to help

provide services in more areas. However, further work would be needed to determine specifics and confirm long-term outcomes. It was inferred from the data that states should monitor students with LISD who are not being served and provide highly trained teachers to raise awareness of service issues by collaborating and providing better access to information, resources, and geographically spreading qualified professionals (Howley & Howley, 2016).

Research has demonstrated that not only are the certification standards varied across states, but so too are the settings, service delivery models, and professionals working with D/HH students. Increasing numbers of D/HH students are being served in inclusive settings and served not only by the TDHH but also by all educational staff within the school. General and special education Administrators oversee supervising TDHH and participating in IEP meetings. A study conducted by Kevin Miller, CCC-SLP (2015) investigated supervision of TDHH. In this article, TDHH were referred to as teachers of students who are Deaf or Hard of Hearing and abbreviated as (TSDHH). For consistency in this literature review, we will use TDHH. A 19-question survey was created by the researchers, with feedback provided by Educational Resources for Children with Hearing Loss (ERCHL) in Pennsylvania. The response rate from the survey was 42%. Out of the 330 TDHH in Pennsylvania at the time of the study, 138 responded. While researchers sent the survey to TDHH for responses, other professionals, including audiologists and SLPs, were also noted to have responded and could have impacted the validity of the results. However, the article indicated that these individuals do work with students who are D/HH and have similar administrative supervision in their roles. The survey provided to participants contained multiple-choice and short-answer questions. The questions covered six areas: Demographics, TDHH Expertise, Supervision and Evaluation, Administrator Knowledge, Expertise and Attributes, Provision and Feedback, and finally, Professional Development.

The results from the demographics questions highlighted that 22% had 26 or more years of experience working with D/HH students, 56% were itinerant teachers, and 16% worked for schools for the Deaf. It was also important to emphasize that over 90% had degrees in education of the Deaf, and 82% had master's degrees. The results for the area of TDHH expertise emphasized that the TDHH rated themselves, so researchers did not verify the accuracy of their responses. This could be a limitation in reliability; however, the findings align with previous literature. The possible inconsistency with self-reporting was demonstrated in the example that many teachers rated themselves highly in the skills of listening and language. Still, very few held Listening and Spoken Language Specialist (LSLS) Certifications. The article noted that this certification is not required to work on this skill; however, it is increasingly requested by parents (Goldberg, Dickson, & Flexer, 2010, as cited in Miller, K. J., 2015). Interestingly, despite the majority of respondents being itinerant and working in the general education environment, they rated their knowledge fairly low in the area of amplification. The low rating is interesting because amplification is an area in which school settings typically consider TDHH experts, as most students in this environment usually use some form of amplification (Johnson, 2013, as cited in Miller, K. J., 2015). The findings on supervisor background varied, with over half of the respondents reporting that supervisors evaluate them without a background in this field. However, the respondents reported that supervisors had strengths in the areas of legal and procedural issues. Part of supervision included observations and evaluation measures; respondents reported little benefit from the formal evaluations, valuing feedback from TDHH (47%) and Principals (9%). The discrepancy in the value of feedback could be due to a lack of knowledge and expertise in working with D/HH students, as over a quarter of respondents noted their supervisor's knowledge of Deaf education as minimal. While respondents reported

attending professional development through sources such as the Pennsylvania Training and Technical Assistance Network and school for the Deaf workshops, participants emphasized that the district-sponsored workshops and staff meetings were not as beneficial for meeting the TDHH professional development needs. TDHH responded that they looked elsewhere for professional development because the topics were not applicable to their students' needs, and the district-level provision did not align with their needs (Miller, K. J., 2015).

This article provided a valuable understanding of the need to prioritize knowledge of the field of Deaf education. It also highlighted the isolation of knowledge for TDHH and the need for additional support. While this study had limitations in the reliability of the methodology due to the use of a survey, the findings are valuable in contributing to the understanding of the supervision, guidance, and support needed for TDHH and their Administrators. Additionally, this article provided valuable recommendations for topics related to professional development and support, such as Listening skills, Sign Language, and self-advocacy (Miller, K. J., 2015).

Understanding the credentialing currently in place across states is critical to understanding current practices within Deaf education. However, with the variety of schooling options available for D/HH students, it is equally important to understand the outcomes of the environments that are being offered. In 2022, a research study that conducted a retrospective cross-sectional descriptive analysis was published that investigated D/HH student outcomes for educational environments and secondary schools. This investigation aimed to review outcomes for D/HH students receiving special education under IDEA and update national estimates for the annual number, academic environments, and secondary schools. They used data from the years 2012-2018 that were provided through IDEA 618 Part B on child count, educational environment, and exiting (graduation, drop-out) for the 50 states (Epstein et al., 2022).

The key findings noted that the median number of students who were identified as D/HH was stable across all six years. This is compelling due to the hypothesis that the implementation of newborn hearing screenings and advancement in hearing technology would have reduced the population that needed to be served, as some students were gaining access to sound and intervention (medical and/or educational) earlier. As cited in the study, the Centers for Disease Control and Prevention (CDC) reported that the number of babies diagnosed before three months with hearing loss or normal hearing increased from 20,102 (2012) to 30,170 (2019) (CDC, 2021). This stability despite advancement in technology and early access to intervention further justifies the continuation and consistent need for programming. When comparing the number of students that received services in the general education setting for more than 80% of the day, the data found that this population increased by 4.2% over the 6 years. In comparison, the number of students who received services in the general education setting for less than 80% of the school day decreased. The number of D/HH students served in settings including separate schools, residential facilities, parentally placed in private schools, homebound/hospital, and correctional facilities showed no significant differences, <1%. When examining exiting, the results indicated that 86.8% of students graduated, and 3.9% dropped out. These results showcase that most of the D/HH population of students served in special education are graduating high school, and the percentage of those dropping out is similar to that of their non-disabled peers (Epstein et al., 2022).

Since the study looked extensively into various areas of data, there were sources for error. One area to emphasize a limitation is that there are students who have a primary disability that is different from the category of Hearing Impairment, which would also qualify as D/HH. These students were not included in the data, creating a possibility of altered results. It was also noted

that the data for graduation rates for D/HH students in special education programming were not directly comparable to the data for the general population of students. The researchers attempted to control for this by utilizing three other sources. Still, results were again noted as not comparable as IDEA data is not longitudinal, individual, or linked with assessments like the additional sources. While this is a limitation, the researchers stated that dropout rates for IDEA and Current Population Survey CPS were compared qualitatively, allowing for the value of the results to be used but interpreted and applied with caution. The conclusions from specific data criteria have significant implications for understanding trends in the needs and provision of services for D/HH students in the general education setting. The enrollment stability reflects the consistent need for trained and qualified TDHH across settings (Epstein et al., 2022).

As discussed in the study by Epstein et al (2022), early identification of hearing loss has increased with medical advancements in hearing screenings. Early identification can lead to early intervention, which has been found to correlate with positive outcomes for the areas of language, speech, and social-emotional development. TDHH programming typically provides training for individuals to serve the D/HH population from birth to age 21. Early intervention strategies are an area in which TDHH are required to have knowledge. The known shortage of individuals trained to serve D/HH students affects access to services and interventions.

A program at Illinois State University was developed to provide coursework for professionals on recommended techniques for early intervention services. A quantitative study was conducted to evaluate graduate students' competencies in the frequency of their use of evidence-based listening and spoken language strategies after finishing the program. The study investigated 10 strategies, including equipment check, pause time, parallel talk, language expansion, slower speaking rate, hand cue, voice-action synchrony, intervention positioning,

acoustic highlighting, and the auditory sandwich. The participants selected for the study included eight TDHH and three speech language pathologists who all completed the coursework and practicum experiences at home-based and clinic-based settings (Martin-Prudent et al., 2016).

The participants were asked to video their practicum experiences, and the videos were coded for the occurrence, not the accuracy, of target strategies. Some strategies, such as equipment checks, were needed only once per session, so measurement was calculated on how many strategies were used per session. Five of the strategies were measured for frequency of use, which was conducted through intervals of five minutes. The study coded all intervention sessions; these sessions ranged in duration from 25 to 40 minutes, meaning there would be five to nine intervals coded per session. The results indicated no statistically significant difference between before and after the coursework; however, four participants increased the number of strategies used. There was also no identified statistical difference between the frequency of strategy pre- and post-coursework. ANOVA was implemented to measure the effects of clinician training, resulting in an influence on two of the five strategies. Results indicated that participants' post-coursework increased use of the “pause-time” strategy. The strategies of parallel talk, slower speaking rate, pause time, and positioning were the most frequently used across participants (Martin-Prudent et al., 2016).

In order to increase reliability, interobserver agreement was utilized for 30% of the studies by coding them by two different individuals. To increase reliability, coders were trained and provided opportunities for reliability, utilizing an alternate video case. Coding protocols were described in detail in the study, further strengthening confidence in the results, achieving 94.8% interobserver agreement for the overall number of strategies. The frequency reliability score averaged 87.7%. Limitations noted within the study included possible pre-exposure to

strategies by participants prior to formal coursework, which could have impacted pre-course work data (Martin-Prudent et al., 2016).

Upon examination of the study's results, it is important to emphasize that while there were no noted statistical differences before and after coursework, the results indicate the benefit of training specific to working with early intervention for DHH populations. The results indicated participants used evidence-based early intervention strategies across settings, highlighting the value of providing the coursework and training for strategy instruction and implementation (Martin-Prudent et al., 2016).

TDHH benefit from increased instructional and linguistic methods and strategies to not only work on academics but also support D/HH students' identities. Some research indicates that the D/HH preparatory programs need to provide increased exposure to early childhood and multicultural methods to aid the identity development of students who are D/HH. A study was conducted on cultural and linguistic role models where researchers surveyed early childhood educators of the Deaf to investigate the early childhood environment and instruction. Instruction was investigated for the presence of cultural and linguistic role models and to determine if they align with cultural or pathological perspectives of Deafness. While the research questions were not explicitly stated, the purpose was listed as focusing on how early childhood teachers interact with Deaf children, mediate their learning, and provide environments that can influence their identity development (Golos et al., 2018).

The survey was sent to 70 programs that were identified by the American Annals of the Deaf, and responses were received from 62 early childhood educators. The participant's geographical representation was made up of 27% from the Midwest, 16% from mountain states, 15% from the Northeast, Atlantic regions, 11% from the South, and 31% from the West Coast.

Due to the small sample size, each region was disproportionately represented. However, responses were collected from each area within the United States, allowing for geographically diverse perspectives, which strengthened the implications of the research. The number of participants who reported being Deaf was 30%, which is higher than the 7% reported as typically developing. Of the participants, 45% were from residential schools, 27% from self-contained classrooms, 13% from day programs for the Deaf, 15% from “other” settings, which included itinerant settings. While it is important to emphasize that this response does not represent the settings equally, as most respondents were from residential schools, it provided representation from participants working in varied settings. The education of the participants was also varied; 75.8% had earned master's degrees, 19% D/HH teaching licenses, 61% special education licenses, and 21% had other certifications. This educational background could have affected the results, as the training held by respondents was varied. The participants also rated their skills in American Sign Language (ASL), with 72.6% rating themselves as advanced and 27.4% grading themselves as beginners. It was noted that the participants’ self-identified skills could also contribute to their classroom's alignment with the cultural or pathological perspective (Golos et al., 2018).

This qualitative study focused on the importance of the teaching environment. Aside from questions regarding educator demographics, they referenced student demographics (three), setting characteristics (five), including early childhood educator self-reported hearing level, ASL skill level (self-reported), and the racial/cultural backgrounds of educators and students. The remainder of the questions on the survey were relevant to the linguistic and cultural elements, including role models, classroom environments, language and cultural interactions, and instruction (Golos et al., 2018). The data in the study were based on the self-reports of

individuals surveyed. This could be considered a limitation, as there was no verification of claims. Also, individuals were able to self-report their skills in ASL, so there was no verification of ASL fluency used in the classrooms. While the survey included many strategies, it did not include an exhaustive list of strategies, so others could have been left out, which could have limited the strength of the findings. Finally, no observations were conducted, so a list of books was included that were determined to demonstrate Deaf character or aspects of Deaf culture, but this was not an exhaustive list. There was an indication of using DVDs or television programming; however, there was no analysis on the messages that were included within these programs, ensuring students understand the cultural relevance within them (Golos et al., 2018).

Results noted that the type and frequency of cultural linguistic offerings were affected by the primary mode of communication used, teachers' hearing level, and the skill level of ASL. The type of multicultural texts available in the classroom was tied to the primary mode of communication. For example, the book *Abby Gets a Cochlear* was seen in classrooms that used total communication (TC) or listening as a spoken language (LSL), versus not in those that used ASL. While all responses indicated that the teachers drew attention to print to facilitate an environment with literacy instruction, it was noted that the way in which they drew the child's attention to the print was tied to the primary mode of communication. If the classroom used ASL or TC as the primary mode of communication, they may use signing, finger spelling, and pointing, versus an LSL environment or TC environment where they may talk and go to print. Across various environments, it was an irregular occurrence for a Deaf adult to regularly visit the classroom or discuss the Deaf community or Deaf culture. While the majority of classrooms held conversations with children, these conversations did not involve talking with a Deaf adult who was not already in the classroom or revolve around Deaf culture aspects. Half of the reporters

indicated using symbolic role models in the form of Deaf characters in books or featured on television programs or DVDs (Golos et al., 2018).

The results of this study speak to the lack of incorporation of Deaf Culture role models and the impact this can have on D/HH children's identity development. There are potential biases that were not explicitly highlighted within the study; however, the description of the settings implies positive outcomes for a cultural environment and adverse outcomes for pathological environments. While the results are informative and strengthen the understanding that more training and knowledge are needed for individuals who provide early childhood services to students who are D/HH (Golos et al., 2018). The claims in the discussion section could be considered subjective that "without a culture perspective informing the classroom, children may grow to view their Deafness as a negative aspect of their identity and never feel good enough or worthy enough about themselves, their language or their culture" (Golos et al., 2018, p.66) While these statements could be viewed as subjective they are relevant to be considered as TDHH provide education to D/HH students.

It can be concluded from the results that educators need to continue to stay updated on how to improve classroom environments and practices because increased incorporation of research-based strategies, activities, and materials, as well as increased interactions with role models for deaf children, is needed in early childhood environments. Preparatory programs need to include information about early childhood and multicultural coursework and possible field experiences to enhance the education of D/HH children. The study noted that educators who included more linguistic and cultural elements in their classroom aligned with the cultural perspective by providing opportunities through various types of exposure. While many classrooms reported having books with Deaf characters or multicultural texts, few of these

contained cultural messages about Deafness within the text. The conclusions state that all educators who work with D/HH students should increase the frequency with which children are exposed to ASL, Deaf culture, Deaf community, and Deaf role models from diverse backgrounds to provide increased linguistic and cultural opportunities (Golos et al., 2018).

The conclusions drawn from the reviewed literature have proven that current practices in TDHH preparatory programs foster commitment to Deaf education in their candidates, helping them understand the diversity of deafness and develop flexible instructional approaches. Literature emphasized areas for improvement, including expanding coursework and training to include identified topics such as navigating public school systems, working with interpreters, integrating subjects in specific areas, and behavior management (Engler & MacGregor, 2018).

When examining current credentialing and programming, it was noted that sustainability was a consistent concern across research, as it impacts the future availability and quality of services provided for D/HH students. The literature revealed that the availability of programs, for not only D/HH but also LISD students, are disproportionate in access, despite growing needs. The results from the Howley and Howley (2016) study highlighted the geographical differences in credentialing, identifying 29 states that offer endorsements, while 21 states provide licensure. States are having to use strategic decisions when creating policies on credentialing due to professional shortages impacting service delivery models (Howley & Howley, 2016). Research conducted by Miller, K. J. (2015) emphasizes that not only does the certification standards differ, but also the individuals who are working with and making decisions about educating D/HH students. This article highlights the need to prioritize sharing knowledge in the field of Deaf education, especially with those who may be supervising TDHH. Possible topics for recommendations of professional development topics were reviewed to assist with the

recognized professional isolation often experienced by TDHH (Miller, K. J., 2015). When investigating services across settings, current literature found that the number of D/HH students served by IDEA remained stable over a six-year period. This was surprising due to the increase in medical advancements and technology for individuals who are D/HH. This finding justifies the consistency of the need for services. This literature also provided the information that there has been an increase in students spending 80% of their day in the general education setting, in addition to graduation rates for D/HH students remaining high at 86.8% (Epstein et al., 2022).

Deficits in current coursework and training are noted from research within the literature review. Conclusions from the study by Martin-Prudent et al. (2016) on early intervention shed light on how these services require professional development and that once received, participants consistently used the instructed evidence-based early intervention strategies across settings (Martin-Prudent et al., 2016). The Golos et al. (2018) study on cultural role models illuminated the need for educators to be exposed to additional coursework or training in early childhood and multicultural education. The conclusions called for TDHH to continuously refine classroom environments by incorporating linguistic and cultural elements, enhancing educational experiences, and developing student identity (Golos et al., 2018). These findings shed light on the current status of Deaf education and demonstrate the present practices and deficits within the preparation, credentialing, and training of TDHH.

Pedagogy and Training Topics

Education is constantly evolving, requiring high-level identification of best practices and pedagogy while effectively relaying them to TDHH. This would enable TDHH to possess the current knowledge and training necessary to achieve more successful outcomes for their students. In a survey conducted by Dostal et al. (2018), it was noted that due to expressive and

receptive language delays in this population, writing is an area that needs to be targeted. This common defect contributes to cross-setting challenges for D/HH students. Due to this need, it is imperative that TDHH have the training to address cross-content needs such as writing.

In 2018, Dostal et al. (2018) conducted a national survey of TDHH to investigate how content area TDHH integrates writing instruction and identify factors that impact content area writing. Research questions focused on teacher beliefs about writing, the frequency of writing incorporation, identifying challenges for writing instruction, and their preparedness for providing writing instruction. To create the survey, researchers reviewed seven surveys on writing instruction, none of which specifically targeted D/HH students. To increase reliability and refine their survey to target D/HH students, they used a focus group consisting of 16 content area TDHH. Based on their input, a 39-question survey was developed using Qualtrics. This final survey consisted of five sections: demographics, content area writing, diverse learners, classroom environment, resources, and beliefs (Dostal et al., 2018).

Participants were located using the directory of education programs from a reference issue of American Annals of the Deaf and state department of education websites for programs that were not listed. Surveys were emailed to 999 teachers, and 180 responses were received. It is important to note that 94 emails were undeliverable to the recipients, and some participants did not fully complete the survey, so the participation rate varied per question. While this response rate contributes to the small sample size, it is common due to the email-based survey method. However, due to the disproportionate response rates, statistical consistency and generalizability may have been impacted. In this survey-based study, there are several sources of error. First, the broad view for the settings in which TDHH can work, including a teacher at a school for the Deaf or a public-school itinerant position. The survey also asked respondents to identify

themselves based on the subject that they teach most often; however, some teach more than one content area. These variances could have provided opportunities for bias or differentiated results (Dostal et al., 2018).

Regarding participant education, more than half of the respondents had master's degrees, and 57% had taught for more than 10 years. While every grade level was represented, from preschool to 12th grade, elementary school teachers were disproportionately represented (51%). The majority of teacher respondents taught more than one grade, with an average class size of 8.04. The majority of programs were bilingual, 52%.

When investigating the beliefs about writing, nearly all teachers agreed that writing is an essential skill for success in classes on high-stakes assessments and for success with college classes/careers. The majority of participants agreed with the statement that writing instruction should be across content areas and disagreed that it was solely the responsibility of TDHH English Language Arts (TDHH-ELA) teachers. When asked about the belief that integrating writing was achievable, 92% of participants were in agreement. An evaluation of integrated writing revealed that 33% of TDHH-ELA teachers had daily independent writing activities in class, and 4% assigned daily homework for independent writing. When comparing TDHH-ELA and other content area teachers' responses, 60% of TDHH-ELA teachers reported writing together as a class daily or multiple times a week, versus 28% of other content area teachers. Responses about feedback for student writing were similar across TDHH-ELA (49%) and other content areas (40%), noting that they do this daily or multiple times a week. In contrast to earlier findings that the instruction for writing is a cross-content responsibility, discrepancies were seen in the responses for using strategies for planning writing (TDHH-ELA-61%, other content teachers-28%) and using strategies for revision (TDHH-ELA-53 %, other content teachers-19%).

Similarly, 50% of ELA teachers teach grammar daily or multiple times per week, while 50% of other content teachers rarely or never teach grammar. These results demonstrate a belief and understanding of the need to provide cross-content instruction in writing that is not consistently practiced (Dostal et al., 2018).

Of the TDHH-ELA and other content teachers, 80% expressed that students with limited academic language pose a challenge for writing instruction. Another widely identified ($\frac{3}{4}$ of respondents) challenge is the diversity of student reading levels tied to expressive and receptive language delays. Participants also reported challenges such as the number of students per class, discipline problems, student attendance, parental involvement, presence of hearing aids or cochlear implants/technology, access to pull-out/resource services, and multi-language learners rarely impact the writing instruction. Interestingly, more than half of the respondents reported minimal or no preparation for teaching writing; however, they indicated proficiency (Dostal et al., 2018).

The most obvious finding to emerge from this study is that TDHH-ELA teachers were more likely to use teaching strategies and had increased confidence in providing writing instruction. The identified cross-content challenges for teaching writing may be due to receiving similar preparation programming. All respondents agreed and emphasized the importance of writing and that it was essential for future success for students. Taken together, these findings support strong recommendations for professional development or teacher training in instructional strategies and support for the integration of writing across content areas. Teachers require support to ensure their instruction includes opportunities to write in class and focuses on discipline-specific literacies (Dostal et al., 2018).

For D/HH students to express their ideas through writing and become more confident in communication, TDHH should also target D/HH students' reading skills. Various instructional approaches need to be applied by TDHH that will enhance these students' ability to comprehend and think critically about text. Researchers conducted a meta-analysis on the topic of reading research for preschool through 12th-grade D/HH students, special education hearing students, and typically developing hearing students. The researchers looked in particular at studies published after the Report of the National Reading Panel: Teaching Children to Read (NRP) in 2000. The methodology included a systematic approach, including articles that were qualitative or quantitative meta-analyses, with strong and clearly articulated methodology published between 2000 and 2014. Researchers excluded studies if the focus was on writing, reviewed neuroimaging, or was based on methodological or reading assessments only. Databases, relevant research journals, and references yielded 50 meta-analyses that met criteria. Of the studies included, three qualitative and 23 quantitative meta-analyses focused on monolingual hearing students. Identified articles also included three qualitative and 15 quantitative examining results, primarily with special education students, including those who are English language learners. Finally, they found five qualitative and one quantitative meta-analysis investigating D/HH students (Wang, Y. E., & Williams, C, 2014).

The researchers summarized the identified themes from the research, answering the identified research questions on effective reading strategies and instructions specifically for D/HH students, students who were hearing (mono and bilingual), and students who were in special education. This overarching meta-analysis also investigated evidence to support the understanding of the Qualitative Similarity Hypothesis (QSH). The QSH notes that English Language and Literacy development are similar for all students including D/HH students,

emphasizing that students require interventions that are tailored to their needs (Paul, 2010, 2012; Paul & Lee, 2010; Paul & Wang, 2012; Paul, Wang, & Williams, 2013, as cited in Wang, Y. E., & Williams, C, 2014). The contradictory view by researchers for QSH in this study was identified in the possibility of D/HH students using non-phonological approaches to learning (Wang, Y. E., & Williams, C, 2014).

The results were generally consistent with those from NRP; however, there were some discrepancies. Phonemic awareness and related instruction are well supported by research for typically developing students. Still, research findings determined them to be less effective for D/HH students due to the dependence on rhyming awareness and instruction not fully encompassing the content and skill. The findings suggest that developmentally targeted interventions are critical with an instructional shift of focus from phonemic awareness to comprehension interventions as age increases. While increased research on reading interventions is needed for D/HH student populations, the QSH instructional strategies can be applied to D/HH students simultaneously but should be adapted with caution. Implications from the results indicate that teacher training is crucial, focusing on evidence-based strategies that target instructional methods, such as code-based skills, comprehension, vocabulary, fluency, and morphology. The literature emphasized from these findings that instructional pedagogy with direct teacher-student interactions was more successful than methodology that utilized curriculum or technology in isolation (Wang, Y. E., & Williams, C, 2014).

Previously reviewed research has highlighted the need for additional training in instructional areas such as reading, writing, and communication. However, further investigation is required to better understand the pedagogical methods that could be used to deliver this instruction. There are studies that provide evidence for beneficial pedagogical approaches, such

as flexible instructional arrangements, which were found to be beneficial for TDHH to utilize with their students in their classrooms within inclusive settings (Catalano et al., 2022).

A quantitative study was conducted on the active engagement of D/HH students through flexible instructional arrangements. Flexible instructional structures change the teaching model from a whole-group to a small-group student-centered method. The researchers utilized a single-subject design replicated across the teachers, applying a changing criterion design. It was emphasized in the article that this design, while considered a limitation, was a justified approach due to the low incidence of this population (as cited by Anita et al, 2017; Canon et al, 2016; Kratochwill et al, 2010). Researchers used a multiple baseline design with a minimum of five baseline data points. The article provided a description of the procedures for interrater reliability, treatment integrity, and social validity, all of which strengthen the confidence of the findings and emphasize their applicability when investigating pedagogy that could be used by TDHH (Catalano et al., 2021).

The study aligned the purpose and research questions to focus on the effects of a coaching intervention on self-contained teachers' ability to implement academically responsive instruction through flexible instruction arrangements and the impact of instructional arrangements on students' academic engagement. The selected participants were three TDHH who taught in self-contained multi-grade level (K-1, 1-2, and 3-5) D/HH classrooms at elementary schools in the southern United States. (Catalano et al., 2021).

Data was collected from classroom observations of instruction, five times during two weeks for baseline, three times a week during intervention, one time a week for three weeks during short-term maintenance, and one time a week for three weeks during long-term maintenance. Observations focused on six categories using a checklist for teachers'

implementation of indicators for flexible instructional arrangements. Researchers observed looking for 12 flexible instructional indicators that included but were not limited to child-managed stations, small homogenous groups, and a positive behavior support system. Additional momentary time sampling was conducted to assess students' engagement with instructional arrangements (Catalano et al., 2021).

In observational studies, there is a potential for bias; to mitigate the limitation, the article clarified the researchers' experience with teaching special education, specifically Deaf education. To increase the validity and reliability of inter-rater-observer agreement, data were collected weekly on the treatment integrity of the coaching sessions. Social validity data were collected through interviews with the teachers. This further strengthened confidence in the application of the findings. This research could be further expanded to examine self-contained D/HH classrooms and a variety of educational setting possibilities. The primary focus of this research was on the presence of instructional arrangements, and further data collection would be required to determine the quality of implementation, as this was not measured. It was explained that a trained researcher was utilized as a coach; this professional development model was demonstrably unsustainable due to predicted financial constraints for districts. A suggested approach to overcoming the constraint is the possibility of implementing a peer coaching model. Since all teachers were willing participants, it could be argued that the results were due to their investment in the strategy, which may not generalize if it were mandated training (Catalano et al., 2021).

The results found that all teachers were able to maintain all or nearly all of the indicators for flexible structural arrangements at two- and eight-week post-intervention. Unanimously, all three teachers expressed the value of the one-on-one time for immediate feedback and planning

support from the coaching on their implementation. The self-reflection component received differing views from participants. Some felt that there were challenges with adequate time, while others expressed that it was beneficial. All participants agreed with the statement that the use of flexible instruction arrangements positively impacted their instruction and aided in differentiating for students within multi-level classrooms. The results found that the students' active academic engagement increased, whereas passive engagement and disruptive behavior decreased with the use of flexible instructional arrangements. The structure provided by this method enables more meaningful interactions between D/HH students, their teachers, and their peers. The purposeful groupings allowed for tailored instruction in the preferred communication mode that addressed student-specific needs as indicated in their Individualized Education Plan (IEP). Educators also viewed that students could be more autonomous and self-directed in their learning (Catalano et al., 2021). This study has identified the positive effects of implementing flexible instructional arrangements through the use of the components in the teacher coaching model. These results suggest that coaching is a promising method for TDHH professional development.

Conclusions drawn from the literature from investigating critical pedagogy and training topics for TDHH noted that writing strategies are one area of needed emphasis for training. Rationale was provided from the findings that D/HH students often display expressive and receptive language delays. Results indicated that while teachers from all content areas understood the vital role that writing plays across academic areas, there is a lack of professional development to provide training for TDHH on generalizing instructional strategies across content areas (Dostal et al., 2018). Research on effective reading strategies was analyzed in a meta-analysis, finding that D/HH learners require tailored, developmentally appropriate interventions

that expand from phonemic awareness. This requires training for TDHH to provide them access to essential instructional strategies (Wang, Y. E., & Williams, C, 2014). Results from research on pedagogical models demonstrated that flexible instructional arrangements increased D/HH students' active academic engagement and reduced passive participation and behaviors while providing specific student-targeted instruction opportunities (Catalano et al., 2021). Results conclude that in order to ensure D/HH students are receiving comprehensive support for engagement and academic success across content areas, TDHH requires training on academic, communication, and cultural trends.

Collaboration for Inclusivity

It is not enough to only provide access to learning; the real value is to create an inclusive community with the social model of disability in mind. A key aspect of this is incorporating all students across all educational environments and linking to the crucial element of professional collaboration for communication and shared expertise. Educators should embrace and utilize Universal Design for Learning (UDL) guidelines when establishing an inclusive environment, allowing flexibility and reduced limitations for various learners, including D/HH students. UDL's principle regarding multiple means of representation promotes inclusive environments by improving acoustics within educational settings and the provision of visual support. These forms of accommodation, while critical for students who are D/HH are universally beneficial for all students.

A qualitative study was conducted on Universal Design for Learning (UDL) and how it relates to Deaf Education (Brandt & Szarkowski, 2022). This scoping review of the literature investigated current knowledge of the application of UDL within Deaf education and what is lacking in current research. Researchers used a five-stage methodology to address the purpose of

this study. In stage one, the research questions were identified based on the purpose. Stage two involved initiating the search with established inclusionary criteria through databases and the research lists from the Center for Applied Special Technologies (CAST). The third stage studies were selected from an independent review with joint discussion. As researchers reviewed keywords and abstracts, selections were narrowed, and following full-text reviews, final selections were made that met the defined criteria. In stage four, researchers collaboratively employed descriptive coding methods to describe information and present elements of UDL. Finally, in stage five, an analysis was conducted using pattern coding (Brandt & Szarkowski, 2022).

Identified articles through inclusion and exclusion criteria reduced the original 71 identified articles from stage two to 23. With the final criteria of explicitly presenting UDL to frame the studies, the final selection was narrowed to three articles. This highlights the lack of literature on UDL practices for students who are D/HH. The selected articles were from three different countries. This limited amount of domestic research is striking due to the connections between UDL and the Every Student Succeeds Act and the National Educational Technology Plan Act (CAST, 2022 b, as cited in Brandt & Szarkowski, 2022). When addressing the purpose of the study to determine what is currently known about UDL practices within Deaf education, the data revealed that there is a limited understanding. The results from the first research question on explicitly presenting UDL elements for Deaf education research are lacking. While UDL is recognized as a beneficial framework, there is no evidence to support how the UDL elements support instructional design and outcomes. This lack of evidence should not correlate to negative results due to the limited body of research on the topic. It is notable that elements such as visual learning environments and the incorporation of multimedia approaches are valuable for

D/HH students. These findings lead to the conclusion that there is a need for more peer-reviewed empirical studies on UDL practices for D/HH students (Brandt & Szarkowski, 2022).

Researchers noted that a broader understanding was possible when expanding the search criteria, allowing for the inclusion of more articles. For example, removing the limitation of UDL to specifically inform the framework, a study made a recommendation to work with pre-service teachers on incorporating UDL elements in the lesson planning stage when working with D/HH students with possible additional disabilities (Guardino, 2015, as cited in Brandt & Szarkowski, 2022). This finding supports the conclusion that TDHH needs training in additional areas to support D/HH students' inclusion.

One of the more significant findings to emerge from this study is that while there is notable research and recognition on the value of UDL practice, there is a lack of explicit research to supply any evidence (positive or negative) linking these practices to Deaf education. This limits the support TDHH can provide to align with the federal policy endorsements for this framework.

Utilizing the UDL guidelines, inclusive environments must be established with diversity in mind and remove barriers to learning for all students, including those identified as D/HH (Orndorf et al., 2022). In 2019, research was conducted at the National Technical Institute for the Deaf (NTID) Biology conference for teachers of Deaf students. The identified purpose was to provide insight into the UDL approach in building accessible, inclusive, productive learning environments for D/HH individuals. It also reviewed ways in which to incorporate pedagogical practices such as Case-based learning. Participants included a variety of professionals who worked with D/HH learners. They included 19 high school science teachers from schools for the Deaf, 13 Biology faculty (two-year institutions), and nine ASL interpreters who primarily

worked in high school or postsecondary settings. While this variety of positions can be a limitation, it is also valuable in terms of the applicability of the findings, given that UDL was the topic and the design (Orndorf et al., 2022).

The conference included keynote speakers, panel presentations, exploration and work sessions, group work time, and social engagement. This was established to meet the four goals of the conference. Data was collected through daily participant reflection surveys, two focus groups, an end-of-conference survey, and a “Plan for Change” follow-up survey sent one year following the conference. The response rate was typically >85% daily during the conference. A year later, the “Plan for Change” survey was distributed following the conference, receiving a 67% response rate and an instructor response rate of 73%. This was significant as the timing coincided with the global COVID pandemic. The Follow-up survey investigated the extent to which the participants were able to accomplish their previously established plans for change (82% strongly/agreed), the success of the changes (71% strongly/agreed), and their view on increased effectiveness of instruction/interpretation (80% strongly/approved). Additionally, the results indicated that 79% of participants experienced an increase in student engagement, 88% utilized the resources from the conference, 86% specifically applied UDL principles, and 73% employed the case study pedagogical approach. Overall, 92% of respondents reported that they were better able to meet student needs due to the training (Orndorf et al., 2022).

The findings of this study have many practical implications. Primarily, increased research is needed on UDL elements for D/HH students. There were limitations in the research that weakened the replicability. The study was conducted as part of a professional development conference; however, despite this method's exploratory nature, the study offers valuable insights into the benefits of training educators who work with D/HH students on using best practices. The

diversity (in language mode, profession, age group taught, knowledge of Deafness) of the professionals used as participants could also be viewed as a limitation; however, the results were overwhelmingly positive. The collaborative effort is proven in the longevity of the results reported (Orndorf et al., 2022).

The study conducted by Orndorf et al. (2022) highlights the success of providing training for TDHH and various professionals who work with D/HH students. This basis for collaboration provides inclusive support that is consistent for D/HH students. Deaf culture and beneficial strategies need to be shared with general education teachers, staff, and administrators so they can understand the cultures and needs of the populations they serve. This is especially critical in rural areas.

Pedersen and Beste-Guldborg (2019) conducted a mixed-methods study in the upper Midwest of the United States. They specifically examined the impact of the Collaborative Consultation service delivery model on the knowledge and self-efficacy of professionals who worked with D/HH students in rural areas. Researchers used a case study design. The quantitative method served as a pre- and post-intervention tool for measuring self-efficacy and knowledge of educating D/HH students. The qualitative data were collected through pre- and post-participant interviews, as well as reflective journals completed during the intervention (Pedersen & Beste-Guldborg, 2019).

The participants were three school professionals (general education teacher, special education teacher, and resource room teacher). They were selected due to their limited access to a TDHH and their newness to serving D/HH students. The case study design format can limit the generalizability of the results. However, the value is in the contextual insights provided into

realistic and applicable situations and the opportunity for multiple data collection techniques (Pedersen & Beste-Guldborg, 2019).

The School Team Assessment of Self-Efficacy and Knowledge-Deaf/Hard of Hearing (STASK-D/HH) was used to measure both independent variables. It was pilot tested to ensure reliability and validity for the measure. Participants completed the STASK- D/HH in the first and last in-service sessions. Descriptive statistics were used to analyze the data. While there is an increased risk of type one errors when administering repeated measures, it provides the opportunity to demonstrate individual item change. Interpretive analysis was conducted to analyze the qualitative data through a structured approach to identify patterns, themes, and meanings (Pedersen & Beste-Guldborg, 2019).

In this study, the Collaborative Consultation (CC) process was found to significantly increase the knowledge and self-efficacy of the participants. While the overall knowledge and self-efficacy of participants improved, it was noted that some responses demonstrated no change or regression; this could be attributed to the wording of certain survey items. Five themes were identified from the qualitative data. These were identified as: resolved misconceptions from previously held views about Deaf education, key areas of knowledge specific to D/HH, Professional development and design, application of treatment beyond D/HH students, and in-service delivery design. When examining in-service delivery designs, hands-on design was highlighted as preferred due to its immediate applicability. Additionally, universally beneficial strategies that were effective for more than just D/HH students, as well as the impact of the CC method on preparing them and improving their personal self-efficacy despite the overwhelming needs (Pedersen & Beste-Guldborg, 2019).

The discussion of the findings highlights the benefits of supporting educators in providing more inclusive settings for D/HH students and broadening awareness of Deaf culture. However, there are concerns about the potential adverse effects of inclusion on Deaf culture and the use of ASL. The findings from this study can be used to address the shortage of specialized teachers and the increasing number of students served in their least restrictive environments across the United States. The application of the CC method could provide increased opportunities for students to receive genuine inclusion services and be fully integrated into their local schools, while empowering the staff who serve them. These methods could be expanded to administrators, elective teachers, and other educationally relevant staff (Pedersen & Beste-Guldborg, 2019).

Efforts to support and provide self-efficacy for educators are critical for creating inclusive environments. Creating positive perceptions and beliefs for inclusive education is dependent on the knowledge and comfort of the educators. A study by Dr. Christina Yuknis, conducted with Pre-service teachers, investigated their perspectives on inclusion when working with students who were identified as deaf (deaf was used in this research study to refer to the medical diagnosis rather than the cultural affiliation using Deaf) (2015). Following the study's approval from the institutional review board, participants were recruited from students who were enrolled in an introductory special education course at an unnamed U.S. university. Using the Teacher Attitudes Toward Inclusion Scale (TATIS) to measure teacher attitudes, researchers investigated what the main criteria is in making placement decisions for children who are deaf, determining if and how attitudes regarding placement change during an introductory special education course, and how do the primary and secondary educational experiences can influence their attitudes toward inclusion (Yuknis, 2015).

The course was three credits with 37.5 contact hours and approximately 75 hours of contactless classwork. The 18 participants had to complete: a demographic questionnaire, a modified version of the TATIS, and 10 case studies. The demographics of participants were 14 females and four males aged 20-32. Hearing status of participants included 14 D/HH (10 deaf without amplification and four who used hearing aids) and four hearing. The educational experiences varied in that 13 were seeking bachelor's degrees and five were working towards master's degrees; nine of these degrees would be in general education, five degrees would be in early childhood, and four students were working towards dual licenses with deaf education and general education or art. Previous educational experiences also varied; three had prior special education coursework, and four had coursework specifically in Deaf education (Yuknis, 2015).

The identified methodology of the study had strengths and weaknesses. The data collection method of the TATIS was researched and recognized as a reliable and valid measure. Researchers carefully selected the measurement tool to increase the confidence of the findings. However, the recruitment method provided a limitation to the study in that these participants were already involved in a special education course and had various previous exposures and experiences. These discrepancies could impact their attitudes and understanding, impacting the pre- and post-data and ultimately the findings (Yuknis, 2015).

Participants reviewed provided case studies and determined the Least Restrictive Environment (LRE), articulated the variables influencing these decisions for them, and the thought processes behind these decisions, through written open-ended responses. Participants were successfully able to identify key factors that would influence decisions about LRE for D/HH students. However, inconsistent preparation and limited confidence in teaching limited the instruction received on the topic of inclusive practices. Results indicated that training should not

be limited to a single course; instead, students should be provided with ongoing training throughout their preparatory programming. The study noted that this inconsistency occurs in some cases because faculty often lack expertise and comfort with the topic/content. Special education still functions from the deficit mode, and an institutional shift is needed to address social and instructional structures. The UDL framework shows promising impacts through multiple means of representation, demonstrating learning and engagement; however, more research is required, particularly with Deaf students (Yuknis, 2015).

The ultimate goal of inclusion is to create an inclusive environment where all students thrive. One of the characteristics of UDL is removing barriers and creating an environment that supports the success of all learners. For D/HH students, this is extremely important acoustically. A quantitative study was conducted on the acoustics environment in general education classrooms. The research questions specifically assessed the reliability of acoustic measurements collected by an iOS device with an external microphone and the proportion of classrooms that met the American National Standards Institute (ANSI) standards for unoccupied noise levels and reverberation. Participating classrooms were selected as they were part of a larger study. The acoustic measurements were collected from 164 classrooms (36 first grade, 69 third grade, 59 fourth grade). The study included descriptions of 156 classrooms, depicting 146 as conventional, five with an open floor plan, and one with a modular design. Volume was recorded for 111 out of the 164 classrooms with results ranging from 4,211 ft³ to 12,066 ft³ (Spratford, Walker, & McCreery, 2019).

The selected instrument for measuring acoustics was the Studio Six Digital AudioTools application on an iPod Touch 5 device, utilizing a Studio Six Digital iTestMic 2. Calibration procedures were conducted to ensure the validity of the measurements. Reverberation was also

measured using AudioTools- RT60 (Initial sound to drop by 60 dB), T30Mid- (Initial sound to drop by 30dB, averaging the measurements for 500 and 1000 Hz). These measurements were assessed for validity, resulting in the mean differences being less than 0.03 seconds(s), indicating good standing. For this study, a duration of 0.6 seconds or less was used as the acceptable measure for sound reverberation. Background noise levels were also measured using the Real Time Analyzer function found within the AudioTools application. The researchers used the ANSI guidelines of 35 dBA as the criterion for an unoccupied classroom.

Measurements of occupied and unoccupied classrooms were collected. Occupied classroom measures were taken as close to the student as possible during quiet desk work and reading activities. Attempts were made to gather three measurements; however, time constraints impacted the success. This inconsistency in the repetition of data could affect the reliability of the results. Another noted uncontrollable inconsistency was whether the heating, ventilation, and air conditioning (HVAC) system was on. For 35 classrooms, this data was unknown. Analysis of the data was conducted using R software, and the measurement of repetition was assessed using linear mixed models. To control for unobserved differences, the example was provided for teachers who were aware of acoustic impacts and those who were not; random intercepts were used, allowing for individual baselines. Results for classroom noise levels in unoccupied classrooms indicated that only 12.7% of classrooms met the ANSI standard of 35 dBA, and the average across all unoccupied classrooms was 43.6 dBA. The HVAC noise was measured to determine its impact on the noise level. When the system was turned on, noise levels increased by up to 6.6 dB. The sound levels in occupied classrooms were measured at 54.7 dBA. Considering reverberation, 95.9% of classrooms had instances below the standard of 0.6s. The only identified predictor of impact for the measure of reverberation was grade level, with 4th-

grade classrooms exhibiting lower reverberation times than those in other grade levels. For the area of clarity, the identified significant predictors included room volume and HVAC status (Spratford, Walker, & McCreery, 2019).

In answering the second research question on unoccupied classrooms' noise levels, the data revealed that while the reverberation times were averaged within thresholds, the noise level was consistently high. Nearly 90% of classrooms did not meet the ANSI standards, which was further exacerbated when the HVAC systems were enabled. This increases challenges within classroom environments for learning for all students, particularly those who are D/HH. While additional areas could be investigated to provide evidence to support additional classroom modifications, the results of this study provide essential data for administrators and district-level personnel on classroom noise levels. The insights gained from this study support using smartphone-based technology to monitor classroom noise levels, which is cost-effective for school districts. Collaboration of professionals who are knowledgeable about classroom acoustics, such as TDHH, with general education staff enables schools to make informed decisions that foster a safe and instruction-friendly acoustic environment, benefiting all learners, especially those who are D/HH (Spratford, Walker, & McCreery, 2019).

Conclusions drawn from the literature emphasized the importance of collaboration for successful inclusion. Collaboration between TDHH and school staff was found to be essential in fostering an environment where D/HH can access the required support and resources needed for academic success. Findings from Brandt and Szarkowski's (2022) research emphasize that there is a lack of peer-reviewed literature that looks explicitly into the outcomes of UDL elements for educating students who are D/HH (2022). However, it was discussed that current available research on UDL depicts that elements such as visual learning environments and the

incorporation of multimedia approaches are found to be beneficial for students who are D/HH (Brandt & Szarkowski, 2022). Confirming the benefit of UDL, research conducted through professional development using UDL practices for creating learning environments that are accessible, inclusive, and productive for D/HH individuals resulted positively in participants' ability to meet their students' needs (Orndorf et al., 2022). As a multi-disciplinary team, it makes decisions regarding the IEP of D/HH students. It is vital that they understand special education and LRE while making these decisions. Research findings on perceptions of preservice teachers indicated that there is a need for ongoing training throughout preparatory programming and anticipated positive outcomes through the incorporation of the UDL framework. These findings also indicated the continued need for increased research in UDL specifically tied to Deafness (Yuknis, 2015). The study on using the Collaborative Consultation service delivery model for increasing knowledge and self-efficacy demonstrated the importance of collaboration in sharing knowledge about Deafness and extending strategies across settings, leading to increased inclusion of D/HH students (Pedersen & Beste-Guldborg, 2019). The combination of the UDL approach on environmental accessibility and collaboration was highlighted in the results of a study of acoustic environments. The research confirmed that the collaboration of individuals specialized in educating D/HH students and general education staff allows for acoustic improvements in the classroom environment that support the learning of all students, especially those who are D/HH (Spratford, Walker, & McCreery, 2019). By creating an environment through strategic collaboration, classrooms can enhance educational experiences and increase accessibility for learning for D/HH students.

Conclusions

After examining existing literature, information was gathered on Deaf education in developing inclusive learning environments that promote successful outcomes for the increasing demand of D/HH students. Throughout this investigation, responses were gathered regarding the identified research questions. In addressing the first research question, *what are the identified specific needs for D/HH students in inclusive settings that impact successful outcomes of academic achievement and post-secondary success?* Research confirms the understanding that students who are identified as D/HH have needs that are different from those of both their general education peers and other students with special needs. The literature emphasizes the development of social skills for students to have proficiency in self-advocacy, communication, navigation, and post-secondary transitions (Cawthon et al., 2015). Strong support networks (parents, TDHH, and school staff) along with the availability of technology and extracurricular activities were identified as needed by D/HH-CLD students for relationship building (Ayantoye & Luckner, 2016). Academic achievement of D/HH-CLD students was found to have been impacted by needs in areas such as having skills for taking responsibility and organization (Ayantoye & Luckner, 2016). Tailored literary instruction was determined to be an area of need for D/HH students working towards academic success. The research confirmed specific needs in literacy instruction, including an emphasis on pre-reading strategies and graphic organizer comprehension (Donne & Rugg, 2015). As the number of D/HH students being educated in inclusive environments expands, there is a need for increased purposeful opportunities for communication with peers and collaboration from the staff for instruction in order to mitigate barriers to success (Alasim, K, 2018).

When addressing the research question, *what makes up the current training/ professional development practices provided for Teachers of the Deaf and Hard of Hearing for enhancing their ability to create inclusive environments for students who are Deaf and Hard of Hearing?*

The gathered literature confirmed that students who are D/HH have unique needs that specialized TDHH meet. These specialized educators require preparatory programs that focus on communication accessibility. These programs are unique from general special education programming, requiring educators to develop vast knowledge to meet the diverse D/HH student needs. The conclusions from research emphasize the need for improved training and sustainable programming to ensure effective instruction for D/HH students. Current programs were found to foster commitment and flexible instructional approaches but also identified expanded needs for training or coursework in public school navigation, interpreter collaboration, and behavior management (Engler & MacGregor, 2018). Findings highlighted that states have disparities with credentialing of TDHH and service availability, especially in rural areas. States are also facing professional shortages for TDHH, which impacts the service delivery model for D/HH students (Howley & Howley, 2016). Findings from research conducted by Miller, K. J. (2015) emphasize that disparities exist not only in certification standards but also among individuals responsible for educating and making decisions about D/HH students. There is an emphasis on the need to disseminate knowledge about the field of Deaf education, particularly among those who supervise TDHH. Topics such as training in listening skills, sign language, and self-advocacy were identified and reviewed as possible professional development to address the inconsistencies (Miller, K. J., 2015). Despite these disparities and continual medical advancements, the literature noted that the number of D/HH students served under IDEA remains steady, confirming ongoing needs for services, especially as more students are being served in general education

environments (Epstein et al., 2022). Conclusions were highlighted that there is a deficit in coursework and continuous professional development in early intervention, as well as academic and cultural trends needed by TDHH to use strategies that foster inclusive classrooms and support students academically and their identity development (Martin-Prudent et al., 2016; Golos et al., 2018).

The literature review supplied answers to the question *What are the most critical pedagogy and training topics for TDHH serving D/HH students that impact successful outcomes?* The Literature review highlighted the need for specialized training in the area of writing to enable TDHH to target academic achievement while addressing the expressive and receptive language delays that are often experienced by D/HH students. The study conducted by Dostal et al. (2018) noted that educators recognized the importance of providing writing instruction across all content areas; there was a need for training to aid TDHH in generalizing the instructional strategies across academic subjects (2018). The need for training on instructional strategies in effective reading interventions was also confirmed in a meta-analysis by Wang and Williams (2014). The results indicated that D/HH require developmentally appropriate interventions that are tailored to their needs and presented with increased direct teacher interaction (Wang, Y. E., & Williams, C, 2014). When specifically exploring pedagogical models, flexible instructional arrangements were found to enhance student engagement, reduce passive participation, and create opportunities for targeted instruction (Catalano et al., 2021). These findings indicated that targeted training for TDHH will aid in ensuring D/HH students receive comprehensive support for academic success.

The final research question investigated was, *how does effective collaboration between Teachers of the Deaf and Hard of Hearing and other school staff affect outcomes for the*

successful inclusion of students who are Deaf and Hard of Hearing? Findings emphasized that effective collaboration between TDHH and school staff is vital in the development of inclusive learning environments that support the academic and social success of students who are D/HH. Conclusions from the literature review highlighted that there is a severe lack of targeted research on UDL practices for D/HH students to include how UDL principles can be tailored to D/HH students and culturally and linguistically diverse D/HH students. While UDL principles are federally endorsed, conversely, explicit research for D/HH students is lacking. Existing literature does, however, reference valuable benefits to the implementation of its principles for engagement, representation, and expression (Brandt & Szarkowski, 2022). The implementation of UDL practices was confirmed through a professional development study, resulting in participants reporting being better able to meet students' needs (Orndorf et al., 2022). Research conducted by Yuknis (2015) also predicts positive student outcomes for D/HH students through incorporating the UDL framework despite a lack of specific research on this population. The study also found that there is a need for training throughout preparatory programming to ensure teachers understand LRE and are able to participate fully in IEP meetings (Yuknis, 2015). The literature noted a shortage of TDHH, emphasizing the importance of collaboration between teams of professionals. A study conducted on the Collaborative Consultation service delivery model resulted in increased inclusion of D/HH students from the collaboration and sharing of strategies and information on Deafness, leading to increased staff knowledge and self-efficacy (Pedersen & Beste-Guldborg, 2019). Additionally, the research found that the inclusion of students was also supported through improvements in the acoustic classroom environments. A study combining the UDL elements on environmental accessibility, looking into improving the acoustic environment, supports all learners, especially those who are D/HH (Spratford, Walker,

& McCreery, 2019). Inclusive environments are strengthened when there is effective strategic collaboration through research-driven approaches such as the UDL principles.

Significance

The research highlights a shortage of TDHH and limited preparatory programs for this needed profession. Districts often have one or a limited number of TDHH, and thus, they are often isolated in their districts with limited training. The research confirmed that with advancements in medicine and technology, and the increase of students being educated in general education settings, there is a consistent need for students to receive specialized services from highly trained TDHH (Epstein et al., 2022). TDHH must develop expertise across a wide range of areas to provide academic instruction for D/HH students as well as cultural and communication skills. The significant findings from the comprehensive research literature analysis indicate the need for increased targeted coursework and training for TDHH. While research highlights the need for more training and professional development for current practices, the TDHH are not receiving this specialized training. Literature indicates that many preparatory programs have room for improvement through additional coursework. For TDHH to support D/HH students and respond as needed to the unique needs as depicted in the research, they require targeted training. The research also emphasized the need for TDHH to be trained in pedagogical methods that have been proven to increase D/HH student access to learning and more successful outcomes. In addition, the findings from the review of literature indicated the importance of the proactive approach to structuring the environment. While there is a lack of specific research on incorporating UDL principles for D/HH students, there are findings that support the use of these across academic settings. TDHH need to be provided training on incorporating UDL and be provided opportunities to share these strategies through collaboration

with peers and all educationally relevant staff. TDHH need to receive targeted and consistent training to successfully create inclusive environments that foster collaboration and provide instruction that supports the academic, social, cultural, and overall growth of the growing population of D/HH students.

Consistently, the literature notes that more research is needed that targets explicitly D/HH students. This lack of research leads to gaps in understanding and evidence to promote change. It limits access to effective interventions, thus limiting the specialized tools that educators can use to support D/HH students. Districts and schools look to educational research to build professional capacity and shape policy and practice. When there is a gap or a lack of sufficient research, it has an impact on the decisions made that affect students. An example of this was clear in the widespread use and acceptance of the UDL framework; however, it was noted that there is a gap in research on incorporating the UDL principles for D/HH students. This leaves leaders and district-level personnel without the information needed to make decisions on training provided to TDHH on UDL principles and hinders the practice of its use with this student population.

It has been made clear through the literature review that there is a disconnect between research and practice. It is evident that D/HH students have evolving needs that are unique across educational contexts. Limited specific research on this population of students increases this gap by denying data-driven, valid access to tailored strategies. Research conducted on preparatory programs indicates that there are areas that need to be addressed through altered coursework or additional training. The lack of research tied to incomplete preparatory programming means that TDHH are entering the field underprepared, making it more vital that districts are providing access to needed training. By increasing access to professional development for TDHH, districts

provide these professionals with the skills and knowledge needed to meet the increasing demands of modern and inclusive classrooms for D/HH students. Targeted and consistent training practice will be vital in bridging the gap between research and practice. A solution that would be recommended would be a three-phase training framework. Phase One: Connect, this would include district onboarding and strategic alignment. Phase Two: Equip, would be the in-service training and development of change through facilitators providing tools knowledge and support. Phase 3 Empower, districts take ownership, sustain, and evolve the training framework.

Section 3: Plan

Research has shown that the amount of time D/HH students spend in the general education classroom is increasing, despite continued technological advances and a consistent need for these students to receive specialized services (Epstein et al., 2022). This information, combined with the emphasis in the literature on inconsistent credentialing across states, a shortage of specialized, trained TDHH, and the diminishing and disproportionate availability of preparatory programs, supports the urgent need to provide training for the individuals who offer these services. (Howley & Howley, 2016; Pedersen & Beste-Guldborg, 2019).

Students who are D/HH have specific and unique needs that a trained TDHH must address. While the findings from the study conducted by Engler & MacGregor (2018) support the knowledge that preparatory programs for TDHH provide valuable instruction that fosters a commitment to the field and skills for needed instructional strategies, they also indicate an increased need for additional training and coursework. The findings consistently identified that TDHH needed additional and targeted training. In addition to academic pedagogy, there is a need for TDHH to be up to date on communication techniques and amplification technology. As the research indicates, this specialized training requires vast knowledge that can be overwhelming for staff who do not specialize in this field (Pedersen & Beste-Guldborg, 2019). Research conducted by K. J. Miller (2015) detailed that TDHH are often supervised and evaluated by someone with minimal knowledge in this field. This gap justifies the need for an in-service to disseminate understanding about the importance of providing increased and targeted training for TDHH. While the position titles may vary across the United States, the focus population for the in-service would be the individuals who make decisions regarding the type and amount of professional development provided to TDHH. These individuals would typically be district-level

personnel, such as Administrators, District Special Education Coordinators, or staff development coordinators.

Professional development has long been the way in which the education system provides training. However, districts often offer broad and general topics as content, which literature emphasizes is not directly tied to the needs of D/HH students and TDHH (Miller, K. J., 2015). The objective of this in-service would be to equip district-level personnel with the knowledge needed about D/HH students, so they are better able to make informed decisions when assessing the training needs of TDHH. This increased knowledge, in turn, supports the creation of more inclusive communities that provide more successful outcomes for D/HH students.

Phases

As D/HH students vary in their language access, hearing abilities, and social needs, providing the specific support that districts need is essential. The findings within the literature review indicate that districts have varied service delivery models and certification requirements (Howley & Howley, 2016). This disparity in knowledge affects the specific needs of individual districts, as each district has a different population and employs different service delivery models. The proposed three phase in-service training would be generalized across states, and its customizable nature would extend the reach of its impacts from urban to rural communities. While the topics would be customizable based on the district's needs, they would be compiled from an analyzed list of research findings.

This list was curated by identifying the topics that required increased training, as determined from the literature review, as shown in Appendix Figure 2. These identified topics were then grouped thematically into ten areas. For example, the excerpt from Figure 2 shows the study, Use of an application to verify classroom acoustic recommendations for children who are

hard of hearing in a general education setting by Spratford, M., Walker, E. A., & McCreery, R. W. (2019). This literature highlights the need for enhanced training in areas such as classroom acoustics, acoustic technology, integrating assistive technology, and collaborative methods for sharing acoustic information. These topics are all related to the area of Educational Access and Assistive Technology. This area, identified by research, emphasizes the understanding that TDHH need training not only in new technology for evaluating acoustic environments but also for enhancing and accommodating these environments to ensure access for D/HH students. This knowledge is required for duties such as measuring acoustics, as depicted in this article, understanding the personal listening devices of their students, applying appropriate sound field/FM systems, and implementing sound-dampening technology. The research conducted by Miller, K. J. (2015) reported that TDHH rated their knowledge as fairly low for the area of amplification, highlighting the need for additional training in this area. TDHH need to not only be knowledgeable in this area but also collaborate and share this information with relevant educational staff. This will ensure that all staff working with D/HH students understand the needs and benefits of the technology provided, as well as the environmental changes, not only for their D/HH students but for all students. Educational access and assistive technology that is unique in its specific needs for D/HH students, but essential in supporting their education and building an inclusive community.

Figure 2:*Topics Identified by Research for TDHH Increased Training*

Note. Figure 2. This figure is a segment of the complete figure located in the Appendix. It was developed from data and findings gathered during the literature review. The researcher paraphrased topics based on the findings and results.

This same method for analyzing topics and identifying themes from research articles within the literature review was systematically applied to identify topics for increased targeted training. Through this consistent approach, patterns and recurring themes were identified across topics. These were then synthesized to emphasize gaps in training. As a result, ten focus areas emerged as shown in Table 2. Each focus area represents a domain that enhanced training could impact TDHH knowledge, D/HH student outcomes, and inclusivity within schools. The focused areas included in Table 2 would be utilized for the preparation of the data collection protocols, as well as options within the predetermined but customizable in-service training.

Table 2:

Areas for Increased TDHH Training

Areas for Increased TDHH Training	
Collaboration and UDL	<ul style="list-style-type: none"> • Collaboration to provide better access to information and resources • Collaboration strategies • UDL principles application • Collaboration • UDL framework • Incorporating UDL elements
Communication Skills	<ul style="list-style-type: none"> • Communication strategies between parents and teachers • Communication strategies
Deaf and Hard of Hearing	<ul style="list-style-type: none"> • Sharing knowledge about Deafness
Early Childhood and Intervention	<ul style="list-style-type: none"> • Early intervention strategies • Early intervention strategy instruction and implementation • Early childhood instruction
Educational Access and Assistive Technology	<ul style="list-style-type: none"> • Classroom Acoustics • Acoustic Technology • Integration of Assistive Technology • Collaborative methods for sharing acoustic information • Working with interpreters • Integration of technology resources
Educational Systems and Extra-curricular	<ul style="list-style-type: none"> • Navigating the public-school systems • Least Restrictive Environment (LRE)
Executive Function and Life Skills	<ul style="list-style-type: none"> • Organizational skills • Social skills for high school D/HH students • Fostering positive interpersonal relationship skills • Social Responsibility • Social experiences
Inclusive and Multicultural Education	<ul style="list-style-type: none"> • Multicultural instruction • Fostering inclusion, communication, interactions, and participation • Provision of role models • Incorporating UDL elements
Instructional Strategies and Pedagogy	<ul style="list-style-type: none"> • Integration of subject-specific strategies • Instructional strategies for the integration of writing across content areas • Instructional pedagogy to increase writing in class and focus on discipline-specific literacies • Research-based strategies, activities, and materials • Evidence-based strategies: <ul style="list-style-type: none"> • Code-based skills, • Comprehension • Vocabulary • Fluency • Morphology • Pre-reading strategies • Comprehension strategies • Various forms of graphic organizers • Case-based learning • Flexible instructional arrangements • Case-based learning
Social and Emotional Learning	<ul style="list-style-type: none"> • Social skills for high school D/HH students • Social experiences • Provision of role models • Fostering positive interpersonal relationship skills

To create the data collection protocols for the in-service, a focus group consisting of TDHH will be implemented. Due to the need for the in-service to have extended reach and generalizability across the United States, it would be pertinent to utilize technology to ensure geographic diversity among focus group members. The members of this focus group would be identified using university contact databases, organizations (such as the National Association of the Deaf (NAD) and the American Society for Deaf Children (ASDC)), and social media groups specifically targeting TDHH. This group would be assembled by email invitation to join a video conference. This email would also include a digital form to complete, which would ask focus group members to rank the identified focus areas in Table 2 from most essential to least essential. They would be asked to rank the areas in order of priority rather than complete a Likert scale, as there is a tendency for some areas to be ranked the same with a Likert scale. The priority ordering method would provide more definitive results. These results would then be compiled and discussed in the group. It is anticipated that this would take respondents less than 5 minutes to complete with thoughtful responses. At the start of the focus group, the facilitator would ask two open-ended questions for discussion: Who makes decisions in your district regarding the training that is provided? What areas regarding Deafness and Deaf education do more educators and decision makers need to know? The facilitator would then ask about the rankings of the identified areas, and the group would be prompted as necessary to explain how they arrived at their decisions. Following this discussion, the focus group members would be asked to share professional development opportunities they are aware of or have personally used. The complete discussion will be transcribed and analyzed for themes. The facilitator would also have taken notes during the discussions, and those notes would be incorporated. These themes would be used in developing a data collection protocol for the surveys used in the in-service.

Phase One: Connect

It is recommended that this be presented in three phases. Phase one would consist of the initial contact and the training completed through the program facilitator. Around the start of the calendar year, in-service implementers would review each state's Department of Education website to get a list of district-level leadership. The first contact would be made by email. This would contain a letter explaining the present problem of practice identified by research and depicting how this proposed in-service would pose as a solution. It will reference the tie to the targeted state's documented special education priorities. For example, if the targeted state were Maryland, the letter would include:

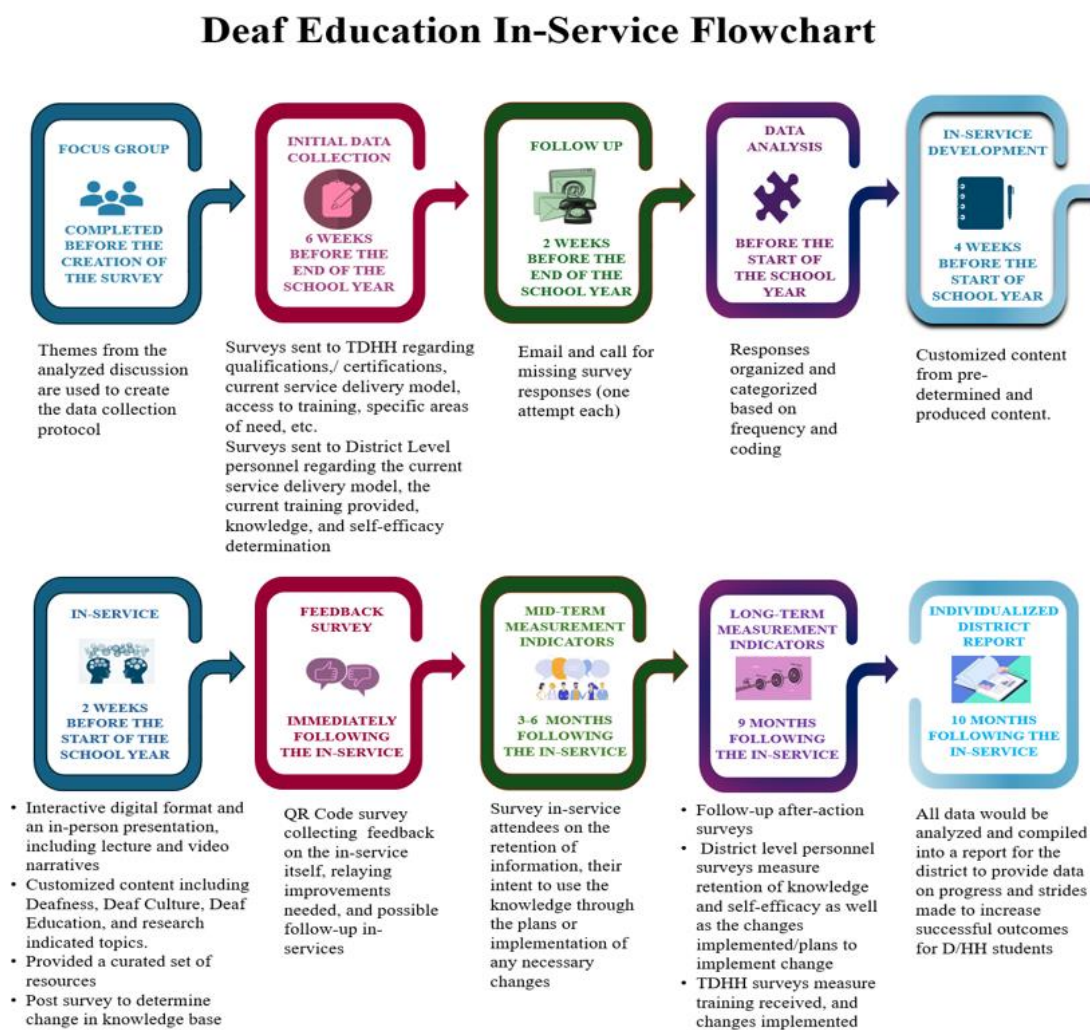
“According to the Maryland State Department of Education, two key priorities are improving instruction and services for students with disabilities and workforce development (2025). This in-service, created from research, will directly align with working towards these priorities by providing your districts with the support and guidance needed for training your TDHH, leading to improved instruction for your D/HH students. Finally, the provided report at the end of the in-service will provide data that demonstrates Maryland's progress and outcomes in working towards its special education priorities.”

The letter will emphasize the research findings that support their growing inclusive population of D/HH students and improve their outcomes. It will indicate the ways the Benchmarks will build capacity for long-term change within their school systems. It also indicates the valuable insight that would be provided to them in a report following the completion of the in-service. Attached also would be a flowchart, as depicted in Figure 3, that summarizes the recommended but flexible timeline and steps within the in-service. There would

also be an opportunity to meet virtually or in person at their convenience to discuss this in-service further and address any questions.

Figure 3:

Deaf Education In-Service Flowchart



When the meeting occurs, an in-service proposal package will be presented that summarizes the research conducted. It would emphasize alignment with state goals, benchmark indicators, and the expected short- and long-term outcomes. The package, consisting of general information, cost estimates (both short-term and long-term), the initial letter provided, a flowchart with a timeline, sample agendas, and sample surveys, would be provided for their reference. Once accepted, the steps would then commence following the recommended timeline as depicted (or amended based on the needs of the district) and explained in the flowchart.

The data collection protocol would collect the necessary information from district-level personnel and the TDHH. It would be recommended to send out these pre-service surveys in the last six weeks of the school year, with a follow-up email or call to be conducted two weeks before the end of school for any that had not been returned. This would allow pre-survey respondents to have spent at least a year in the district, have meaningful input, and have sufficient time to complete the surveys. The eight-question district-level pre-service surveys would investigate their school systems' current service delivery models for students who are D/HH, including the type of training currently provided and their knowledge of Deafness/Deaf education determination prior to training. It would also include a question on their self-efficacy regarding confidence with decisions related to 13 areas of Deaf education and TDHH training. The information gathered from the 13-question TDHH pre-service surveys would reference their qualifications and certifications, current service delivery model, and access to training. It would allow for identifying specific areas of need for training. It is anticipated that both surveys would take approximately 5 minutes to complete and were created with the intent to respect professionals' time while still collecting valuable data. This was achieved by the format of the

questions and responses, which included multiple choice, check boxes, and rating scale responses.

Once the responses are submitted, the information will be gathered, and the data will be organized and coded based on frequency and themes. The coded data patterns, in combination with the findings from the current literature review, will then be utilized to create the content for the in-service. This content will be customized from pre-established and developed materials, providing a tailored blueprint for in-service.

Phase Two: Equip

Phase two would start at the in-service training and run through the course of the year. This would be implemented by the program facilitator. The in-service would be recommended to take place in the two weeks leading up to the start of school and would need a half day to complete. It would be proposed that the delivery model be a combination of a digital and an in-person presentation. The presentation format recommendation is due to the customized nature of the content, as well as the content being presented with a mix of lectures and video narratives from subject matter representatives to deepen understanding and empathy.

While the content will include a brief introduction to Deafness, Deaf Culture, and Deaf Education, it will also highlight the findings from current research on program preparation, the specific needs of Deaf students, pedagogy, and training topics needed by TDHH. It would incorporate ways to foster collaboration and build more inclusive environments. The focused areas of required training that the TDHH identified in their school system would be emphasized to provide targeted knowledge.

During this in-service, individuals would receive a curated set of resources to facilitate sustained implementation. Resources would include lists of relevant websites offering training

and resources, recommended implementation timelines, materials that can be disseminated at the school level, and a curated directory of optional programs to explore for additional resources. Towards the end of the in-service, a post-service survey (a version of the initial survey measure) would be administered to determine the change in the knowledge base and self-efficacy of the district-level personnel. Directly following the in-service feedback would be collected, using a learner reaction form, to determine areas for improvement on the presentation and implementation of the in-service itself. At intervals of three to six, and nine months following the in-service, brief follow-up data will be collected to determine the mid-term and long-term impact of the in-service.

All data collected will be analyzed to provide the district with a report on progress and recommendations for further improvement. It would discuss findings from all surveys collected, progress towards benchmark indicators, and outcomes for change. This would provide the district with data on the effectiveness of the in-service and progress toward its goals. It would also inform future planning within the district regarding professional development topics and knowledge gaps that require additional training. It would provide evidence of continuous improvement made to increase the successful outcomes of their D/HH students. The report would also provide the district with an identification of areas of need to align support when making decisions regarding the allocation of time and resources.

Phase Three: Empower

Phase three is the improvement for excellence of professional practice. This is the point that the districts would take ownership of the framework and use it to continue improvement. The program facilitator would no longer be involved and the individuals within the district could use the report and resources provided to continue the established communication. The in-service

is proposed as a starting point designed to enhance current training frameworks and provide continual improvement for TDHH staff development. By implementing, districts can better support their TDHH and increase recruitment and retention. This framework could be replicated and applied for other teachers within districts who provide services to students with low-incidence sensory disabilities, thereby enhancing their professional growth. It can be expanded and formatted for the school-level teams as well to build their self-efficacy for working with D/HH students.

Benchmarks

To evaluate the overall effectiveness and value of the in-service, a criteria benchmark approach was implemented. Benchmark indicators were identified for Knowledge Acquisition, Participant Perceptions, Feedback and Satisfaction, and Long-term Impact. When approached collectively, they provide the opportunity to measure the immediate impact and lasting outcomes of the in-service.

Knowledge Acquisition

The initial benchmark for this plan would be knowledge acquisition. Understanding the level of growth from district-level personnel would provide the key value of the in-service training. By comparing pre- and post-service surveys, providers can determine the acquisition and knowledge gained from the in-service training. The measurement of their content understanding and self-efficacy from participating in the in-service determines the effectiveness of the in-service while also contributing to their confidence in making decisions, resulting in meaningful change in practice.

Participant Perceptions

The self-efficacy of district-level personnel in their skills and knowledge base for understanding the field of Deaf education, their school systems' current needs, and provisions for TDHH is critical in affecting change. By increasing their self-efficacy in this area, they are better equipped to make informed and confident decisions regarding training for TDHH in their school system. It is not necessary for district-level personnel to be experts in the field of Deaf education. However, it is vital that they make an effort to not only understand the educational challenges faced by D/HH students and TDHH but also be aware of the historical and cultural impacts on the field (Miller, K. J., 2015). This will also increase their awareness of the need and the relevance to their policy discussions.

Feedback and Satisfaction

Feedback and satisfaction would be another benchmark measure, taking place at the end of the in-service, in the form of a learner reaction form. This data could be collected via a QR code that will be posted prior to the conclusion of the in-service and sent via email to the attendees. Collecting feedback directly following the in-service provides timely insights into the in-service itself. It would provide data on satisfaction and areas for improvement, such as presentation, duration, information provided, and potential follow-up topics.

Long-Term Impact

Long-term impact benchmarks would be collected from data gathered in follow-up surveys, which would include optional open-ended questions to provide an opportunity for elaborate feedback and testimonials on the outcomes of the in-service. The three- to six-month interval would indicate whether the knowledge gathered during the in-service was being applied through a plan or initial implementation. The nine-month interval would determine the success of

implementing the plan or access to targeted and consistent training for TDHH. This benchmark would strengthen the value of the plan by providing insight into the longer-term changes.

Measurement Strategies

Short-Term Measurement Indicators

Various measurement strategies will be employed to assess the progress and effectiveness of the in-service training in relation to the identified benchmarks. First, the pre- and post-service surveys will be provided to district-level personnel and TDHH. While the questions for both will be derived from the analyzed focus group transcripts, they will be distinct in content focus, evaluative purpose, and timelines.

The data collected in pre-service surveys administered to the TDHH would provide insight as to their qualifications and certifications, the current service delivery model they use, their current access to training, and specific areas of need for their population of D/HH students. The responses regarding information about the current amount of training, service delivery models, and qualifications would be analyzed quantitatively, indicating trends for the school system. The more open-ended questions would be coded and analyzed to identify themes and patterns of needs within the district. While measuring this data would not provide benchmark data for that purpose, it is to provide insight into the content and direction of the in-service.

The pre- and post-surveys that would be administered to district-level personnel would be the same, allowing for the measurement of change before and after the in-service was provided. These surveys would incorporate questions derived from the focus group, as well as an informal measure of self-efficacy. The questions created from the focus group would provide data on knowledge of Deafness, the field of Deaf education, and focus areas for training. The data collected in the pre-service survey administered to district-level personnel would provide the

baseline data with which the benchmark of knowledge acquisition could be measured. This would allow the in-service providers to determine the mean knowledge base and anticipate content needs. The post-in-service survey would be provided to attendees toward the end of the in-service administration. It would only be provided to district-level personnel who participated in the in-service. This measurement tool would collect data and be compared with the baseline to measure gains in knowledge acquisition self-efficacy. This would provide data for the benchmarks on knowledge acquisition and participant perceptions.

The final measurement tool used during the in-service would be the feedback form. The learner reaction form would be provided to the contributors directly following the in-service session, prior to their departure. While this measure would not be used to track attendee growth, it would provide data to inform the benchmark of feedback and satisfaction. Allowing for the understanding of the effectiveness of the in-service and any areas of improvement.

Mid-Term Measurement Indicators

Following the in-service, approximately three to six months later, a questionnaire would be distributed to district-level personnel who attended the in-service. This would be brief but measure the retention of information and their intent to apply the knowledge through the plans or implementation of any necessary changes. Although brief in length, it would enable the determination of the effectiveness of the in-service in making meaningful improvements to the training provided to TDHH.

Long-Term Measurement Indicators

The final measurement strategy would be follow-up after-action surveys. These would be distributed to district-level personnel and TDHH to determine how the knowledge was utilized. Each survey will differ, yet all are intended to assess final results relative to the

benchmark objectives. The surveys provided to district-level personnel would provide data on the retention of knowledge and self-efficacy, as well as the changes implemented or planned changes. The information collected from the TDHH would be regarding training received and changes implemented. These measures would be taken at the end of the school year, allowing ample time for change and improvement.

Anticipated Outcomes

Anticipated immediate outcomes following the provided service would include increased knowledge of Deafness, Deaf Culture, and Deaf education, as well as increased self-efficacy among district-level personnel within the specific districts. The in-service would provide attendees with the knowledge needed to understand terminology, technology, and pedagogy, as well as a basic introduction to the pathological and cultural views within Deaf education, and current credentialing for this profession. District-level personnel would also be provided with a basic understanding of the history of Deaf culture and its impact on education. The in-service would also cover topics identified through research that are necessary for training in TDHH, as well as qualification requirements and methodologies for educating their student population. Finally, it is anticipated that recipients will increase their self-efficacy and feel empowered to make decisions for educating students in their district who are D/HH.

It would also be predicted that the TDHH would gain a feeling of recognition and empowerment. They would also be provided with consistent and targeted training to improve their professional skill set. It would open direct and clear communication with district-level personnel on the needs of their D/HH student population.

When examining short-term anticipated outcomes, it is expected that the professionals participating in the in-service will review their current district's plan for providing training for

TDHH and possibly suggest improvements to deliver targeted, consistent training for TDHH. It would allow the district's TDHH to voice their needs to serve their students better.

The anticipated long-term outcomes would include implementing improved, targeted, consistent training for TDHH. This would encompass topics from research that enhance the inclusion and empowerment of D/HH students. TDHH would be able to apply the skills taught in the provided training to increase successful outcomes for D/HH students and establish more inclusive communities. TDHH would collaborate and utilize the resources provided to empower all school-level staff who work with D/HH students.

The data derived from the in-service provided a report for the district and the state to demonstrate their process towards identified priorities. It would provide districts with key takeaways, including topics covered, resources shared, and recommendations for change. It would enable districts and states to make informed decisions when planning for professional development and distributing resources. The report would also provide evidence for professional growth and dedication to this population of teachers and students.

Section 4: Summary of Results

The proposed in-service is expected to pose a solution to the identified problem of practice. The expectation is that the in-service will enhance the district-level personnel's knowledge of Deafness, Deaf culture, and the field of Deaf education. By gaining this understanding, the confidence and self-efficacy of district-level personnel will increase, enabling them to make informed decisions regarding the training of TDHH, which will directly impact the support provided to their D/HH student population. The in-service would provide foundational knowledge in terminology, technology, pedagogy, and cultural and medical perspectives of Deaf education. It would also provide an overview of the diverse credentialing and instructional methodologies needed by TDHH. District-level personnel do not need to be experts in the field of Deaf education, but they do need to have an awareness of the needs of the professionals for whom they are making decisions and the students they are serving.

The anticipated outcomes include short-term improvements in district-level training plans for TDHH and fostering communication between TDHH and district-level personnel. It would be predicted that TDHH would feel more recognized and supported through the implementation of the targeted and consistent training, as well as because the individuals supervising them have demonstrated an effort to understand their field. Long-term outcomes would include the implementation of targeted training aligned with researched topics to improve practices and inclusion, resulting in increased successful outcomes for D/HH students. TDHH would also be better equipped to collaborate with school-level staff, thus extending the reach of the in-service outcomes. The strategies learned from the training will be put into practice and contribute to the building of inclusive educational communities for D/HH students. The benefits and understanding gained from the in-service would continually extend through continued

resurveying of TDHH to better understand the evolving needs of this population and remain current on research-based practices. The report generated by the in-service will serve as evidence for districts on the professional growth of their staff, dedication to practical instruction, and successful outcomes for their D/HH student population. The report will document the key takeaways, shared resources, and recommendations for the future. This valuable information can be utilized at both the district and state levels for informed decision-making in planning professional development and allocating resources effectively.

This method has both benefits and limitations. The proposed in-service would result in skill enhancement across professionals and encourage professional growth not only for TDHH but also for other staff. It will provide opportunities for TDHH not to feel so isolated in their concept knowledge and instead feel more supported. The benefit of increased and more effective collaboration would allow for increased reach of the results from the in-service. The time commitment described could be considered a limitation, but when considering the short and long-term benefits, they make the investment worthwhile.

While this proposed in-service is a start on the path to mitigating the problem of practice, it is not the sole solution. This in-service is proposed to start with district-level personnel; however, as research by Miller (2015) has indicated, knowledge is also needed by those who supervise TDHH at the school level. Current views of Deafness and hearing impairment held by professionals working with D/HH students are often focused on medical models and special education laws such as IDEA. These are necessary and provide the criteria required for eligibility and the provision of services; however, they overlook the social, cultural, and educational identities of D/HH students. The research findings shed light on the need for collaboration and shared knowledge, ensuring that all relevant staff members have the necessary skills and

knowledge to provide quality education for D/HH students. This leads to the possibility of expanding this training to school-level administrators. As districts continue to utilize the structure, parts could also be used with other school-level staff. While it is not necessary that they become experts in the field of Deaf education, it would be a step towards building inclusivity through increased self-efficacy. This need for collaboration between teams of professionals to increase the reach, especially to rural areas, was reinforced in a study conducted on the Collaborative Consultation (CC) service delivery model. The findings support the use of the CC model to share strategies and information on Deafness, leading to improved staff confidence and increased inclusion of D/HH students (Pedersen & Beste-Guldborg, 2019). The TDHH could facilitate this provision of information once they receive the training.

As discussed in the literature review, there is a need for increased research, specifically working with D/HH students. Often, the limitation was noted that further research was needed in this area in order to understand and validate the findings fully. Expanding research can continue to address and support evolving needs in Deaf education. As advancements in technology continue to develop, it is important to understand how they can impact the classroom environment and instructional methods. It is important to continue to evaluate the needs of D/HH students and research practices for increased access and outcomes. Continued research on this population of students can also reduce inconsistencies in practice by identifying the gaps and what supports are in place, enhancing or adding to professional development, and creating consistency in the quality of education across districts and states. Increased research typically provides the documentation that influences policy and aids in securing funding for programs and services. The data provided through the research could justify the need for training and resources.

Research has revealed a clear gap between research and practice for the training needs of TDHH. The students served by these professionals have diverse and evolving demands that vary across educational settings. There is a need for districts to provide consistent and targeted training for TDHH. By providing this, they are equipping their TDHH with the tools necessary to meet the needs of their D/HH students and educate them in inclusive environments.

Strengthening the training provided for this profession is essential in bridging the gap revealed by research on the needs of D/HH students and the present practices for professionally preparing and supporting TDHH. By supporting the TDHH and providing them with the professional growth they need, this could lead to increased retention of this specialized staff, thereby decreasing the difficulty of filling TDHH vacancies among districts.

Section 5: Product

The Capstone project led to the development of a comprehensive in-service proposal package. It was created for distribution to District-Level leadership; these positions could be Superintendents, Community Superintendents, chief academic and educational officers, and/or Special Education Directors. It serves as a strategic resource to provide these professionals with the information needed to decide to incorporate this in-service into their school systems. This proposal package begins with an introduction and overview that provides a list of key terminology and definitions to ensure clarity and shared understanding. This section also outlines the purpose of the in-service and describes the target audience at each step of implementation. A cost analysis is included in this package that breaks down anticipated long- and short-term costs to inform implementation decisions. The formal letter that was initially sent to the district-level leadership for the outreach is also included for reference to individualized goals. In order to demonstrate the proposed rollout, the flowchart is included in the package with a recommended timeline. Additionally, the package includes supporting materials, such as sample surveys, agendas, and a copy of the presentation that will be used during the proposal meeting. Finally, the information derived from the literature review would also be included in the package to emphasize the evidence-based approach and highlight the potential impact of implementation.

The primary objective of the proposed in-service is to equip and empower district-level personnel with a comprehensive understanding of the unique instructional and developmental needs within Deaf Education. By targeting the district level personnel in the in-service, it is prioritizing knowledge to support the understanding, enabling these professionals to make more informed decisions when assessing the training needs of Teachers of the Deaf and Hard of Hearing (TDHH). The proposed in-service allows these districts to support the professional

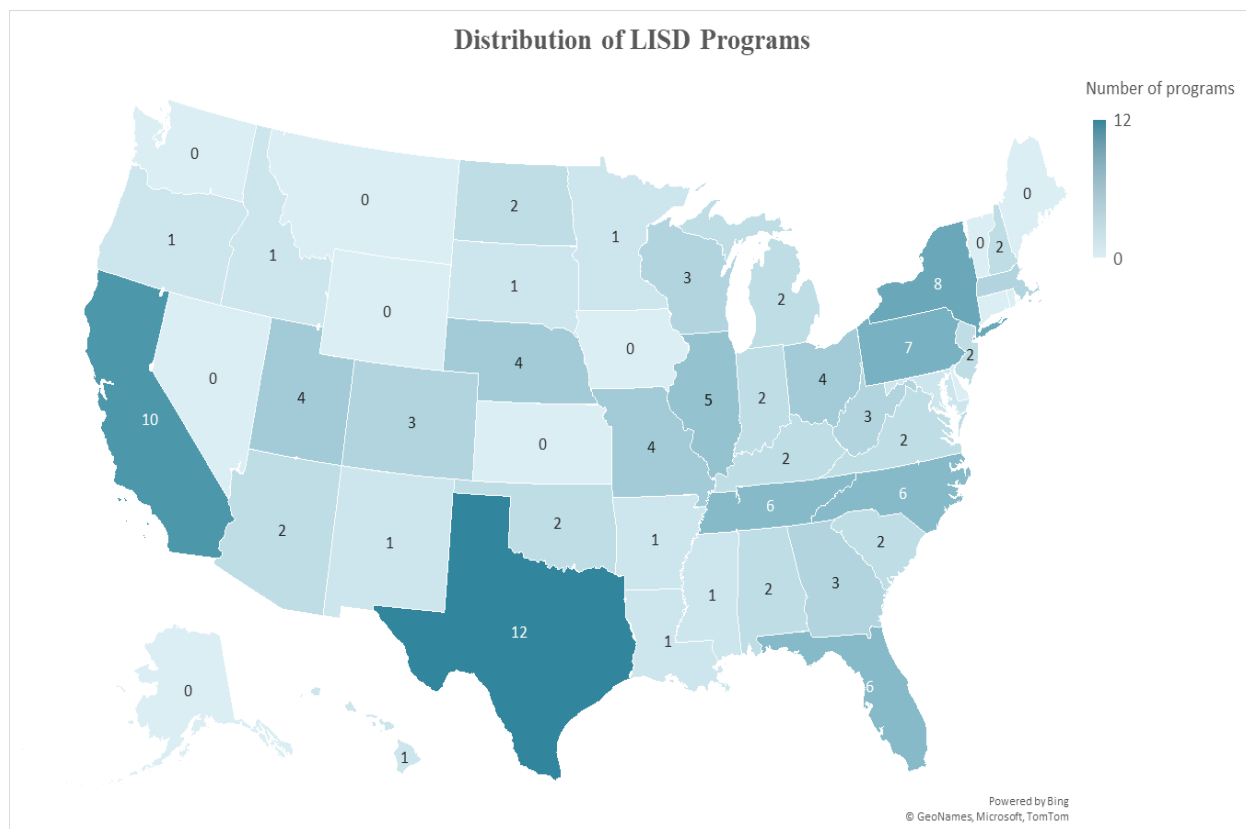
growth of their teachers and foster the development of more knowledgeable and inclusive communities for D/HH students.

This proposal package is the starting point for the individualized in-service that is designed to enhance districts' current training frameworks and provide continual improvement for the staff development of TDHH. Distributing this package provides district-level leaders with a clear overview of the initiative, along with practical examples of materials to increase understanding of the need. This resource helps with clarifying the process, making it easier for leaders to visualize how this framework would integrate into their districts. This package emphasizes the connection from themes identified in research to educational practices that align with their districts' educational goals. By making these connections explicit, it supports informed decision-making, strengthening the case for adaptation.

Appendices

Figure 1

Low Incidence Sensory Disability Program Distribution



Note. Figure created from data on Table 3, Howley & Howley (2016)

Table 1*LISD Program Distribution*

State	Total Programs	LISD Program Distribution					
		HI	VI	DB	OM	BRL	ASL
Texas	12	✓	✓	✓	✓	✓	✗
California	10	✗	✓	✗	✓	✓	✗
New York	8	✓	✓	✓	✓	✓	✓
Pennsylvania	7	✓	✓	✓	✓	✓	✓
Florida	6	✗	✓	✗	✓	✓	✗
North Carolina	6	✓	✓	✓	✓	✓	✓
Tennessee	6	✗	✗	✗	✗	✓	✗
Illinois	5	✓	✗	✗	✗	✗	✗
Missouri	4	✗	✗	✗	✗	✗	✗
Nebraska	4	✗	✗	✗	✗	✗	✗
Ohio	4	✓	✗	✗	✗	✗	✓
Utah	4	✗	✗	✓	✓	✓	✗
Colorado	3	✓	✓	✓	✗	✗	✓
Georgia	3	✓	✓	✗	✗	✓	✓
Massachusetts	3	✗	✗	✗	✗	✓	✗
West Virginia	3	✗	✓	✗	✗	✗	✗
Wisconsin	3	✗	✓	✗	✗	✓	✗
Alabama	2	✓	✗	✗	✗	✓	✓
Arizona	2	✗	✗	✗	✗	✗	✗
Indiana	2	✓	✗	✗	✗	✗	✗
Kentucky	2	✗	✗	✗	✗	✓	✗
Michigan	2	✓	✗	✗	✗	✗	✓
New Hampshire	2	✗	✗	✗	✗	✓	✗
New Jersey	2	✓	✓	✗	✗	✗	✗
North Dakota	2	✓	✓	✓	✗	✗	✗
Oklahoma	2	✓	✗	✗	✗	✗	✗
South Carolina	2	✓	✗	✓	✓	✓	✓
Virginia	2	✓	✗	✗	✓	✗	✗
Arkansas	1	✓	✗	✗	✗	✗	✓
Hawaii	1	✓	✗	✗	✗	✗	✗
Idaho	1	✓	✗	✗	✗	✗	✗
Louisiana	1	✓	✗	✗	✗	✗	✓
Maryland	1	✗	✗	✗	✗	✗	✗
Minnesota	1	✓	✗	✗	✗	✓	✗
Mississippi	1	✗	✗	✗	✗	✗	✓
New Mexico	1	✓	✗	✗	✗	✗	✗
Oregon	1	✗	✓	✗	✓	✓	✓
South Dakota	1	✗	✗	✗	✓	✓	✗
Alaska	0	✗	✗	✗	✗	✗	✗
Connecticut	0	✓	✗	✗	✗	✗	✗
Delaware	0	✗	✗	✗	✗	✗	✗
Iowa	0	✓	✗	✗	✗	✗	✗
Kansas	0	✗	✗	✗	✗	✗	✗
Maine	0	✓	✗	✗	✗	✗	✗
Montana	0	✓	✗	✗	✗	✗	✗
Nevada	0	✓	✗	✗	✗	✓	✗
Rhode Island	0	✓	✗	✗	✗	✗	✓
Vermont	0	✗	✗	✗	✗	✓	✗
Washington	0	✗	✓	✗	✗	✓	✓
Wyoming	0	✗	✗	✗	✗	✓	✓

Note.

Figure created from data on Table 3 from Howley & Howley (2016). States are ordered by frequency of programs.

Figure 2: *Topics Identified by Research for TDHH Increased Training*

Participation and Interaction of Deaf and Hard-of-Hearing Students in Inclusion Classroom
Alasim, K. N. (2018)

- Collaboration strategies
- Sharing knowledge about Deafness
- Fostering inclusion- communication, interactions, and participation

Are we hammering square pegs into round holes? An investigation of the meta-analyses of reading research with students who are d/Deaf or hard of hearing and students who are hearing, the researchers argue that these instructional strategies also should effectively support d/Dhh children's reading development. Wang, Y. E., & Williams, C. (2014).

- Evidence-based strategies that target instructional methods: Code-based skills, Comprehension, Vocabulary, Fluency Morphology, etc

Successful students who are deaf or hard of hearing and culturally and/or linguistically diverse in inclusive settings. Ayantoye, C. A., & Luckner, J. L. (2016)

- Building relationships and the use of human resources
 - Integration of technology resources
 - Incorporation in extracurricular activities
- Fostering positive interpersonal relationship skills
 - Social Responsibility
 - Organizational skills

Social Skills as a Predictor of Postsecondary Outcomes for Individuals Who Are Deaf. Cawthon, S. W., Caemmerer, J. M., Dickson, D. M., Ocuto, O. L., Ge, J., & Bond, M. P. (2015).

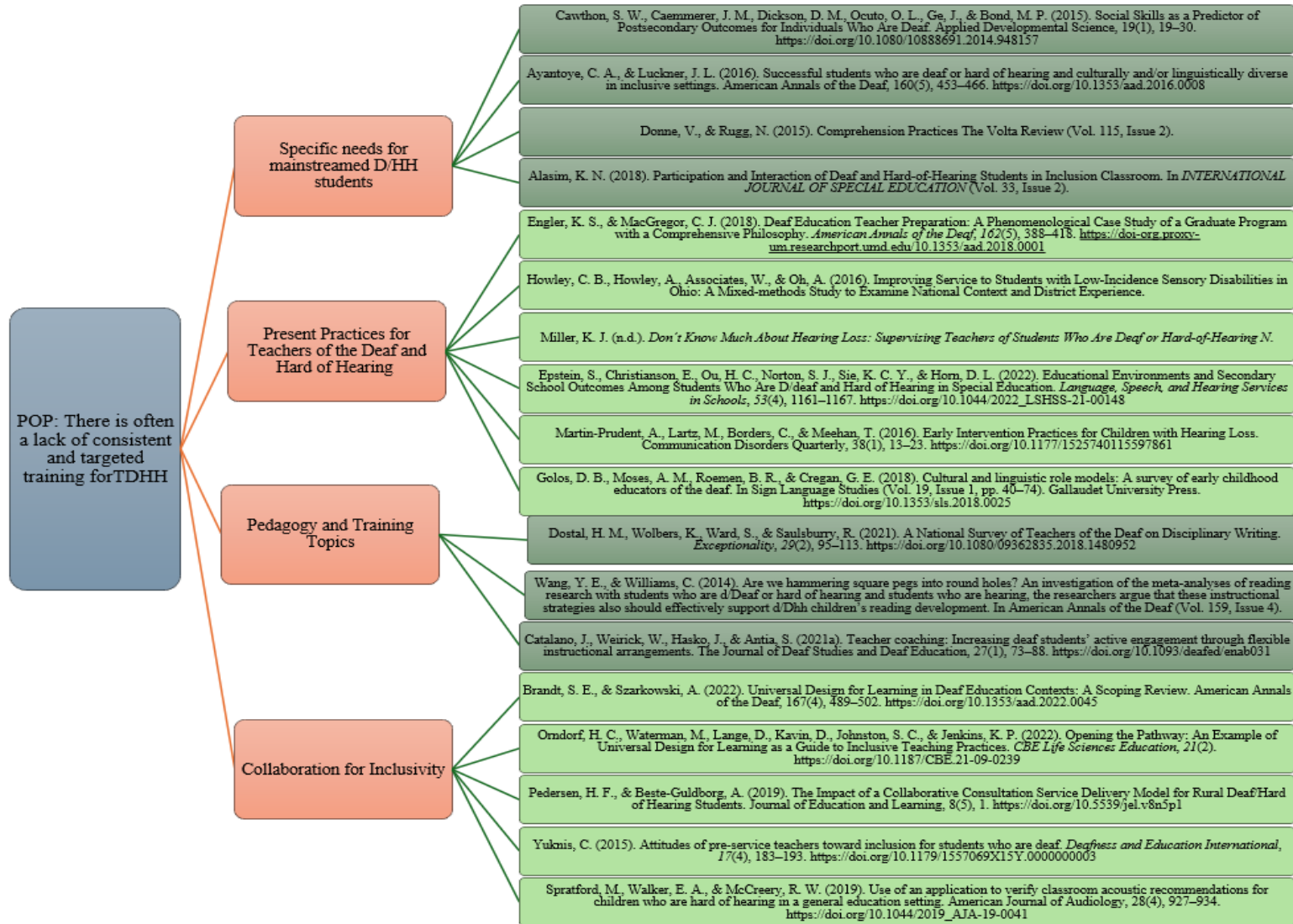
- Social skills for high school D/HH students
- Communication strategies between parents and teachers
 - Communication strategies
 - Social experiences
 - Provision of role models

Comprehension Practices The Volta Review
Donne & Rugg, (2015)

- Pre-reading strategies
- Comprehension strategies
- Various forms of graphic organizers

<p>Universal Design for Learning in Deaf Education Contexts: A Scoping Review. Brandt, S. E., & Szarkowski, A. (2022).</p>	<ul style="list-style-type: none"> • Incorporating UDL elements
<p>The Impact of a Collaborative Consultation Service Delivery Model for Rural Deaf/Hard of Hearing Students. Journal of Education and Learning Pedersen, H. F., & Beste-Guldborg, A. (2019).</p>	<ul style="list-style-type: none"> • Collaborative Consultation (CC)
<p>Teacher Coaching: Increasing Deaf Students' Active Engagement through Flexible Instructional Arrangements. Catalano, J., Weirick, W., Hasko, J., & Antia, S. (2022)</p>	<ul style="list-style-type: none"> • Flexible instructional arrangements
<p>Opening the Pathway: An Example of Universal Design for Learning as a Guide to Inclusive Teaching Practices. Orndorf, H. C., Waterman, M., Lange, D., Kavin, D., Johnston, S. C., & Jenkins, K. P. (2022)</p>	<ul style="list-style-type: none"> • UDL principles application <ul style="list-style-type: none"> • Collaboration • Case based learning
<p>Use of an application to verify classroom acoustic recommendations for children who are hard of hearing in a general education setting. Spratford, M., Walker, E. A., & McCreery, R. W. (2019).</p>	<ul style="list-style-type: none"> • Classroom Acoustics • Acoustic Technology • Integration of Assistive Technology • Collaborative methods for sharing acoustic information.
<p>Attitudes of pre-service teachers toward inclusion for students who are deaf Yuknis, C. (2015).</p>	<ul style="list-style-type: none"> • UDL framework • Collaboration • Least Restrictive Environment

Literature Map



Bibliography

- Alasim, K. N. (2018). Participation and interaction of deaf and hard-of-hearing students in inclusion classrooms. *International Journal of Special Education*, 33(2), 493–506.
- Alasim, K. (2021). Inclusion and d/Deaf and hard of hearing students: A qualitative meta-analysis. *International Journal of Disability, Development and Education*, 70(6), 1120–1146. <https://doi.org/10.1080/1034912X.2021.1931818>
- Aristotle. (350 BCE). *De anima* (J. A. Smith, Trans.). <http://classics.mit.edu/Aristotle/soul.html>
- Ayantoye, C. A., & Luckner, J. L. (2016). Successful students who are deaf or hard of hearing and culturally and/or linguistically diverse in inclusive settings. *American Annals of the Deaf*, 160(5), 453–466. <https://doi.org/10.1353/aad.2016.0008>
- Johns Hopkins Medicine. (2022, December 15). *Bone conduction hearing aids*. <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/baha--the-implantable-hearing-device>
- Brandt, S. E., & Szarkowski, A. (2022). Universal design for learning in deaf education contexts: A scoping review. *American Annals of the Deaf*, 167(4), 489–502. <https://doi.org/10.1353/aad.2022.0045>
- Bruce, S., DiNatale, P., & Ford, J. (2008). Meeting the needs of deaf and hard of hearing students with additional disabilities through professional teacher development. *American Annals of the Deaf*, 153(4), 368–375. <http://www.jstor.org/stable/26234533>
- Catalano, J., Weirick, W., Hasko, J., & Antia, S. (2021a). Teacher coaching: Increasing deaf students' active engagement through flexible instructional arrangements. *The Journal of Deaf Studies and Deaf Education*, 27(1), 73–88. <https://doi.org/10.1093/deafed/enab031>

- Cawthon, S. W., Caemmerer, J. M., Dickson, D. M., Ocuto, O. L., Ge, J., & Bond, M. P. (2015). Social skills as a predictor of postsecondary outcomes for individuals who are deaf. *Applied Developmental Science, 19*(1), 19–30.
<https://doi.org/10.1080/10888691.2014.948157>
- Centers for Disease Control and Prevention. (2021). *Annual data: Early Hearing Detection and Intervention (EHDI) program*. <https://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html>
- Charles Michel de l'Épée. (n.d.). *Encyclopedia of World Biography*. Encyclopedia.com.
Retrieved March 11, 2025, from <https://www.encyclopedia.com/history/encyclopedias-almanacs-transcripts-and-maps/charles-michel-de-l-epe>
- Cordano, R. (2023, January 9). *A charter and a champion: The meaning of Lincoln's legacy at Gallaudet: Office of the president*. Gallaudet University. <https://gallaudet.edu/president/a-charter-and-a-champion-the-meaning-of-lincolns-legacy-at-gallaudet/>
- Donne, V., & Rugg, N. (2015). Comprehension practices. *The Volta Review, 115*(2).
- Dostal, H. M., Wolbers, K., Ward, S., & Saulsbury, R. (2021). A national survey of teachers of the deaf on disciplinary writing. *Exceptionality, 29*(2), 95–113.
<https://doi.org/10.1080/09362835.2018.1480952>
- Encyclopedia Britannica. (n.d.). *Deaf history*. <https://www.britannica.com/science/deaf-history>
- Engler, K. S., & MacGregor, C. J. (2018). Deaf education teacher preparation: A phenomenological case study of a graduate program with a comprehensive philosophy. *American Annals of the Deaf, 162*(5), 388–418. <https://doi.org/10.1353/aad.2018.0001>
- Epstein, S., Christianson, E., Ou, H. C., Norton, S. J., Sie, K. C. Y., & Horn, D. L. (2022). Educational environments and secondary school outcomes among students who are

- D/deaf and hard of hearing in special education. *Language, Speech, and Hearing Services in Schools*, 53(4), 1161–1167. https://doi.org/10.1044/2022_LSHSS-21-00148
- Gallaudet University. (2022, June 1). *The impact of the Deaf President Now protest - the Deaf President Now (DPN) protest*. <https://gallaudet.edu/museum/history/the-deaf-president-now-dpn-protest/the-impact-of-the-deaf-president-now-protest/>
- Gallaudet University. (2022, July 29). *Language and identity in the 1800s: Deaf students denied use of sign language*. <https://gallaudet.edu/museum/exhibits/history-through-deaf-eyes/language-and-identity/language-and-identity-in-the-1800s-deaf-students-denied-use-of-sign-language/>
- Gallaudet University. (2022, August 4). *Events leading up to DPN - the Deaf President Now (DPN) protest*. <https://gallaudet.edu/museum/history/the-deaf-president-now-dpn-protest/events-leading-up-to-dpn/>
- Gallaudet University. (2022, August 24). *American Sign Language, a language recognized: Awareness, access, and change*. <https://gallaudet.edu/museum/exhibits/history-through-deaf-eyes/awareness-access-and-change/american-sign-language-a-language-recognized/>
- Gallaudet University. (2022, August 26). *I. King Jordan's account of the DPN protest - the Deaf President Now (DPN) protest*. <https://gallaudet.edu/museum/history/the-deaf-president-now-dpn-protest/i-king-jordans-account-of-the-dpn-protest/>
- Gallaudet University. (2024, March 7). *Gallaudet's 150-year history all began with a chance encounter - celebrating 150 years!* <https://gallaudet.edu/museum/celebrating-150-years/gallaudets-150-year-history-all-began-with-a-chance-encounter/>

- Golos, D. B., Moses, A. M., Roemen, B. R., & Cregan, G. E. (2018). Cultural and linguistic role models: A survey of early childhood educators of the deaf. *Sign Language Studies, 19*(1), 40–74. <https://doi.org/10.1353/sls.2018.0025>
- Hands & Voices. (2023). *What is Total Communication (TC)?* Hands & Voices. <https://handsandvoices.org/comcon/articles/totalcom.htm>
- Howley, C. B., Howley, A., WordFarmers Associates, & Oh, A. (2016). *Improving service to students with low-incidence sensory disabilities in Ohio: A mixed-methods study to examine national context and district experience* (Subgrant No. R-21494). Ohio Department of Education, Office for Exceptional Children. <https://eric.ed.gov/?id=ED570178>
- Luft, P. (2017). What is different about deaf education? The effects of child and family factors on educational services. *Journal of Special Education, 51*(1), 27–37. <https://doi.org/10.1177/0022466916660546>
- Martin-Prudent, A., Lartz, M., Borders, C., & Meehan, T. (2016). Early intervention practices for children with hearing loss. *Communication Disorders Quarterly, 38*(1), 13–23. <https://doi.org/10.1177/1525740115597861>
- Maryland State Department of Education. (2025, June 24). *Blueprint special education workgroup final recommendations*. <https://www.marylandpublicschools.org/stateboard/Documents/2025/0624/Special-Education-Workgroup-Final-Recommendations-A.pdf>
- Mayo Foundation for Medical Education and Research. (2025, April 4). *Hearing aids: How to choose the right one*. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/hearing-loss/in-depth/hearing-aids/art-20044116>

- Mayo Foundation for Medical Education and Research. (2024, April 26). Cochlear implants. Mayo Clinic. <https://www.mayoclinic.org/tests-procedures/cochlear-implants/about/pac-20385021>
- Miller, K. J. (2015). Don't know much about hearing loss: Supervising teachers of students who are Deaf or hard-of-hearing. *Journal of Special Education Leadership*, 28(1), 14–24. https://doi.org/10.1044/2019_AJSLP-IDLL-19-0003
- National Deaf Center. (2025, March 19). *Deaf awareness*. <https://nationaldeafcenter.org/resources/deaf-awareness/>
- National Association of the Deaf. (2025). *FAQ: Community and culture*. <https://www.nad.org/about-us/faq/>
- Orndorf, H. C., Waterman, M., Lange, D., Kavin, D., Johnston, S. C., & Jenkins, K. P. (2022). Opening the pathway: An example of universal design for learning as a guide to inclusive teaching practices. *CBE—Life Sciences Education*, 21(2). <https://doi.org/10.1187/cbe.21-09-0239>
- 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*, 8(5), 1. <https://doi.org/10.5539/jel.v8n5p1>
- Pyfers, L. (2020, October). *Deaf history - Europe*. Deaf History - Europe → Deaf Education. <https://deafhistory.eu/index.php/deaf-history/deaf-education>
- Individuals with Disabilities Education Act. (2018, May 25). *Sec. 300.8 Child with a disability*. <https://sites.ed.gov/idea/regs/b/a/300.8>
- Spratford, M., Walker, E. A., & McCreery, R. W. (2019). Use of an application to verify classroom acoustic recommendations for children who are hard of hearing in a general

education setting. *American Journal of Audiology*, 28(4), 927–934.

https://doi.org/10.1044/2019_AJA-19-0041

UNMC Today. (2022, August 29). Cultural competency in serving the deaf has come a long way. *Newsroom*. <https://www.unmc.edu/newsroom/2002/03/29/cultural-competency-in-serving-the-deaf-has-come-a-long-way/>

Wang, Y. E., & Williams, C. (2014). Are we hammering square pegs into round holes? An investigation of the meta-analyses of reading research with students who are d/Deaf or hard of hearing and students who are hearing. *American Annals of the Deaf*, 159(4).

World Health Organization. (2025, February 26). *Deafness and hearing loss*.

<https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>

Yuknis, C. (2015). Attitudes of pre-service teachers toward inclusion for students who are deaf.

Deafness and Education International, 17(4), 183–193.

<https://doi.org/10.1179/1557069X15Y.0000000003>