SUPPORTING TEACHERS OF STUDENTS WHO ARE DEAF PLUS: PERCEPTIONS IN PROVISION OF SUPPORTS AND RESOURCES

by

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ABSTRACT

Literature about educational experiences of students who are deaf or hard-of-hearing with accompanying disabilities (deaf plus) and those who teach them is limited. Extant literature reveals that teachers have limited knowledge of effective practices in the education of students who are deaf plus. Broader educational literature links perceived lack of knowledge and skills to teach students with disabilities to negative teacher attitude, which can impact student outcomes. Educational research has also found that provision of support to teachers of students with disabilities improves teacher attitude and perception of effectiveness. Therefore, gaps in knowledge and skills of teachers of students who are deaf plus may result in such students not receiving an appropriate or effective education. Furthermore, appropriate provision of teacher support may positively impact the experience of teachers and students who are deaf plus. This national survey of teachers educating students who are deaf or hard-of-hearing (DHH) investigated teacher access to supports and resources when teaching students who are deaf plus. Participants responded to whether 29 supports and resources were needed when teaching students who are deaf plus and whether they were available in their teaching assignment. All but one support was reported as needed by at least 70% of participants. Several items perceived as needed by large percentages of participants, such as feeling supported by families of students or by administrators and consultation with additional personnel such as speech-language pathologists or paraprofessionals, were also perceived by large

percentages of participants to be available. Discrepancies in provision of supports were identified when items were reported as needed but not available. The largest identified discrepancies pertained to supports related to training needs, meetings, and extra time for planning instruction. The impact of factors such as experience teaching, significance of disability, teacher effectiveness, and inservice training on perception of need and availability of supports was also investigated. Perceptions of participants are not representative of every teacher of students who are deaf plus and, therefore, findings are not intended for direct application to schools and programs. Rather, outcomes provide a template upon which supervisors and teachers can discuss needs and availability.

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CHAPTER 1

INTRODUCTION

Students who are deaf or hard-of-hearing (DHH) comprise a heterogeneous population but share a common need for specialized instruction. They often do not develop language skills, such as listening, speaking, and/or signing, without exposure to specific strategies that make language accessible (Fiedler, 2001; Spencer & Marschark, 2010). One subgroup of students who are DHH includes children and youth who have one or more disabilities concomitant to their hearing loss. Various labels have been used in the educational literature to refer to this group of students. Although not an exhaustive list, some common terms include: (a) deaf or hard of hearing with "multiple," "additional," or "concomitant" disabilities or conditions (Allen, 1992; Borders & Bock, 2012; Bruce, DiNatale, & Ford, 2008; Daneshi & Hassanzadeh, 2007; Ewing & Jones, 2003; Guardino, 2008; Holden-Pitt & Diaz, 1998; Jones & Jones, 2003; Karchmer & Mitchell, 2003; Knoors & Vervloed, 2003; Luckner & Carter, 2001; Mauk & Mauk, 1998; McCain & Antia, 2005; Powers, Elliott, Patterson, & Shaw, 1995; Wiley, Arjmand, Meinzen-Derr, & Dixon, 2011); (b) "Deaf with disabilities" (Laurent Clerc National Education Center, n.d.); and (c) "deaf plus" (Beams, 2012). The term "deaf plus" is used throughout the remainder of the paper to represent this distinct population.

Students who are deaf plus are as varied as the population of students who are

DHH (Jones & Jones, 2003; Jones, Jones, & Ewing, 2006). Concomitant disabilities range from mild to severe and can impact all domains of development: cognitive, physical, emotional, behavior, attention, and language (Flathouse, 1979; Luckner & Carter, 2001). Overly general or vague descriptions of individuals who are deaf plus can hinder appropriate conceptualization of the complexity that exists in the group.

Reported prevalence of concomitant disabilities in students who are DHH ranges from one-fourth to one-half (Bruce et al., 2008; Guardino, 2008; Luckner & Carter, 2001; Picard, 2004; Schildroth & Hotto, 1996; Soukup & Feinstein, 2007; Spencer & Marschark, 2010), and there is some indication among researchers that the number of children who are deaf plus is increasing (Picard, 2004; Robertson, Howarth, Bork, & Dinu, 2009; Schildroth & Hotto, 1996; Spencer & Marschark, 2010). In 2008, Guardino stated that although the incidence of students who are deaf plus had increased, focused research on such students had declined. This is problematic due to the need for evidence-base practices in education (Council for Exceptional Children, 2017). Scholars in the field have identified sparse published research as a barrier to the appropriate and effective education of students who are deaf plus (Guardino, 2008; Jones & Jones, 2003; Luckner & Carter, 2001; Mauk & Mauk, 1992; Spencer & Marschark, 2010). Factors in extant literature that hinder the effective education of students who are deaf plus include the following: (a) complexity in identification of disabilities accompanying hearing loss, and assessment of individual students' strengths and deficits (Bond, 1984; Flathouse, 1979; Luckner & Carter, 2001; Mauk & Mauk, 1992; Roth, 1991); (b) sample bias in demographic surveys (Mitchell, 2004; Moores, 2001); (c) influence of historical aspects on current educational practices (Mauk & Mauk, 1992; Roth, 1991); (d)

misunderstandings of how legal concepts impact educational practices (Mauk & Mauk, 1992; Roth, 1991); (e) lack of knowledge of educational strategies with an evidence-based of effectiveness (Luckner & Carter, 2001); and (f) gaps in knowledge, skills, and acceptance of professionals to teach this distinct student population (Borders & Bock, 2012; Luckner & Carter, 2001).

Students who are deaf plus have the same rights to appropriate education as do other students with disabilities. This includes access to the general curriculum across a continuum of placements with typically developing peers and highly qualified teachers knowledgeable in evidence-based practices that target the educational needs resulting from their hearing loss and accompanying disability. They also have the same rights to specialized communication strategies known to be effective with students with hearing loss and classroom environments and strategies that allow for access to instruction and communication with peers. This review of the literature addresses the following: (a) prevalence, identification, and categorization of students who are deaf plus; (b) information from national surveys of students who are deaf plus; (c) historical contributions to current educational practices with students who are deaf plus; (d) legal and policy aspects regarding the education of students who are DHH and deaf plus; (e) current educational practices of students who are deaf plus; (f) preparation of educators to meet the needs of students who are deaf plus; and (g) educator attitude and perception of self-efficacy when teaching students who are deaf plus.

Prevalence, Identification, and Categorization of Students Who Are Deaf Plus

There exists a wide range in prevalence reports of accompanying disabilities in individuals with hearing loss. Identification and disability labeling practices play a large role in how students who are deaf plus are counted in student population prevalence reports. This section includes the following: (a) reported prevalence of individuals who are deaf plus, (b) challenges in identification of students who are deaf plus, and (c) categorization and labeling of concomitant disabilities.

Reported Prevalence of Individuals Who Are Deaf Plus

Prevalence statistics of students who are deaf plus reported in the literature range from 25 to 51% of students who are DHH (Bruce et al., 2008; Guardino, 2008; Luckner & Carter, 2001; Picard, 2004; Schildroth & Hotto, 1996; Soukup & Feinstein, 2007; Spencer & Marschark, 2010). Schildroth and Hotto (1996) concluded that at least 8% of students who are deaf plus have two or more disabilities concomitant to their hearing loss. Pollack (1997) reported that multiple disabilities occur three times as often in the population of students who are DHH than occur in the hearing student population. One explanation for this is that several etiologies that result in hearing loss also cause delays in other domains such as motor or intellectual areas (Mauk & Mauk, 1992; Pollack, 1997). In addition, Robertson et al. (2009) found a 73% prevalence of infants who are deaf plus in their investigation of extremely premature infants who are DHH.

The majority of studies reporting prevalence of students who are deaf plus cited the Gallaudet Research Institute Annual Survey (GRI Survey) as their source. The GRI Survey, begun in 1968, is a source of national demographic data for students who are

DHH receiving Individual Education Program (IEP) services, and includes concomitant disability prevalence. GRI Survey results are reported annually by academic school year. Ten recent reports are available to the public online—the 1999-2000 school year through the 2009-2010 school year, excepting the 2008-2009 school year (GRI, 2001, 2002, 2003a, 2003b, 2005a, 2005b, 2006, 2007, 2008, 2011). For the purposes of this review, a report is referenced in the text using the end date of the school year; for example, the 1999-2000 report is referred to as the 2000 report. In the 10 years of GRI Survey reports available online, the prevalence of concomitant disabilities in students who are DHH ranged from 38.9 - 51.4%, a difference of 12.5 percentage points (GRI, 2001, 2002, 2003a, 2003b, 2005a, 2005b, 2006, 2007, 2008, 2011). This may have contributed to the range in reported prevalence in the literature. Table 1.1 includes prevalence data. Picard (2004) referenced prevalence data from another source, the Center for Disease Control, reported by Van Naarden, Decouflé, and Caldwell (1999 as cited in Picard, 2004) who found a 30% prevalence of at least one accompanying disability in addition to deafness. Although not specific to the United States, Fortnum and Davis (1997) reported data from a long-term epidemiological study in the East Midlands of England and found that 38.7% of individuals who are DHH had a concomitant disability.

Challenges in Identification of Students Who Are Deaf Plus

Identification of additional disabilities in students with hearing loss is challenging (Bruce et al., 2008; Guardino, 2008; Jones & Jones, 2003; Luckner & Carter, 2001; Moores, 1987; Picard, 2004; Roth, 1991; Schein & Miller, 2008). For example, accurate auditory assessment in young children with disabilities is often more complex than is

hearing assessment in children who are typically developing (Jones & Jones, 2003). Other factors that confound identification include the following: (a) varying definitions, (b) "diagnostic overshadowing" (Szymanski & Brice, 2008, p. 2031), and (c) historical factors.

An example of how definitions can complicate the identification of concomitant disabilities in students who are DHH is the legal definition of learning disabilities. In the Individuals with Disabilities Education Act (IDEA; 2004), the definition of learning disabilities specifically excludes identification of students who are DHH with a learning disability if their learning deficits are an outcome of hearing loss (Mauk & Mauk, 1992; Roth, 1991). However, the law gives no guidance on how to determine whether learning disabilities result from a hearing loss. Another challenge to identification of additional disabilities is diagnostic overshadowing that occurs when observed deficits are attributed to a known disability when in reality they stem from a separate, unidentified disability. For example, autism is identified more often in children with normal hearing than in children who are DHH (Vernon & Rhodes, 2009). Observable behaviors that flag a concern regarding possible autism may be similar to behaviors that are characteristic of children with hearing loss (Szymanski & Brice, 2008). Finally, historically, students with hearing loss were frequently misdiagnosed as having either mental retardation or emotional/behavioral disorders (Lane, 1992; Moores, 2001; Puchir, 2010; Roth, 1991). This historical factor contributes to reluctance on the part of some deaf educators to identify accompanying disabilities in students who are DHH (Mauk & Mauk, 1992; Moores, 1987; Roth, 1991). In summary, this historical factor, diagnostic overshadowing, and varying definitions complicate accurate and timely identification of disabilities

concomitant to hearing loss.

Categorization and Labeling of Concomitant Disabilities

Concomitant Disability Data

The GRI Survey collected data on concomitant disability type. Comparison of data across years reveals that percentages of students with some concomitant disabilities have remained stable, whereas others have increased or decreased. Comparison is challenging because the list of disabilities from which respondents could select changed across survey years. The 2000, 2001, 2002, and 2003 GRI Surveys included the following: (a) low vision, (b) legal blindness, (c) learning disability, (d) mental retardation, (e) attention deficit disorder, (f) emotional disturbance, (g) cerebral palsy (CP), and (f) other conditions (GRI, 2001, 2002, 2003a, 2003b). Additional categories added to the 2004 GRI Survey included the following: (a) developmental delay, (b) autism, (c) orthopedic impairment (replaced CP), (d) traumatic brain injury, and (e) other health impairment (GRI, 2005a). Table 1.2 includes data from the 2006 to 2010 reports because other than a few exceptions, disability category labels remained consistent across those years. Exceptions include speech/language impairment as an option on the 2005 through 2007 school years (GRI, 2005b, 2006, 2007). Low vision and legal blindness shifted to visual impairment and deaf-blindness for only the 2007 and 2008 school years (GRI, 2007, 2008). Usher syndrome, a condition that results in adventitious deaf-blindness, was added to the 2010 survey (GRI, 2011). The following percentages were reported on the most recent GRI Survey summary available (2009-2010 school year): (a) no additional conditions, 61.1%; (b) other conditions, 8.5%; (c) mental retardation, 8.3%;

(d) learning disability, 8.0%; (e) other health impairment(s), 5.8%; (f) ADD/ADHD, 5.4%; (g) developmental delay, 5.3%; (h) orthopedic impairment, 4.4%; (i) low vision, 3.8%; (j) emotional disturbance, 1.8%; (k) legal blindness, 1.7%; (l) autism, 1.7%; (m) traumatic brain injury, 0.3%; and (n) Usher syndrome, 0.2% (GRI, 2011).

Functional Abilities Assessment of Students Who Are DHH

Categorical data alone do not provide a complete picture of a student's abilities and limitations (Bunch, 1987; Karchmer & Allen, 1999). There is heterogeneity among individuals with the same categorical disability label. Additionally, concomitant disability label data do not account for students who are DHH with no identified accompanying disability, but who also do not function at the same level as their typically developing DHH peers. Based on this consideration, an inquiry about functional abilities and limitations across designated domains as observed in students who are DHH was initiated on the 1998 GRI Survey. Nine domains were assessed: (a) thinking/reasoning, (b) attention, (c) social interactions/behavior, (d) expressive language, (e) receptive language, (f) vision, (g) use of hands, arms, and legs, (h) balance, and (i) overall physical health. The functional assessment was included as part of the GRI Survey until 2003. Survey summaries included the percent of students with functional limitations in each of the nine domains. This data set is reported in Table 1.3.

Karchmer and Allen (1999) analyzed data from the initial year the functional assessment was part of the GRI Survey and discovered that it revealed complexities about students who are DHH and deaf plus not found in categorical disability data. They found a large difference in the percentage of students reported to have functional limitations

compared to the percentage of students reported to have a disability concomitant to hearing loss. For example, according to categorical disability data, 25.8% of students who are DHH had one or more disabilities concomitant to hearing loss, whereas functional assessment data the same year showed that 64.5% of students who are DHH had a functional limitation in one or more of nine designated developmental domains. The comparison can be observed in Table 1.1. Most students were reported to have functional limitations in two or more domains, and 6% of students were functionally limited in seven or more domains. This may be an indication that some students were more involved, and accordingly, may have had more educational needs. Based on the disparity between these two reporting methods, it can be concluded that the prevalence of concomitant disabilities in students who are DHH drawn from surveys of disability label alone presents a limited view of the educational needs of students who are deaf plus. However, functional limitation data are no longer gathered in the survey, and therefore, its potential to broaden understanding of this population of students is no longer available. Reasons why the functional assessment is no longer included are not known.

Categorization and Labeling for Educational Services Eligibility

As part of the eligibility process for special education services, students are assigned to at least one of 14 eligibility categories: autism, deaf-blindness, deafness, developmental delay, emotional disturbance, hearing impairment, intellectual disability, multiple disabilities, orthopedic impairment, other health impairment, specific learning disability, speech or language impairment, traumatic brain injury, and visual impairment including blindness. Borders and Bauer (as cited in Rudelic, 2012) reviewed

Individualized Education Plans (IEP) of 64 students receiving audiological services and found that assigned disability categories impacted services received. The frequency of services with a Speech-Language Pathologist (SLP) was greater for students categorized as hearing impaired when compared to the frequency of SLP services for students with speech or language impairment and intellectual disability determinations. They also discovered that over a span of 5 years, five students identified as having a speech or language impairment had a change in categorization to hearing impairment. For four of the five students, the change in categorization resulted in a change in the frequency of SLP services (Rudelic, 2012).

If more than one eligibility category is listed on an IEP, students can have primary and secondary designations. Jones and Jones (2003) found that determination of placement and programming for students who are deaf plus has frequently been based on the disability category considered primary. It follows that determination of which disability will be primary versus secondary in students who are deaf plus is likely to impact their educational experience, and therefore, suggests that teams carefully consider whether their determination has potential to negatively impact a student's education.

In IDEA (2004), a student is appropriately categorized as having multiple disabilities when the combination of concomitant impairments "causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments" (IDEA regs, 300.A.300.8(c)(7)). There are students who are deaf plus who have disabilities that cannot be addressed individually and in isolation of the other because the disabilities interact to create unique needs different than those that exist in the education of students with either hearing loss or another disability.

These students are appropriately labeled as students with multiple disabilities (D'Zamko & Hampton, 1985; Flathouse, 1979; Jones, 1984; Jones et al., 2006; Moores, 2001; R. van Dijk, Nelson, Postma, & J. van Dijk, 2010). Alternatively, when either the hearing loss or additional disability is mild, and, with appropriate supports, a student can be accommodated in a program that addresses either deafness or the other disability, a categorization of multiple disabilities would not be appropriate (Knoors & Vervloed, 2003; Spencer & Marschark, 2010). Such students may have a primary categorical eligibility of hearing impairment or deafness or their concomitant disability.

Jones (1984) disagreed with the disability labeling practices for students who are deaf plus. He stated that although educational categorization by disability is beneficial in demographic surveys, it does not provide useful information about educational needs and may hinder determination of appropriate educational services. Placement decisions should be based on educational needs rather than on disability category. He summarized several classification systems found in the literature for the population of students who are deaf plus that are not based on disability category. These systems incorporated groupings based on the severity of the needs that result from the combination of disabilities (e.g., students with severe educational needs versus mild educational needs). He further proposed that categorization include a description of strategies that would benefit the student, such as environmental modifications, personnel needs, instructional strategies, and method of language instruction. He concluded that because disability labels do not appropriately convey the needs of students who are deaf plus, an improved system of categorization that includes information about educational needs has potential to increase the appropriateness of placement decisions and, therefore, positively impact

the quality of education of students who are deaf plus.

Information From National Surveys About Students Who Are Deaf Plus

There are three federally supported annual national surveys that yield information regarding educational elements of students who are DHH and deaf plus. These sources include the following: (a) the IDEA-mandated Part B and Part C Annual Child Count (Child Count), (b) the National Deaf-blind Census (DB Census), and (c) the Gallaudet Research Institute Annual Survey of Deaf and Hard of Hearing Children and Youth (GRI Survey). Each source differs in type of data collected and the proportion of the population represented. Although it can be argued that none of the sources completely represents the population of students who are DHH or deaf plus, the information they provide is the best available. Other than the DB Census, which is the primary source of placement data for students who are deaf-blind, the GRI Survey is the only source of placement data by additional disability category for students who are deaf plus. Placement data of each source are discussed in the following sections and included in the Appendix. To enable the comparison of data across sources, data from the 2009-2010 school year is reported, even if for some sources more recent data are available.

Child Count

Since the inception of the Education for All Handicapped Children Act (EHA) in 1975, an annual count of students with disabilities receiving special education services has been mandated by law. The amount of federal funding allocated to programs is based on the count. Because it is mandated and impacts funding, participation of programs in

the survey is the highest compared to the DB Survey or GRI Survey. Child Count reaches a larger proportion of the population of students with hearing loss than the GRI Survey (Karchmer & Mitchell, 2003). In the 2009-2010 school-year, the number of students with hearing loss was 37,828 on the GRI Survey whereas the Child Count number was 79,431 students. All Child Count data are reported as aggregate; however, some information (e.g., age, educational environment, exit, and discipline information) can be sorted by disability category. Educational placement data for students with hearing loss can be found in Child Count data. The Child Count requires an unduplicated tally of students receiving special education services, and only one primary disability can be reported. Therefore, information on educational placements specific to students who are deaf plus is not available from the Child Count database. Although more recent Child Count data are available to the public online, Table 1.4 includes Child Count placement data for the 2009-2010 school year, because this is the most recent school year available in the GRI Survey.

Deaf-Blind Census

The Deaf-blind Census (DB Census) has been conducted since 1986 and gathers information on students, birth to 21, who are deaf blind. The 1986 revision of EHA Part D outlined a requirement that deaf-blind projects be established in each state, with federal funding allocated to do so, and participation in the DB Census is mandated as part of each state's federally funded deaf-blind project. The DB Census counts more students with deaf-blindness and gathers more detailed information on individuals who are deaf-blind than either the Child Count or GRI Survey. The DB Census provides no separate

information for students who are DHH with concomitant disabilities other than visual impairment. DB Census placement data from 2009 are in Table 1.5.

GRI Survey

This survey began in 1968 and is managed by the Gallaudet University Research Institute. Data are gathered on students who are DHH receiving special education services. Unlike the Child Count and DB Census, participation in the GRI Survey is not connected to funding and, therefore, not all programs serving students with hearing loss are motivated to participate. Karchmer and Mitchell (2003) discovered that compared to Child Count numbers, GRI survey data represented approximately 60% of students who are DHH, pre-K to 12th grade, receiving special education services. Also based on Child Count data, Mitchell (2004) applied a weighted statistical analysis of GRI Survey data from 1997 and found that the GRI group included a lower proportion of students who are Caucasian and a higher proportion of students with the following characteristics: (a) profound hearing loss, (b) use sign language communication, (c) educated in separate schools, (d) lower socio-economic status, and (e) English not spoken in the home. This sampling bias delimits generalization of GRI survey statistics to the whole population of students who are DHH; however, the GRI survey is the only source for the detailed information it collects and, therefore, its findings are applicative (Mitchell, 2004). In the published summaries of the survey online, educational setting and services data are reported for the whole group of students who are DHH. Although they are not found in reports available online, data sorted by concomitant disability label for the 2009-2010 school year were obtained via specific request (K. Lam, personal communication,

December 18, 2012). These data are included in Table 1.6.

These three national surveys report data on students who are DHH, and they include minimal information about students who are deaf plus. Educational settings and services (e.g., school and classroom type, peer characteristics, related services received) of students who are deaf plus remains unknown with the exception of data from one school year that was obtained when requested. Lack of access to this information limits understanding of educational experiences of students who are deaf plus.

Historical Contributions to Current Educational Practices With Students Who Are Deaf Plus

Current educational practices emanate from historical approaches and methods. A review of historical educational approaches with students who are deaf plus enhances understanding of current methods. Discussion includes historical foundations of the following, as they relate to students who are DHH and deaf plus: (a) preparation of teachers, (b) educational placements and program offerings, (c) gaps in efficacy of educational approaches, and (d) approaches for language instruction.

Historical Preparation of Teachers

In the United States, programs to train teachers in the education of students with hearing loss were established as early as the late 1800s. The first federal funding for teacher preparation, instituted in 1961, targeted teachers of students who are DHH (Brownell, Sindelar, Kiely, & Danielson, 2010). Brownell et al. (2010) wrote a detailed historical review of personnel preparation in special education in the latter part of the 20th century. They stated that prior to 1980, teachers were prepared categorically; they

received training specific to disability categories. This was called the categorical era of personnel preparation in special education (Brownell et al., 2010). The expectation was that special educators would teach only the group of students for whom they had received training to teach. During the categorical era of personnel preparation, teachers of students who are DHH received training specific to students with hearing loss. They did not typically teach students who were deaf plus because they had limited exposure to or knowledge of teaching strategies for accompanying disabilities, and, therefore, they were ill-prepared to meet the educational needs of such students (Johnson, 2004). Therefore, although the categorical era was effective in preparing teachers with specialized skills to meet the needs of a specific group of students, it created a paradigm of reluctance in teachers to teach students with eligibility labels different from the one in which training was received (Blanton, Pugach, & Florian, 2011; Flathouse, 1979). This orientation was further ingrained because teacher credentialing was also categorical; teachers held licensure to teach only a specified population of students. In the 1980s, personnel preparation in special education moved to a noncategorical model, and, in the 1990s, to an integrated model of teacher training and education of students with disabilities (Brownell et al., 2010). Personnel preparation in deaf education, however, has remained categorical.

Historical Educational Placements and Program Offerings

In 1817, 150 years before the 1975 passage of the Education for all Handicapped Children Act (now IDEA), the American School for the Deaf was founded in Hartford, Connecticut, with a combination of state, federal, and private funding. By the year 1900,

50 states had established schools for the deaf (schools for the specific education of students with hearing loss, separate from schools educating hearing students, and that typically included residential facilities). In 1864 and 1865, also prior to EHA, two college-level educational programs for students with hearing loss were established with congressional financial support; the first is now known as Gallaudet University, and the other is the National Technical Institute of the Deaf (NTID) at the Rochester Institute of Technology. During this era for establishment of programs and separate schools for the deaf, students with hearing loss were not educated solely in separate settings; in 1848 in Maryland, there was a mainstream placement for deaf students (Stinson & Kluwin, 2003).

A paradigm existed during the mid-20th century that teachers in separate schools for the deaf were not equipped to address the needs of students with hearing loss and intellectual disability. In 1952, MacPherson (as cited in Anderson & Stevens, 1969) stated that students who were DHH with intellectual disability should, therefore, be educated in separate settings of their own, with teachers specially trained to adequately meet their needs. However, there is little information regarding establishment and accessibility of these separate settings. As of at least 1972, students who were deaf plus were not eligible for education in separate schools for students who are DHH (Ewing & Jones, 2003; Jones & Jones, 2003; Vernon & Rhodes, 2009). Rather, they were educated separately from their DHH peers in settings with students whose diagnoses matched their accompanying disability and who were hearing (Ewing & Jones, 2003). When Ewing and Jones (2003) reported this finding, they questioned the effectiveness of this placement practice because teachers in those settings had knowledge of educational strategies that

addressed the disability but not of strategies related to the unique language needs of students with hearing loss.

The Kendall Demonstration Elementary School (KDES) at Gallaudet University has a federal mandate to be a national model school for the education of students who are DHH. In 1981, the Special Opportunities Program (SOP) was developed to address the needs of students who are deaf plus (Owner, 1982). Program options differed by age of student, but services were offered in self-contained, resource room, or transitional placements with a curricular focus on socialization, communication, emotional development, preacademic, academic, behavior, functional skills, community skills, and prevocational skills training.

In 1987, Bunch delineated the hearing and disability status of possible peers of students who are deaf plus: (a) peers who are DHH without accompanying disabilities, (b) peers who are hearing with disabilities that match their concomitant disability, (c) peers who are deaf plus with matching concomitant disabilities, and (d) peers who are deaf plus with accompanying disabilities that don't match. Other than program summaries in Owner (1982) and Bunch (1987), there is limited evidence that students who are deaf plus with severe multiple disabilities were educated in settings with peers with hearing loss, with or without accompanying disabilities. It is, therefore, unclear to what degree students who are deaf plus with severe multiple disabilities have benefited from teachers with deaf education training.

Historical Gaps in Efficacy of Educational Approaches

In March, 1964, the U. S. Secretary of Health, Education and Welfare organized an Advisory Committee on the Education of the Deaf (ACED). The committee's directive was to investigate deaf education practices of that time and determine strategies to improve the education of deaf students (Babbidge & AACED, 1965). The ACED summary, known as the Babbidge Report (1965), found discouraging academic outcomes including limited provision of early intervention services, low-ranked performance on college entrance exams, and limited occupational opportunities after transition from high school. Gaps were attributed to a lack of systematic educational programming for students with hearing loss and a failure to attack the problem of deaf students' language learning through quality research (Babbidge & ACED, 1965). Twenty-three years later, Congress initiated a follow-up investigation. In 1988, the Commission on the Education of the Deaf (COED) also found gaps and observed low outcomes for students who are DHH.

A finding of the ACED committee germane to this discussion was that the education of students with hearing loss and concomitant disabilities was an "almost untouched field" (Babbidge & ACED, 1965, p. xvii). Therefore, despite the long-standing presence of deaf education in the United States, student outcomes were poor and resources were not aligned to address the needs of students who are deaf plus.

Historical Approaches for Language Instruction

Historically, there has been a division among deaf educators regarding how to approach language instruction for optimal educational outcomes of students who are

DHH (Lang, 2003; Spencer & Marschark, 2010). Although multiple approaches have been implemented, two main paradigms are reviewed in this chapter: (a) the auditory-oral approach, and (b) the bilingual-bicultural approach.

The auditory-oral perspective promotes early and intensive habilitation services designed to strengthen speaking and listening skills through the use of amplification to maximize residual hearing. Aligned with the framework of the medical model of disability (Reagan, 1995), efforts are focused on correcting the impairment and rehabilitating individuals to function as persons without disabilities (Oliver, 1996). Students are initially educated in separate environments specifically focused on habilitation of listening skills, then, when they are able to comprehend auditory information, they transfer to an inclusive educational setting with peers who do not have hearing loss (Schwartz, 1996).

The bilingual-bicultural approach is based on a culture-linguistic model (Reagan, 1995), and deafness is viewed through the lens of minority language and culture, not of disability (Ladd, 2003; Woll & Ladd, 2003). This method of language instruction values benefits obtained from association with culturally Deaf individuals and prepares students for inclusion in that community. Early and intensive services facilitate visual language development and orient family members who do not have hearing loss to the culture, beliefs, and attitudes of the Deaf community. Students are educated in settings that allow maximum exposure and access to teachers and peers who use the manual communication system used by Deaf community members.

Professionals educating students who are DHH have frequently debated preferred approaches. Although communication methodology is a prime consideration in

determining appropriate educational programming for students who are DHH, the process of determining an appropriate approach can be more complicated for a student who is deaf with disabilities. For example, a student who is deaf plus may require accommodations to access either spoken language or formal manual communication systems or may need an individualized communication approach based on individual needs (Jones, 1984; R. van Dijk et al., 2010). Originally, children who are deaf plus were not included in candidacy for cochlear implants because their acquisition of listening and spoken language skills with cochlear implants was slower and less complete compared to children with no concomitant disabilities. Candidacy no longer excludes students who are deaf plus and professionals communicate to families the unique and slower rate of skill acquisition observed in this population (Beer, Harris, Kronenberger, Holt, & Pisoni, 2012; Zaidman-Zait, Curle, Jamieson, Chia, & Kozak, 2015).

Legal and Policy Aspects Regarding the Education of Students Who Are DHH and Deaf Plus

With noted gaps in what is known about the education of students who are DHH and deaf plus, a review of salient laws and policies clarify appropriate practices in the education of students who are deaf plus. Four legal aspects are included here: (a) the right to a free and appropriate public education, (b) continuum of placements, (c) least restrictive environments, and (d) the standard of qualified deference.

Free and Appropriate Public Education

A key component of the IDEA (2004) is the right of students with disabilities to receive an education provided by public education entities via public funds with no

requirement for families to pay for services. The educational services are to be appropriately designated to meet individual needs such that a student receives academic and social benefit. This mandate is known as a Free and Appropriate Public Education (FAPE). The "free" and "public" requirements of FAPE are easier to distinguish than is the requirement for an appropriate education which is "appropriate." Cypress-Fairbanks I.S.D. v. Michael F. (1997) upheld a district court decision that incorporated the testimony of Christine Salisbury, Ph.D., who identified a four-part test for whether an Individual Education Plan (IEP) is appropriate, or "reasonably calculated to provide a meaningful educational benefit under the IDEA" (District court proceedings, para. 1): (a) individualization of the education program is drawn from assessment results and student performance data; (b) takes place in the least restrictive environment; (c) implementation of services happens through a coordinated team; and (d) benefits, both academic and non-academic, are apparent.

The first special education case to go to the Supreme Court was related to FAPE and involved a student with hearing loss. In the Board of Education of the Hendrick Hudson Central School District v. Rowley (1982), the parents' request for an interpreter for their child in first grade was denied by the school, and the decision was upheld by multiple hearing officers. Both the United States District Court for the Southern District of New York and the United States Court of Appeals for the Second Circuit reversed the decision based on their determination that Rowley was not receiving FAPE. Although she was making better than average academic progress when compared to her peers, they decided that she would have been able to make more progress had she not been deaf. Therefore, the requested interpreter could provide her the opportunity to achieve her

educational potential. However, the Supreme Court of the United States interpreted FAPE as a provision of educational benefit and not a mandate to maximize potential and accordingly reversed the decision of the appellate court. This key Supreme Court decision continues as the basis for interpretation of special education legal cases related to FAPE. The Rowley decision assumes that the Least Restrictive Environment mandate is in place (Thomas & Rapport, 1998).

Continuum of Placements

EHA (1975) mandated that a "continuum of alternative placements" (IDEA, 2004, Sec. 300.115) be available to students with disabilities that will "meet their unique needs" (34 C.F.R. § 300.116). Anastasiou and Kauffman (2011) clarified that an educational placement is not simply the physical aspects of the selected classroom or setting, but includes the arrangement of services available in the setting. A continuum of placements assumes a wide array and combination of services, accommodations, physical environments, and access to teachers with specified training and designated peers. In Brimmer v. Traverse City Area Public Schools (1994), a local hearing officer supported a school's determination of change in placement; however, the district court overturned the decision based on several procedural violations of IDEA on the part of the school, one of which was insufficient evidence of assessment of the students' needs. Although the ruling was procedural, the case included substantive commentary regarding the importance of consideration of a student's needs, abilities, and potential when placement decisions are made. This ruling has particular application in determination of placement for students with complex needs, including students who are deaf plus. However, Jones and Jones

(2003) stated that the prevailing determinant of placement for students who are deaf plus is primary disability label.

Specialized language needs of students who are DHH must be addressed across the continuum of placements (Fiedler, 2001; Moores & Martin, 2006; Spencer & Marschark, 2010), and appropriate placements for students who are deaf plus include not only options that address the unique language needs, but also strategies targeting needs related to the concomitant disability (Brehm, 2010; Flathouse, 1979; Owner, 1982). Jones & Jones (2003) reported that placements that meet all the needs of students who are deaf plus are challenging to find. Frequently, students are accommodated in the program in which they are enrolled, but the appropriate array of services may not be incorporated (Jones & Jones, 2003). Options on the continuum of placements for students who are DHH include classrooms in general, special, or deaf education settings (Rudelic, 2012). Placements in general education settings may be inclusive with students who do not have disabilities; however, in the literature, there is a lack of focus on inclusive educational placements for students who are deaf plus (Rudelic, 2012). Segregated, categorical classes for students with a variety of disabilities may be in general or deaf education settings. Special education services may be provided by special educators who serve as classroom teachers, resource teachers, or itinerant teachers. The continuum also includes separate schools for both students with disabilities and students who are DHH (Fiedler, 2001; Moores & Martin, 2006).

In J.C. v. California School for the Deaf, (2007), the state residential school for the deaf was sued for discrimination when they requested a hearing to change the educational placement of a student who was DHH with autism from the state school for

the deaf to a classroom established to meet the needs of students with autism. Although the student had attended the school for the deaf for at least a decade, the hearing officer supported the school's request, and the student was moved from an educational environment with peers who were DHH to a classroom with peers with whom she could not communicate. A judge in the Federal District Court of Northern California approved a settlement, and the student was reinstated in the California School for the Deaf. As part of the settlement agreement, the state school initiated a separate, self-contained transition classroom for students who are at least 16-years-old and who are DHH with autism.

Least Restrictive Environments

To the greatest extent possible, students with disabilities have the legal right to participate in the general curriculum, programs, and activities, as do their nondisabled peers (IDEA, 2004). With appropriate accommodations of varied intensity, depending on the nature or severity of a disability, students with disabilities can access instruction or social interactions and be appropriately educated in the general education setting. Educational environments are less restrictive when there are opportunities for interaction with nondisabled peers and access to the general education curriculum.

Although federal education law states that students with disabilities should be educated to the maximum extent appropriate with their nondisabled peers (IDEA, 2004), some consider it appropriate for students who are DHH to be educated in separate environments because of their unique language and educational needs (Lang, 2003; Spencer & Marschark, 2010). Spencer and Marschark (2010) stated that separate environments are applicable to students who are DHH irrespective of language

methodology because separate schools exist for both manual and auditory methods.

Stephen Aldersley, who is a chair in the English department at National Technical Institute for the Deaf and an impartial hearing officer adjudicating cases related to IDEA law in the state of New York, emphasized some historical events that elucidate this unique acceptance of separate settings as appropriate placements for educating students who are DHH. He reviewed a 1988 report from the COED, "Toward Equality," which referenced a statement from the U. S. Assistant Secretary of the Office of Special Education and Rehabilitative Services (OSERS), Madeleine Will, promoting the concept of Least Restrictive Environment (LRE) as a core aspect of Public Law 94-142, or EHA. In the same report, based on this statement, the COED urged consideration of the following in determining LRE for students who are DHH: (a) auditory information such as level of hearing loss or functional hearing received from amplification; (b) communication and language preference and needs; (c) academic ability, learning style, and motivation; (d) nonacademic needs such as social, cultural, and emotional; (e) other choices central in deaf education such as mode of communication and educational placement; and (f) family support (Aldersley, 2009). In 1989, Robert Davila replaced Madeleine Will as U. S. Assistant Secretary of Education, OSERS, and in 1992, Davila and Lamar Alexander, U. S. Secretary of Education, expanded the consideration of LRE for students who are DHH. The influence of the COED report is apparent in the elements included in their statement. It reiterated the primacy of access to communication with teachers and peers and also included the following as considerations of LRE: (a) severity of loss and gain from amplification; (b) academic ability; (c) other nonacademic needs such as social, emotional, and cultural; (d) language level; (e) communication preference;

and (f) access to peers and professionals who use that mode. Elements from the Davila and Alexander statement were included in the 1997 reauthorization of IDEA. A specific statement regarding the development of an IEP for students who are DHH has remained a statute in IDEA, 2004:

> The IEP team shall consider the communication needs of the child, and in the case of a child who is deaf or hard of hearing, consider the child's language and communication needs, opportunities for direct communications with peers and professional personnel in the child's language and communication mode, academic level, and full range of needs, including opportunities for direct instruction in the child's language and communication mode. (Title I,B,614,(d),(3),(B),(iv))

Therefore, special education law specifies that educational environments that are least restrictive for students who are DHH may be distinct from students with other disabilities. This mandate, specifying the importance of communication needs, peers, and access for students who are DHH, is also applicable in determining LREs for students who are deaf plus. Siegel (2000) asserted that the target classroom for a student educated with the auditory-oral approach or other listening and spoken language communication options is inclusion in the neighborhood classroom with hearing peers, whereas students who communicate using sign language such as those in bilingual-bicultural programs have more access in a classroom with instruction from teachers who sign and with deaf peers who also sign. Therefore, LRE is differentially dependent on each student's chosen mode of communication. From this perspective, target classrooms for students who are deaf plus may also be different depending on chosen communication modes.

In the early 1980s, in two United States Court of Appeals cases, the courts ruled that although a student could receive a better education with more opportunities in a segregated setting, they upheld the legal preference for the mainstream setting as long as

it provides the student with some educational benefit (Roncker on behalf of Roncker v. Walter, 1983; Springdale School District v. Grace, 1982). Twelve years later, this perspective shifted as evidenced in Brimmer v. Traverse City Area Public Schools (1994), in which the District Court disagreed with a hearing officer's comment about Davila and Alexander's statement that it does "not carry the weight of law and should be treated accordingly." The district court added that "while the policy statement may not have the force of law, the interpretation given a statute by the agency charged with administering it is certainly entitled to substantial deference" (Substantive issues, para. 14). The District Court reiterated that professionals should be wary of any educational placement that does not meet the needs of a student who is DHH. The case specifically mentioned communication needs and stated that a setting that does not address communication needs of a student who is DHH is not the LRE for that student.

Aldersley (2009) stated that in cases involving students who are DHH, decisions regarding educational placement are intricately connected to a child's communication methodology. He reviews three cases illustrating this circumstance: (a) Lachman v. Illinois State Board of Education, 1988; (b) Brougham v. Town of Yarmouth, 1993; and (c) O'Toole v. Olathe District Schools Unified School District, 1998. Lachman v. Illinois State Board of Education (1988) established that parents' rights do not include dictating an educational program that matches their preferred language method implemented in the education of students with hearing loss. In Brougham v. Town of Yarmouth (1993), the court asserted that its role was not to determine the specific language methodology of a student's education, but to follow the standard established in Board of Education of the Hendrick Hudson Central School District v. Rowley (1982) that the legal burden of the

court is to determine whether an IEP has been developed to result in beneficial educational outcomes. In regard to what instructional method is best for the education of students with hearing loss, O'Toole v. Olathe District Schools Unified School District (1998) established that it is "precisely the kind of issue which is properly resolved by local educators and experts" (Exclusion of evidence, para 5). Therefore, a teacher's knowledge and skills in educating students who are deaf plus is germane to the legal and policy discussion of educational placements for this population of students.

The Standard of Qualified Deference

Thomas and Rapport (1998) reviewed 49 educational placement court cases across all circuit courts, and 38 of the cases were decided using the standard of qualified deference. They referenced Board of Education of the Hendrick Hudson Central School District v. Rowley (1982) as a landmark case in the decision that "courts were not viewed as having the specialized knowledge and experience necessary to answer 'persistent and difficult questions of educational policy' (Rowley, 1982, p. 3052)" (p. 67). Rather, IDEA established that IEP teams are responsible for determining appropriate practices and instructional methods and content when developing educational programs to effectively address a student's unique needs.

> In determining appropriate placements…the lower courts must not impose their view of preferable educational practices upon the states. …lower courts were instructed to recognize the expertise of state and local educators and to consider their findings carefully. (Thomas & Rapport, 1998, p. 67)

This is called the "qualified deference standard" (Thomas & Rapport, 1998, p. 66). It follows that if courts are deferring their judgment of appropriate educational programming for students with disabilities to IEP teams, then they rely on the expertise

of professionals on those IEP teams to determine methods and placements that constitute effective educational programs for students. This reinforces the importance of educators and administrators of students who are deaf plus possessing not only knowledge of strategies effective in educating students who are deaf plus, but also knowledge of appropriate placement that give students access to evidence-based practices. However, there are gaps in what is known about effective educational practices for students who are deaf plus, including appropriate assessments, accommodations, placement options, instructional methods, and outcomes (Jones et al., 2006; Knoors & Vervloed, 2003; Luckner & Carter, 2001; Spencer & Marschark, 2010).

Effective Educational Practices Described in the Literature

Students who are deaf plus have specialized and complex educational needs, including language acquisition and communication (D'Zamko & Hampton, 1985; Flathouse, 1979; Jones & Jones, 2003; R. van Dijk et al., 2010). Determination and implementation of appropriate educational services and placement for this portion of the student population includes consideration of the following: (a) language and communication, (b) needs relative to the additional disability, (c) the interaction of disabilities, and (d) cross-disciplinary collaboration (Jones et al., 2006; Owner, 1982; R. van Dijk et al., 2010).

Language and Communication

Guardino (2008) stated that relationships requisite for teaching students who are deaf plus have at their foundation an understanding of deafness and the provision of

accessible language. Although not a complete list, some communication strategies included in the literature for this population of students are: (a) visual sign language, (b) spoken language, (c) auditory habilitation and training, (d) visually perceived elements (e.g., facial expression, body language, gestures), (e) words represented via pictures or print, and (f) Augmentative and Alternative Communication (AAC) systems and devices (Bradley, Krakowski, & Thiessen, 2008; Myck-Wayne, Robinson, & Henson, 2011; R. van Dijk et al., 2010; Vernon & Rhodes, 2009). Programs typically have an array of communication options available; however, the type and amount differs across programs. Jones (1984) acknowledged that when students who are deaf plus are not successful in the acquisition of language learning strategies implemented with typically developing students who are DHH, determination of appropriate placement is challenging. R. van Dijk et al. (2010) explained that when implementing communication strategies with students who are DHH with intellectual disability, consideration of numerous forms of communication is important, ranging from presymbolic to symbolic or formal languages in the child's natural environment. Supporting language acquisition with students who are deaf plus who do not function at a symbolic language level may present a challenge to educators trained only in language strategies at the symbolic level of communication.

Davis, Barnard-Brak, Dacus, and Pond (2010) conducted a meta-analysis to investigate the use of aided Augmentative and Alternative Communication (AAC) systems with students who are deaf plus. The authors categorized communication systems requiring no external equipment (i.e., sign language systems) as unaided AAC, and systems requiring external equipment (i.e., speech generating devices) as aided AAC. Their analysis included 14 studies (see sources in Davis et al., 2010) and a total of 32

participants. Participants' additional disabilities were varied, although the majority were reported to have concomitant intellectual disability or vision loss. Overall, they found the use of aided AAC systems to be effective. Additional findings include the following: (a) of the 32 participants, 72% were over the age of 12, whereas the literature is well established on the effective use of AAC with young students who can hear; (b) AAC was used as a last resort, and thus students may have been able to benefit from the systems if exposed sooner; (c) professionals assumed that the use of aided AAC systems would impede speech development, and yet the general AAC literature does not support that assumption; (d) aided AAC systems were used primarily with students who are deaf plus with low incidence accompanying disabilities and/or intellectual disabilities even though AAC has an evidence base with students with higher incidence disabilities who do not have hearing loss; (e) AAC devices used were limited in type; (f) Sound Generating Devices (SGD) were primarily used, yet students who are DHH have questionable access to the output; and (g) assessments used to determine the need for an AAC device were inadequate.

Needs Relative to the Accompanying Disability

When educating a student who is deaf plus, it is important to consider needs that result from the accompanying disability. Knowledge of evidence-based practices (EBPs) that target educational needs of disabilities other than deafness, including multiple disabilities, and skills in implementing those practices contribute to the effective education of students who are deaf plus. Jones and Jones (2003) identified strategies commonly implemented in special education programs that, from their perspective, may

be less familiar to deaf educators but may be effective in educating students who are deaf plus, including applied behavior analysis, augmentative or alternative communication, positive behavior supports, functional behavior analysis, ecological assessments, and attention to the medical needs of students. Although literature about students who are deaf plus is sparse, a review yielded publications about implementation of the following practices with students who are deaf plus: (a) coteaching or coenrollment classrooms, (b) differentiated instruction, (c) appropriate selection of materials, (d) task analysis, (e) antecedent strategies, (f) preteaching and reteaching, (g) differentiated reinforcement or stimulus shaping and fading, (h) peer-mediated instruction, (i) modeling and video modeling, (j) optimal structuring of educational environments, (k) arrangement of physical environment, (l) multisensory or multimodal teaching methods, (m) sensory integration, (n) clear rules and expectations, (o) positive reinforcement, and (p) social skills training (Bond, 1984; Bradley et al., 2008; Brehm, 2010; Busch, 2012; Elliott et al., 1988; Flathouse, 1979; Jones & Jones, 2003; Litchfield & Lartz, 2002; Luckner, 1999; Mauk & Mauk, 1993; Myck-Wayne et al., 2011; Pollack, 1997; Postsecondary Educational Program Network 2.0 (PEP-Net2), 2012; Powers et al., 1987; Soukup & Feinstein, 2007; Vernon & Rhodes, 2009). These and other EPBs in the areas of collaboration models, instructional modifications, physical supports, and behavior interventions, are defined in Table 1.7.

The Interaction of Disabilities

No single set of instructional practices can meet the complex needs of all students who are deaf plus (Fiedler, 2001). Jones and Jones (2003) identified considerations in the

provision of effective services to students who are deaf plus. They noted that some strategies or equipment (i.e., music for soothing, voice-activated devices) effective in the education of hearing students with disabilities require listening and spoken language skills, and therefore, the extent to which they are effective when used with a student who is deaf plus depends on that student's listening and spoken language skills. Or visual language strategies utilized with students who are DHH may require adaptation when used with a student who is deaf plus who demonstrates atypical visual-motor planning or visual-spatial deficits. Beals (2004) stated that the combination of disabilities of students who are deaf plus may result in needs that are misunderstood by professionals and may lead to poor implementation of strategies. Bradley et al. (2008) acknowledged the challenge of teaching students who are deaf plus with limited available information about how to educate them and reported that some teachers have found success when they've used common sense and discovered what works through trial and error.

Naiman (1982) reviewed a model program for DHH students with additional Intellectual Disabilities (ID) and found that programs and placements in the effective model were individualized, and students had the flexibility to move across classrooms with different focuses as needed. Several studies suggested meeting the needs of students who are deaf plus through a combination of strategies (Ewing & Jones, 2003; Jones & Jones, 2003). For example, strategies implemented with typically developing students who are DHH may be combined either with strategies that target the needs of the concomitant disability (Mauk & Mauk, 1998; Myck-Wayne et al., 2011; Vernon & Rhodes, 2009) or, depending on the severity of the combination of disabilities, with strategies for students with multiple disabilities who are not deaf (Bond, 1984; Flathouse,

1979; Rudelic, 2012; R. van Dijk et al., 2012).

Although an appropriate combination of strategies is suggested in the literature, this approach may not be widely practiced. For example, Jure, Raplin, and Tuchman (1991) reported on placements of students who are DHH with autism. Five of 46 students were educated in placements that included resources to address both the autism and hearing loss; therefore, approximately 90% of students were in placements addressing either the deafness or the autism, with little focus on the other (Jure et al., 1991). This is consistent with Vernon and Rhodes (2009), who reported that IEP teams who made educational placement determinations for students who are DHH with autism chose from limited continuum of placements options, and could choose a setting with strategies and resources and teachers trained to educate students with hearing loss or strategies and resources and teachers trained to educate students with autism, but not both hearing loss and autism.

A student who is deaf plus and placed in a setting that is equipped to either address deafness and not another disability or to address disabilities other than deafness may experience an array of services not sufficient to meet all of their needs (Rudelic, 2012). It is therefore requisite that special educators know how to accommodate deafness and that deaf educators know how to target the needs of accompanying disabilities.

Current paradigms in education may impede effective implementation of services for students who are deaf plus (Jones & Jones, 2003). For example, Roth (1991) suggested that the merging of strategies and techniques known by Learning Disability (LD) specialists and deaf educators approaches an appropriate education of students who are DHH-LD; however, historical practices have separated the two professional

disciplines. As another example, deaf educators are trained to address the needs of students who are DHH but not students with other disabilities, and alternatively, special educators have knowledge to target the needs of students with many disabilities, but they do not know deafness (Jones & Jones, 2003). Flathouse (1979) stated that some students who are deaf plus in programs designated for students with a single disability are at risk of being "unserved" or "underserved" (pp. 562-563). Ewing and Jones (2003) stated that collaboration across disability fields has been found to be an effective approach to the development and adaptation of curriculum for students who are deaf plus.

Cross-Disciplinary Collaboration

Ewing and Jones (2003) stated that cross-disciplinary collaboration is requisite for the successful transition toward the effective education of students who are deaf plus, and that cross- or transdisciplinary collaboration yields more positive outcomes for students than multi- or interdisciplinary collaboration models. Myck-Wayne et al. (2011) conducted a case study with four young students with hearing loss and autism enrolled in early intervention services and found that deaf educators differ in their willingness to participate in cross-disciplinary consultation. They reported that one student's teacher initiated teaming efforts and collaboration across programs occurred. Parents of another student who received no cross-disciplinary services reported that the auditory habilitation therapist working with their child expressed discomfort having the child's Applied Behavior Analysis (ABA) therapist participate in the sessions.

Hwang and Evans (2011) investigated the relationship between teacher attitude and the quality of educator collaboration. They found that although general educators

acknowledged their lack of knowledge and skills in the education of students with disabilities, having other adults in their classrooms and receiving support from others resulted in increased feelings of discomfort. They observed that teachers in new collaborative relationships established rigid agreements regarding how responsibilities would be shared; then, as relationships strengthened, those roles became more relaxed. They concluded that the extent of teaming between special and general educators, as well as clarity of roles, has direct impact on the success of efforts to educate students with and without disabilities in the same classrooms (Hwang & Evans, 2011).

Itinerant educators are in collaborative and consultative teaching roles (Luckner & Ayantoye, 2013; Luckner & Howell, 2002). Borders and Clark-Bischke (2011) described an itinerant teacher as one who travels between educational placements to provide collaborative services with professionals in those settings to meet the needs of students with low-incidence disabilities. Luckner and Ayantoye (2013) described the varied role of deaf itinerant teachers to be one of coteaching, consultation, or direct service to students. The itinerant teacher role may include consultation with professionals or direct instruction with students, based on individual student needs (Foster & Cue, 2009; Luckner & Howell, 2002). Foster and Cue (2009) stated that although more inclusive consultation models have been found to be effective, the majority of deaf educator itinerants' time is spent in a less-inclusive, direct service pull-out model (students are pulled out of their classroom to work with the itinerant teacher). They discussed barriers to more inclusive consultation practices: (a) deaf educators are trained to teach students in separate settings, (b) they lack training in effective collaboration or in the general education curriculum, and (c) they lack time for more inclusive consultation models

(Foster & Cue, 2009). Borders and Clark-Bischke (2011) reviewed the literature on itinerant teachers' collaborative duties and found that good communication, facilitation skills, flexibility, and experience in itinerant teaching or experience in implementation of varied strategies assist them in fulfilling their role.

The majority of articles found in a review of the literature about itinerant teachers of students with hearing loss focused on these teachers' roles in general education classrooms (Foster & Cue, 2009; Luckner & Ayantoye, 2013; Luckner & Howell, 2002; Kluwin, Morris, & Clifford, 2004; Moores, 2008). However, a limited number of studies addressed itinerant educators' experiences with students who are deaf plus (Alturki, 2001; Luckner & Ayantoye, 2013; Luckner & Howell, 2002). Alturki (2001) investigated the prevalence of concomitant disabilities among 1,285 students who are DHH on itinerant teachers' caseloads in Texas. The following concomitant disabilities were reported: (a) intellectual disabilities, 15%; (b) visual impairment, 8%; (c) learning disabilities, 9%; (d) emotional-behavioral disorders, 3%; and (e) other, 8% (e.g., other health impaired, autism, orthopedic impairment, and communication disorders). Luckner and Howell (2002) studied desired training topics of itinerant teachers and found that skills to work with students who are deaf plus was frequently mentioned.

Preparation of Educators to Meet Needs of Students Who Are Deaf Plus

In the various settings across the continuum of placements, students who are deaf plus may be educated by general educators, special educators with specializations other than DHH, or teachers who have training in teaching students who are DHH (Rudelic, 2012). However, there is a distinct paucity of literature that describes preservice

preparation of general educators, special educators, or deaf educators to teach students who are deaf plus. A search of Ebsco Host, ERIC, and Wilson Education databases yielded some evidence of general and special educators receiving exposure to methods effective in teaching students who are DHH (Fiedler, 2001); no publications were found describing preparation of either general or special educators in the area of deaf plus. Although limited, existing studies do investigate the preparation of deaf educators in the area of deaf plus. The following sections detail this extant literature base.

Teacher Licensure and Credentialing

Professional certification on a state level is granted to teachers, and frequently, this teacher licensure is a requirement for employment. All states excepting three (i.e., Washington, D.C., Montana, and New Mexico) offer a specific licensure to teach students who are DHH; however, states differ in licensure requirements for deaf educators. This is germane to the topic because states individually determine what elements are needed in preservice preparation programs to effectively prepare deaf educators to teach students who enter their classrooms. Across states, any combination of the following may be requisite: (a) designated university coursework; (b) specified number of hours in a teaching practicum or internship; (c) letters of recommendation; or (d) a passing score on a national, state, or local test. Licensure to teach students who are DHH may be a stand-alone credential, or it may be an endorsement added on to either a general education (early childhood/K-12) or special education (grade level/age/mild-moderate or moderate-severe) credential. Six states offer a credential specific to language methodology (i.e., auditory-oral or sign language).

Preservice Deaf Education Program Coursework and Experiences

One might speculate that coursework offered in a deaf education preservice program might differ, depending on the department that houses the program. For example, a teacher who graduated from a program within a department of special education may enter the classroom with knowledge of special education practices such as individualized education plans, whereas a teacher who graduates from a program in a department of communication disorders may have knowledge of speech acoustics. A review of personnel preparation programs across the United States found variances in which departments or colleges within universities offer degree programs focused on preparing educators of students who are DHH. The following categories were identified: (a) special education (16 programs); (b) deaf education (14 programs); (c) education (11 programs); (d) communication disorders (9 programs); (e) combinations of these (13 programs); or (f) others such as educational psychology, human services, or educational leadership.

Harrison (2007) asked 47 teachers of students who are DHH in northwestern states in the United States if their preservice teacher training program directly and effectively addressed practices for instructing students who are deaf plus. Seventy-four percent of teachers surveyed responded that their program did not. Borders and Bock (2012) reviewed coursework offered in 42 higher education programs identified as preparing teachers of students who are DHH. Less than 30% of programs offered a course addressing behavior or classroom management, 30% offered a class in additional disabilities, and just fewer than 70% of programs included a class that taught methods or interventions, either academic or behavioral, not explicitly focused on or directed to

students with hearing loss. They also reported that six of the 42 programs (14%) offered classes in all three of the categories delineated whereas 26% offered none of them.

Dodd and Scheetz (2003) investigated specific elements of coursework teachers received related to teaching students who are deaf plus. They found that just under 80% were in undergraduate and/or graduate programs that did not address motor and self-help for students with severe disabilities, 92% had been in programs in which life skills were not addressed, 77% had been in programs that did not include elements related to teaching academics to students who are deaf plus, and 48% did not learn about individualizing content for students who are deaf plus. Despite these statistics, 71% reported that their teacher preparation programs had been effective in preparing them to fulfill the responsibilities of their current teaching positions. This means that slightly less than one third (29%) did not feel they had sufficient preparation.

Council on Education of the Deaf Program Accreditation

The Council on Education of the Deaf (CED) certifies deaf education personnel preparation programs in up to six specializations or areas of focus: (a) elementary, (b) secondary, (c) early childhood, (d) parent-infant, (e) bilingual/bicultural, and (f) multiple disabilities. In 2002, Jones and Ewing reported that 9 of 46 programs had a CED approved specialization in teaching students who are DHH with multiple disabilities. They compared this finding to a similar study in 1986 by Israelite and Hammermeister that captured changes in CED certification or specialization over the almost 2-decade span between the two studies. There was an increase in programs with a specialization in Early Intervention/Early Childhood (up 6%), Elementary (up 21%), and Secondary (up

14%). However, programs specializing in preparing educators to teach students who are deaf plus decreased by 5%. In the same study, Jones and Ewing (2002) surveyed the 46 deaf education personnel preparation programs with CED accreditation at the time of the study. Programs reported the types of settings that students had participated in during practicum experiences. Only 6 of the 282 reported practicum placements (2%) were in settings for students with multiple disabilities.

Priority in Higher Education to Address Challenges in Teaching Students Who Are Deaf Plus

LaSasso and Wilson (2000) surveyed directors of 70 university programs that prepared teachers of students who are DHH, as identified in the American Annals of the Deaf publication, and asked them to rank by importance areas of knowledge desired in potential faculty. Nineteen of the 31 respondents rated working with students who are deaf plus as being the first or second most desired area of knowledge. The National Center on Low-Incidence Disabilities conducted an online, convenience-sample survey of parents, professionals, administrators, and higher education faculty about training and research needs in deaf education. Survey results revealed that out of 39 options, meeting the needs of student who are deaf plus was ranked third by professionals and first by university faculty (Luckner, Goodwin-Muir, Johnson-Howell, Sebald, & Young, 2005).

Inservice Training Needs Related to Teaching Students Who Are Deaf Plus

Rosen (2009) surveyed 856 professionals in jobs related to educating students who are DHH in the United States during the 2003-04 school year and inquired about the

participants' professional development needs. Fifteen percent of respondents had bachelor's degrees, 72% had master's degrees, and 11% had doctorate degrees. Just over half of respondent were teachers (53.4%), and the others were administrators (18.15), support staff (13.0%), faculty/professors (5.6%), interpreters (0.5%), or in other professions (9.5%). The subject of additional disabilities in students with hearing loss was among the eight most popular professional development topics. Sixty-one percent of respondents selected it, making it the second most popular topic surmounted only by technology in education with a selection rate of 62%. Luckner and Hanks (2003) reference the unpublished 1983 dissertation of J. L. Johnson who found that 1 of 10 most frequently reported stressors for teachers of students who are DHH was preparing lessons and materials for students who had wide variations in abilities.

Knowledge of Evidence-Based Practices

Two studies investigated preparation of teachers of students who are DHH to teach students with specified accompanying disabilities. Borders and Bock (2012) studied deaf educators' knowledge of strategies found to be effective with students with autism spectrum disorders. Slightly less than half of the teachers surveyed were not familiar with the evidence-based practices included on the survey. Soukup and Feinstein (2007) surveyed deaf educators regarding their preparation to teach students who are DHH-LD. Surveyed teachers reported that they lacked training in appropriate assessment and instructional methods for this population of students. Thirty-three percent of participants felt prepared or very prepared to teach students who are DHH-LD, whereas half of surveyed teachers reported that they were somewhat or not well prepared. Forty percent

of participating teachers reported that their graduate training included elements of working specifically with students who are DHH-LD, and 24% were in undergraduate programs that did.

Based on findings in the literature, preservice training programs in deaf education vary in the extent to which they focus on preparation of educators to teach students who are deaf plus, and the majority of programs do not include discussion of strategies effective in the education of students who are deaf plus. However, deaf educators have students who are deaf plus in their classrooms; Borders and Bock (2012) surveyed deaf educators and found that more than 50% of them had had in their classrooms or on their caseloads students identified with the following disability categories: (a) speech language delay, (b) other health impaired, (c) specific learning disability, (d) cognitively impaired, (e) emotionally disabled, (f) autism spectrum disorder, and (g) orthopedic impairments. Soukup and Feinstein (2007) reported that teachers trained to teach students who are DHH with learning disabilities are few in number, and when teachers are inadequately prepared to address the needs of atypical learners, motivation to educate such students wanes.

Educator Attitude and Perception of Self-Efficacy When Teaching Students Who Are Deaf Plus

Researchers have posited that in addition to knowledge and skills, effective teaching of students who are deaf plus requires a positive, accepting attitude toward such students (Luckner & Carter, 2001; Soukup & Feinstein, 2007). Because the continuum of placements for students who are deaf plus may include classrooms in general, special, and deaf education programs, attitude of any such teachers is applicable. However, the

degree to which general, special, and deaf educators possess a positive attitude to meet the specialized needs of students who are deaf plus is unclear, due, in part, to a paucity of research specific to teachers of students who are deaf plus. For the most part, empirical investigation of educator attitude regarding students with disabilities has focused on general education teachers during an era of increased representation of students with disabilities in inclusive settings (de Boer, Pijl, & Minnaert, 2011; Cook, Cameron, & Tankersley, 2007; Cullen, Gregory, & Noto, 2010; Gal, Schreur, & Engel-Yeger, 2010; Hwang & Evans, 2011; Shippen, Crites, Houchins, Ramsey, & Simon, 2005; Sze, 2009). International research was included in this review of the literature based on assumptions that teacher attitude toward students with disabilities can be generalized across educational settings that implement inclusive practices, and that the education of students with disabilities in classrooms with nondisabled peers has occurred internationally. Increased transition of students with disabilities into regular classrooms with non-disabled peers directly impacted teachers who had general education training that did not typically prepare teachers with the specialized skills to meet the needs of students with disabilities (Hwang & Evans, 2011). Teachers of students who are deaf plus are likely to experience similar challenges based on findings in the literature that they lack knowledge of effective practices to meet the needs of students who are deaf plus. It follows that similarities can be drawn between general educators who teach students with disabilities and general, special, or deaf educators who teach students who are deaf plus.

There is evidence of a gap between theory and practice in literature about educator attitude; more general educators are supportive of the idea of including students with disabilities in classrooms with nondisabled peers than they are of actually having

these students in their classrooms (Cook et al., 2007; Hwang & Evans, 2011; Sze, 2009). Some researchers applied Bandura's (1982) relationship between self-efficacy and behavior (individuals are not likely to persist in activities if they believe they lack requisite ability or knowledge and skills) to discussions of educator attitude about teaching students with disabilities (Buell, Hallam, Gamel-Mccormick, & Scheer, 1999; Sze, 2009). Based on reports in the literature that teachers do not feel they have sufficient training in the effective education of students who are deaf plus, it follows that teachers may not have a positive orientation to teaching these students. However, a teacher's lack of knowledge and skills does not relieve teachers of the responsibility to educate students who are deaf plus who are appropriately placed in their classrooms (Hunt & Goetz, 1997). Only one empirically-based study was found in the literature that examined teacher attitude about teaching students who are deaf plus, and it was published in 1969, prior to the passage of Public Law 94-142, or EHA (Anderson & Stevens, 1969). Participants included 43 administrators of residential schools for students who are DHH and 150 teachers of students who are DHH with intellectual disabilities (DHH-ID). Eighty percent of the responding teachers had professional certification to teach students who are DHH, 13% had certification to teach students with intellectual disability, and 11% had dual certification. Similar to studies reviewed in the previous section on teacher training needs, this study found that the types of additional training desired by the largest majority of teachers were coursework and practica in teaching students with intellectual disability. Administrators (n=43) were asked about factors they considered in selection of teachers for students who are DHH-ID. The three most frequent responses were the following: (a) teacher was "well-adjusted" (46%), (b) teacher had expressed a preference

to teach such students (56%), and (c) teacher had a "high tolerance for limited educational progress" (72%; Anderson & Stevens, 1969, p. 26). Anderson and Stevens (1969) also found the following about the responding teachers: (a) some felt prepared to teach students who are DHH-ID (40%); (b) many felt they needed more training (86%); (c) some preferred to teach students who are DHH-ID (28%); (d) many preferred to teach students who are DHH, not deaf plus (66%); and (e) many were teaching this population by assignment, not by choice (78%). Thus, large percentages of teachers in the study had not received adequate training to teach students who are DHH-ID, they had not asked to teach them, and they did not want to teach them. Based on the length of time that has elapsed since this study was administered, it is unknown whether these attitudes are still prevalent for teachers of students who are deaf plus.

Shifting of teacher attitude to be more positive toward students with disabilities can be challenging (Gal et al., 2010). Buell et al. (1999) described teacher self-efficacy as a belief that "he or she has the ability to teach the student successfully" (p. 145). Sze (2009) asserted that relationships exist between teacher perceptions of self-efficacy, teacher attitude, and successful education of students with special needs. These assertions are supported by findings in the literature. For example, research has demonstrated that teacher acceptance of students with disabilities correlates with improved student outcomes (Cullen et al., 2010; Forlin, Loreman, Sharma, & Earle, 2009). Furthermore, sufficient access to needed supports and resources as well as knowledge and skills have been found to positively impact teacher attitude and increase general educators' willingness to teach students with disabilities (Buell et al., 1999; Scruggs & Mastropieri, 1996). Two successive studies investigated how perceived access to needed supports and

resources related to self-efficacy when teaching students with disabilities (Werts, Wolery, Snyder, Caldwell, & Salisbury, 1996; Wolery, Werts, Caldwell, Snyder, & Lisowski, 1995). Teachers who rated themselves low in self-efficacy perceived supports and resources to be less available and more needed compared to teachers who rated themselves as more effective.

Several supports and resources for teachers have been identified in the literature. Resources and supports that contribute to positive experiences had by general educators when teaching students with disabilities include the following: (a) adequate class size, (b) adequate funds, (c) information about specific disabilities, (d) preservice and inservice training in effective methods for teaching students with disabilities, (e) accessible physical environments, (f) access to personnel (e.g., specialists, paraprofessionals), (g) some teacher demographics (e.g., younger, more experience), (h) administrator and family support, (i) collaboration (e.g., consultation, lesson planning, problem solving, sharing expertise, service coordination, coteaching), (j) additional structured time for modifying lesson plans and for meetings, and (k) positive past experiences teaching students with disabilities (de Boer et al., 2011; Cook et al., 2007; Gal et al., 2010; Glazzard, 2011; Scruggs & Mastropieri, 1996; Santoli, Sachs, Romey, & McClurg, 2008; Solis, Vaughn, Swanson, & Mcculley, 2012; Sze, 2009; Valeo, 2008). General educators noted the following as challenges when teaching students with disabilities: (a) insufficient knowledge or skills to educate students with disabilities; (b) absence of administrative or systematic leadership or support; (c) severity of disabilities in students; (d) limited resources, e.g., time, funds; (e) focus on standards or academic achievement; (f) past experience of difficulty meeting the needs of students with disabilities; and (g)

resistance from families (Cullen et al., 2010; Gal et al., 2010; Glazzard, 2011; Hwang & Evans, 2011; Scruggs & Mastropieri, 1996; Valeo, 2008).

Although not empirically based, Owner (1982) reported that teachers of students who are deaf plus in the pilot Special Opportunities Program at the Kendall Demonstration Education School at Gallaudet University expressed resistance in their acceptance to teach students who are deaf plus and felt their challenges were significantly different compared to teachers of typically developing students who are DHH. They did not feel they had ample time to attend mandatory meetings and modify instruction and materials. Moreover, they wanted opportunities to share experiences and seek support.

Based on these findings, if teachers of students who are deaf plus have supports and resources (e.g., administrative support, needed funds, training in effective practices, training related to accompanying disabilities, ample time to plan differentiation of instruction, time for meetings, appropriate staffing, or opportunities to share experiences and seek additional support), their readiness and willingness to teach students who are deaf plus may increase. The extent to which these resources are available to or needed by teachers of students who are deaf plus is unknown.

Need for Further Research

Jones and Jones (2003) stated that sparse empirical studies focused on students who are deaf plus have been a barrier to the effective education of such students; however, the lack of effort displayed by professionals in the field to align and mobilize resources to increase what is known about educational programming for these students has been a greater impediment. Extant literature is unclear regarding elements related to

education of students who are deaf plus, including the following: (a) where students who are deaf plus are receiving their education, (b) what they are being taught, (c) how and with whom they are being taught, and (d) who is teaching them. A reported increase in prevalence of students who are deaf plus merits focused research on these students.

Determination of educational needs of a student who is deaf plus is a complex process. This review of the literature revealed that few educational settings are equipped with educators prepared to address needs of students who are deaf plus. Limited documented research focused on educational needs of this population of students further complicates the issue. Practices with an evidence base of effectiveness have not been fully explored.

Categorical teacher preparation of deaf educators and the historical placement of students who are deaf plus in categorical self-contained special education classroom with peers who are hearing, not deaf, may have resulted in deaf educators with narrowly focused expertise and attitudes that they do not share responsibility to educate students who are deaf plus. Little is known about current attitudes of general, special, or deaf educators toward teaching students who are deaf plus because the most recent study conducted on educator acceptance to teach students who are deaf plus took place in 1969.

Due to complex educational needs of this student group and limited educational placements that meet their needs, it is important to support teachers by equipping them with knowledge, skills, and requisite resources as they educate students who are deaf plus. Research has suggested that teachers have not typically been prepared to address the complex needs of students who are deaf plus. This is incongruent with the qualified deference standard implemented in a number of court cases involving decisions about the

appropriateness of educational programming for students with disabilities; the standard is founded on an assumption that professionals participating on IEP teams possess knowledge of strategies effective in the education of the students for whom they are making decisions and knowledge of evidence-based placement options that promote effective education. This standard suggests the importance of considering the extent to which educators have requisite training and skills to effectively teach students who are deaf plus and the degree to which supports are provided if they do not feel they have sufficient knowledge and skills.

Little is known about teachers of students who are DHH and their perceptions of need and the availability of supports and resources when teaching students who are deaf plus. Similar to the Werts, Wolery, Snyder, Caldwell, and Salisbury (1996) and Wolery et al. (1995) studies, research is needed to investigate teacher perceptions of need and availability of supports and resources, teacher perception of severity of disability, and teacher perception of self-efficacy when teaching students who are deaf plus. If educational environments are expected to meet the full range of a student's needs, sufficient support of teachers is an important consideration.

Table 1.1

Percent (%) of accompanying disabilities in students who are DHH or developmental domains with observed limited functioning

	Disability accompanying hearing loss		Functional domains in which limitations were observed	
School-year	None	1 or more	None	1 or more
1998-1999	--	--	35.5	64.5
1999-2000	58.6	41.4	32.1	67.9
2000-2001	58.4	41.6	31.0	69.0
2001-2002	60.1	39.9	29.7	70.3
2002-2003	60.6	39.4	30.3	69.7
2003-2004	60.5	39.5	--	--
2004-2005	57.6	42.4	--	--
2005-2006	51.1	48.9	--	--
2006-2007	48.6	51.4	--	--
2007-2008	60.7	39.3	--	--
2009-2010	61.1	38.9	--	--

Note: The source of this information is the Gallaudet Research Institute Annual Survey, 2000; 2001; 2002; 2003, January; 2003, December; 2005, January; 2005, December; 2006; 2007; 2008; & 2011. The 1998-1999 data are from Karchmer and Allen, 1999.

Table 1.2
Percent (%) of accompanying disabilities in students who are deaf plus

Condition	School-year				Column average
	2005-06	2006-07	2007-08	2009-10	
Speech or Language Impairment	19.5	24.9	--	--	22.2
Intellectual Disability	8.2	8.0	8.7	8.3	8.3
Learning Disability					8.2
Specific Learning Disability	--	8.0	8.3	--	
Learning Disability	8.5	--	--	8.0	
Other condition	6.5	--	9.1	8.5	8.0
ADD/ADHD	5.6	5.1	5.6	5.4	5.1
Other Health Impaired	3.1	3.6	5.2	5.8	4.4
Developmental Delay	3.0	3.8	4.8	5.3	4.2
Orthopedic Impairment	4.0	4.0	4.4	4.4	4.2
Vision Loss					3.6
Visual Impairment	--	3.6	3.8	--	
Low Vision	3.4	--	--	3.8	
Emotionally Disabled	1.9	1.8	2.0	1.8	1.9
Blindness					1.5
Deaf-Blindness	--	1.4	1.6	--	
Legal Blindness	1.5	--	--	1.7	
Autism	1.2	1.3	1.6	1.7	1.4
Traumatic Brain Injury	0.3	0.3	0.3	0.3	0.3
Usher Syndrome	--	--	--	0.2	0.2

Note: The source of this information is the Gallaudet Research Institute Annual Survey, 2001; 2002; 2003, January; 2003, December; 2005, January; 2005, December; 2006; 2007; 2008; & 2011.

Table 1.3
Percent (%) of students who are DHH with teacher-reported limitations in functional skills

Domain	School-year					Column average
	1998-99	1999-00	2000-01	2001-02	2002-03	
Thinking/reasoning	32.9	33.4	34.3	34.9	34.7	34.0
Attention	35.1	36.6	37.7	38.5	38.4	37.3
Social interaction / behavior	27.5	28.7	29.7	30.5	30.5	29.4
Expressive language	45.6	49.4	51.2	52.8	52.5	50.3
Receptive language	46.9	50.5	52.2	53.8	53.2	51.3
Vision	12.5	12.6	12.8	12.9	12.6	12.7
Use of hands, arms, and legs	10.4	11.1	11.6	12.1	12.3	11.5
Balance	8.6	9.3	9.8	10.1	10.3	9.6
Overall physical health	9.5	10.5	10.9	11.3	11.2	10.7

Note: The information for the 2000—2003 school years was drawn from the Gallaudet Research Institute Annual Survey (2001; 2002; 2003, January; 2003, December), whereas the 1999 data are from Karchmer and Allen, 1999.

Table 1.4
Child Count: Percent (%) of students in educational settings
per designated disability

	Autism		Deaf-Blindness	
Educational setting	Ages 3-5 (*n* = 47,165)	Ages 6-12 (*n* = 333,022)	Ages 3-5 (*n* = 216)	Ages 6-12 (*n* = 1,359)
Regular setting: 80% or more time	24.8	37.4	21.8	21.6
Regular setting: 40-79% of time	8.4	18.3	3.7	13.3
Regular setting: 40% or less time	20.5	34.8	13.4	33.3
Separate class	37.9	--	31.5	--
Separate school	5.4	8.0	20.8	19.1
Residential facility	0.05	0.6	0.5	9.9
Service provider location	2.1	--	2.3	--
Private setting (parent placed)	--	0.7	--	0.6
Home	0.9	--	6.0	--
Homebound / Hospital	--	0.3	--	2.3
Correctional facility	--	0.01	--	0.2

Table 1.4 continued

	Developmental Delay		Emotional Disturbance	
Educational setting	Ages 3-5 (*n* = 263,514)	Ages 6-12 (*n* = 104,432)	Ages 3-5 (*n* = 3,346)	Ages 6-12 (*n* = 405,293)
Regular setting: 80% or more time	45.1	45.1	44.8	40.6
Regular setting: 40-79% of time	7.8	20.5	9.3	18.8
Regular setting: 40% or less time	9.2	16.2	23.0	22.2
Separate class	29.8	--	14.4	--
Separate school	3.7	0.9	5.3	13.2
Residential facility	0	0.1	0.2	2.0
Service provider location	1.8	--	1.5	--
Private setting (parent placed)	--	0.6	--	0.2
Home	2.7	--	1.5	--
Homebound / Hospital	--	0.2	--	1.1
Correctional facility	--	0	--	2.0

Table 1.4 continued

	Hearing Loss		Intellectual Disability	
Educational setting	Ages 3-5 (*n* = 8,883)	Ages 6-12 (*n* = 70,548)	Ages 3-5 (*n* = 12,223)	Ages 6-12 (*n* = 460,964)
Regular setting: 80% or more time	34.0	54.6	19.3	17.4
Regular setting: 40-79% of time	7.2	17.0	7.9	26.7
Regular setting: 40% or less time	12.6	14.7	25.7	48.2
Separate class	27.6	--	37.2	--
Separate school	12.8	8.2	6.6	6.3
Residential facility	0.6	4.0	0	0.4
Service provider location	3.2	---	1.9	--
Private setting (parent placed)	--	1.3	--	0.3
Home	2.0	--	1.3	--
Homebound / Hospital	--	0.2	--	0.5
Correctional facility	--	0.1	--	0.3

Table 1.4 continued

	Multiple Disabilities		Orthopedic Impairment	
Educational setting	Ages 3-5 (*n* = 7,855)	Ages 6-12 (*n* = 124,380)	Ages 3-5 (*n* = 7,635)	Ages 6-12 (*n* = 57,930)
Regular setting: 80% or more time	17.5	13.2	39.0	52.2
Regular setting: 40-79% of time	6.1	16.2	5.1	16.3
Regular setting: 40% or less time	24.6	45.5	11.2	23.6
Separate class	27.5	--	29.9	--
Separate school	14.8	19.6	7.0	5.1
Residential facility	1.1	1.9	0.7	0.2
Service provider location	1.5	--	4.2	--
Private setting (parent placed)	--	0.4	--	0.9
Home	6.9	--	3.5	--
Homebound / Hospital	--	0.3	--	2.3
Correctional facility	--	0.01	--	0.2

Table 1.4 continued

	Other Health Impairment		Specific Learning Disabilities	
Educational setting	Ages 3-5 (*n* = 19,537)	Ages 6-12 (*n* = 678,640)	Ages 3-5 (*n* = 14,190)	Ages 6-12 (*n* = 2,483,391)
Regular setting: 80% or more time	41.3	61.4	59.4	63.3
Regular setting: 40-79% of time	8.3	23.8	8.0	26.6
Regular setting: 40% or less time	16.2	10.8	8.2	8.0
Separate class	24.0	--	20.5	--
Separate school	3.0	1.6	0.8	0.6
Residential facility	0.1	0.2	0	0.1
Service provider location	2.3	--	--	0.9
Private setting (parent placed)	--	1.1	2.2	--
Home	4.9	--	0.9	--
Homebound / Hospital	--	0.9	--	0.2
Correctional facility	--	0.3	--	0.4

Table 1.4 continued

Educational setting	Speech or Language Impairment		Traumatic Brain Injury	
	Ages 3-5 (*n* = 342,203)	Ages 6-12 (*n* = 1,107,029)	Ages 3-5 (*n* = 1,041)	Ages 6-12 (*n* = 24,395)
Regular setting: 80% or more time	60.0	86.3	35.9	46.4
Regular setting: 40-79% of time	3.0	5.6	12.1	23.8
Regular setting: 40% or less time	5.8	4.6	11.1	21.5
Separate class	12.0	--	26.8	--
Separate school	0.8	0.3	7.3	5.2
Residential facility	0	0	0.5	0.6
Service provider location	--	3.1	--	0.7
Private setting (parent placed)	15.9	--	2.9	--
Home	2.4	--	3.4	--
Homebound / Hospital	--	0.1	--	1.7
Correctional facility	--	0	--	0.2

Table 1.4 continued

	Visual Impairment	
Educational setting	Ages 3-5 (*n* = 3,442)	Ages 6-12 (*n* = 25,813)
Regular setting: 80% or more time	43.1	62.6
Regular setting: 40-79% of time	6.9	13.5
Regular setting: 40% or less time	10.4	12.0
Separate class	24.0	--
Separate school	9.2	6.2
Residential facility	0.2	3.6
Service provider location	--	1.4
Private setting (parent placed)	2.1	--
Home	4.0	--
Homebound / Hospital	--	0.6
Correctional facility	--	0.0

Note: Child Count educational setting data reported for December 1, 2009. Retrieved from: www.kidscount.org

Table 1.5
Deaf-Blind Census: Percent (%) of students in educational settings

	Deaf-Blind		
Educational setting	Ages Birth-2 (*n* = 624)	Ages 3-5 (*n* = 1,226)	Ages 6-12 (*n* = 7,343)
Regular setting: 80% or more time	--	16.4	11.2
Regular setting: 40-79% of time	--	5.8	7.9
Regular setting: 40% or less time	--	12.2	40.0
Separate class	--	18.5	--
Separate school	--	15.3	21.1
Residential facility	--	1.2	5.8
Private setting (parent placed)	--	--	2.9
Service provider location	2.1	1.1	--
Community-Based setting	5.6	--	--
Home	84.9	15.6	--
Homebound/hospital	--	--	5.5
Other setting	5.4	--	0.0
Unknown / Missing	4.0	13.8	4.9

Note: Deaf-Blind Census educational setting data reported for one day between October and December, 2009. Retrieved from: http://documents.nationaldb.org/products/2009-Census-Tables.pdf.

Table 1.6
GRI Survey: Percent (%) of students in educational settings
per designated disability

	Disability accompanying hearing loss		
Educational setting	No concomitant disability (*n* = 19,741)	ADD/ADHD (*n* = 1,751)	Autism (*n* = 563)
General education setting with hearing peers	64.9	55.1	32.3
Resource room	10.6	18.3	10.5
Self-contained classroom	17.4	23.8	37.8
Special or center school	23.0	31.0	33.5
Home	2.8	0	0
Other setting	3.2	3.3	5.5

Educational setting	Developmental Delay (*n* = 1,728)	Emotional Disturbance (*n* = 574)	Learning Disability (*n* = 6,202)
General education setting with hearing peers	21.3	36.0	62.0
Resource room	7.5	10.6	26.0
Self-contained classroom	38.4	17.1	21.3
Special or center school	34.1	51.2	21.1
Home	10.6	7.0	4.0
Other setting	4.0	4.6	2.8

Table 1.6 continued

	Disability accompanying hearing loss		
Educational setting	Low Vision (*n* = 1,228)	Legal Blindness (*n* = 550)	Intellectual Disability (*n* = 2,691)
General education setting with hearing peers	37.9	28.2	22.3
Resource room	11.3	6.0	7.7
Self-contained classroom	33.2	46.5	49.5
Special or center school	30.1	24.1	30.8
Home	7.2	10.1	2.2
Other setting	4.6	7.7	6.6

Educational setting	Orthopedic Impairment (*n* = 1,422)	Other Health Impairment (*n* = 1,868)	Traumatic Brain Injury (*n* = 106)
General education setting with hearing peers	29.7	41.5	46.4
Resource room	7.9	11.9	15.1
Self-contained classroom	37.6	35.7	41.7
Special or center school	30.3	22.4	16.7
Home	8.5	6.5	3.6
Other setting	4.7	5.6	6

Table 1.6 continued

	Disability accompanying hearing loss		
Educational setting	Ushers Syndrome (n = 49)	Other Conditions (n = 2,735)	Total in survey (n = 37,608)
General education setting with hearing peers	65.9	43.1	57.1
Resource room	19.5	13.3	11.9
Self-contained classroom	36.6	31.9	22.7
Special or center school	24.4	27.5	24.3
Home	0	4.5	3.1
Other setting	2.4	4.6	3.9

Note: GRI Survey educational setting data reported for the 2009-2010 school-year. Retrieved from: K. Lam, personal communication on December 16, 2012.

Table 1.7
Educational practices with evidence-based implementation
with students who are deaf plus

Coteaching or coenrollment classrooms Two credentialed teachers instruct one classroom of students; one may be trained in content and the other in a specialization such as a related services professional or special educator; how responsibilities are shared may differ (Litchfield & Lartz, 2002; Luckner, 1999)
Sensory integration Addresses the sensitivity of students to their environment; sensory needs are assessed; students are provided with opportunities to regulate to environments by slowly increased exposure to or experience with triggers of hyper- or hyposensitivity (Brehm, 2010; Vernon & Rhodes, 2009)
Physical structure of building/ classroom/ setting Physical environment arranged to optimize access for students with physical barriers to learning such as preferential seating (PEPNet2, 2012)
Multisensory teaching methods Instruction and activities that incorporate multiple learning modalities across the senses which may include auditory, visual, tactile, vestibular, olfactory, gustatory, and proprioceptive (Flathouse, 1979)
Differentiated instruction Diversification of how concepts are taught through modification of instruction to fit students' differing needs; for example, modification of the difficulty of material, clarification of instruction, multisensory instruction, alternate assignments, adjustment of goals, simplification of demands, reduction of the length of task, slower or faster rate of instruction, allowance of more time (Bond, 1984; Brehm, 2010; Elliott, Powers, & Funderburg, 1988; Mauk & Mauk, 1993; Jones & Jones, 2003; Postsecondary Educational Program Network 2.0 (PEP-Net2), 2012; Powers, Elliott, & Funderburg, 1987; Soukup & Feinstein, 2007)
Appropriate selection of materials Materials used during instruction are interesting, multisensory, and contain an appropriate level of stimulation such as increased color for students with ADD, less stimulating or complex for students with autism, appropriate contrast for students with vision loss (Bond, 1984; Bradley et al., 2008; Brehm, 2010; Busch, 2012; Elliott et al., 1988; Flathouse, 1979; Soukup & Feinstein, 2007)
Task analysis Routines, songs, skills, etc., reduced to smallest steps; students can learn one step at a time (chunking tasks) and then string those steps together in sequence (chaining tasks) (Bond, 1984; Brehm, 2010; Busch, 2012; Elliott et al., 1988; PEPNet2, 2012; Powers et al., 1987)
Antecedent strategies A learning environment is organized or instruction is planned to enhance learning such as predictable routines, opportunities to make choices, instructional prompts, environmental arrangement, visual supports, visual schedules (Bradley, Krakowski, & Thiessen, 2008; Brehm, 2010; Pollack, 1997)
Preteaching, Reteaching A skill is pretaught before the skill is taught in another context or setting or a skill is taught again after a student has learned it; both allow a student added exposure to concepts taught as well as multiple opportunities to practice (Elliott et al., 1988; PEPNet2, 2012; Powers el al., 1987; Soukup & Feinstein, 2007)

Table 1.7 continued

Peer-mediated instruction A lesson plan involves peers in academic, behavior, communication, or social instruction; benefits include increased opportunities to learn through teaching a peer, reinforced teacher instruction, and increased opportunities to respond (Brehm, 2010; Busch, 2012; Mauk & Mauk, 1993 Myck-Wayne, Robinson, & Henson, 2011)
Differential reinforcement / stimulus shaping and fading As a student evolves their behavior or responses to more closely match a target, only attempts closest to the target are reinforced, while prior, less accurate approximations are no longer reinforced; for example, a preschooler gets a requested item by signing "please"; however, after that child pairs a verbal approximation with a sign, the sign alone no longer results in receipt of the requested item (Bradley et al., 2008; Soukup & Feinstein, 2007)
Modeling and video modeling After a target skill is modeled, a student imitates or approximates the skill, then receives feedback; implemented with both academic and behavior targets; video modeling is when a target skill is modeled on video then watched by the learner; video modeling may incorporate the learner or someone else doing the activity, can be from learner's or others' point of view, can include the whole task or segments of the task; also effective in teaching behavior (Bradley et al., 2008; Soukup & Feinstein, 2007)
Optimal structuring of educational environments Structure of the physical environment supports rather than detracts from instruction such as materials hanging on walls are not too stimulating; Walls, dividers, work areas, and/or visuals are structured to maximize learning, attentiveness, and order, including schedules, expectations, reliable routines that focus on safety and promote a habit of positive interactions (Elliott et al., 1988; PEPNet2, 2012; Pollack, 1997)
Assistive and augmentative communication (AAC) Devices that assist individuals in communication; typically used for individuals who cannot communicate by typical spoken or written means; AAC devices span low tech to high tech; systems may incorporate visual, auditory, kinesthetic, or tactile methods such as picture communication systems, tactile communication, or voice output communication aid (Jones & Jones, 2003)
Positive reinforcement Acceptable behavior is reinforced via receipt of desirable, motivating rewards such as specific/contingent praise, token economies, group contingency, tangible rewards, positive attention (Busch, 2012; Elliott et al., 1988; Powers et al., 1987; Soukup & Feinstein, 2007)
Clear rules and expectations Rules are simple, clear, few in number, posted, explicitly taught with examples, reviewed; ongoing, immediate feedback is provided regarding expectations linked to established rules (e.g., Pollack, 1997)
Social skills training Explicit instruction in social skills is imbedded in the curriculum for all students; appropriate behaviors are explicitly taught and practiced; it is not assumed that students know socially appropriate behaviors; social skills training may include problem-solving, self-regulation or self-discipline, interpersonal skills, turn-taking, sharing, communication, social engagement, interactions, initiating, greeting, talking to peers, imitative vs. spontaneous, scripted, context related, joint attention, initiating play, facial expressions, or response to others' affect (e.g., Bradley et al., 2008; Myck-Wayne et al., 2011; Vernon & Rhodes, 2009)

CHAPTER 2

METHODS

Purpose of the Study

The purpose of this study was to investigate perceptions of preschool or elementary classroom teachers of students who are DHH about supports and resources relative to teaching students who are deaf plus. Participants reported which supports and resources they considered to be necessary when teaching students who are deaf plus, as well as those that were available in their current teaching assignments. This revealed gaps between what teachers felt they needed versus received in their task of teaching students who are deaf plus. Supports and resources included in the study were drawn from the literature on experiences of general and special educators teaching students with disabilities that correlated with positive teacher attitude and improved student outcomes. Results of this study contributed to extant knowledge about the experience of deaf educators who teach students who are deaf plus.

Research Questions

1. What percent of study participants teach at least one student who is deaf plus?
2. What supports and resources do study participants report as being available in their current teaching assignment?

3. What supports and resources do study participants consider to be needed when they teach a student who is deaf plus?
4. Is there a discrepancy between study participants' perceived availability versus perceived need of supports and resources when teaching students who are deaf plus?
5. What are differences in perceived need, perceived availability, or discrepancy measures as a function of the following:
    a. self-perception of effectiveness when teaching a student who is deaf plus?
    b. perception of significance of disability of students taught who are deaf plus?
    c. teaching experience?
    d. amount of coursework?
    e. inservice training?
6. Is there a correlation between self-perception of effectiveness when teaching a student who is deaf plus and training received relative to teaching students who are deaf plus?
7. Which areas of study in preservice programs include coursework related to students with disabilities or students who are deaf plus?

Research Design

This exploratory, descriptive study investigated perceptions of teachers of students who are DHH related to supports and resources they considered to be available in their teaching assignments and needed when they taught students who are deaf plus. A

nonprobability convenience sample of deaf educators were invited to participate in an online survey.

Participants

Teachers of students with hearing loss in the United States may teach in one classroom (e.g., regular or resource classroom teacher) or in multiple classrooms or settings (e.g., itinerant teacher, early intervention home visitor). This study included educators who taught in one classroom or setting because supports and resources differ across multiple settings, and it would be challenging to answer questions about multiple settings. Additionally, educators in middle and high school typically teach more than one class of students, and availability of and need for supports and resources may differ across classes. Therefore, this study focused on preschool or elementary teachers of students who are DHH. To encourage potential for a large response to the survey, teachers of all ages, years of experience, and licensure types were invited to participate. In summary, the target population for the study was teachers in the United States with current teaching assignments as classroom teachers of preschool or elementary students who are DHH. The following entities received inquiries about the size of the target population:

- the Council on Education of the Deaf, a national organization that accredits university programs and provides national professional certification for deaf educators (email to CED on June 30, 2014);
- two experts and prominent researchers in the field of deaf education (personal communication with John Luckner and Pamela Luft in July 2014);

- the Office of Special Education Programs (OSEP) in the U.S. Department of Education (personal communication with Maryanne McDermott in August 2014);
- Gallaudet University Laurent Clerc National Deaf Education Center (personal communication with Anita Gilbert on August 29, 2014);
- Gallaudet Office of Research Support and International Affairs (personal communication with Rowena Winiarczyk in March 2015); and
- Gallaudet Research Press (personal communication with Valencia Simmons in March 2015).

Based on responses from these individuals and organizations, there was no available statistic related to the number of deaf educators in the nation. Therefore, despite efforts to discover a target population size, the number of deaf educators in the nation was unknown. Consequently, no sample size could be calculated, and analysis of the representativeness of the sample was not possible. Based on this discovery, this study identified potential participants from a nonprobability sample.

Selection of a sampling frame began with identification of national professional groups for teachers of students with hearing loss. A request was made to the Council on Education of the Deaf (CED) to distribute a survey to teachers in their organization, and they determined that for confidentiality reasons, they could not release contact information for affiliated teachers. Teachers of students who are DHH are part of the Council for Exceptional Children-Division of Communication Disorders & Deafness (CEC-DCDD) professional community. The chair of the deaf and hard of hearing sub-group of CEC-DCDD was contacted and reported that he was uncertain as to whether surveys could be sent to CEC-DCDD members. The chair, an expert in the field who has

conducted survey research with deaf educators, suggested survey distribution through programs listed in the American Annals of the Deaf (AAD) Journal (personal communication with John Luckner in November 2014). Although the list was not a complete representation of schools and programs that serve students who are DHH, teachers in schools and programs listed in the resource were determined to be a feasible sample frame for this study.

Potential participants were drawn from educators who taught at sites listed in the American Annals of the Deaf Journal (AAD) in a report of schools and programs that serve students who are DHH (Schools and Programs in the United States, 2015). Educators chose to participate in this study when they received a link to the survey from a representative at their school. The April 2015 issue of AAD included a list of 820 schools or programs serving students with hearing loss in the United States with phone numbers and mailing addresses. The majority of programs also included emails and contact persons. Thirty-five programs were not included in the study because they were listed more than once, they were located in Puerto Rico or the Virgin Islands, or their name explicitly stated high school, middle school, or nursery school. Of the remaining 785 programs, 678 programs included an email address. Only programs with emails could be contacted due to a University of Utah Institutional Review Board policy that initial contact with research participants could be by email but not by phone call. Following an internet search, emails were found for 45 of the 107 programs for which emails were not listed. Therefore, an initial email was sent to 723 programs informing them that they could reply to the email and opt out, or they would receive a phone call inviting them to forward a link to a survey to teachers in their programs. An automatic message was

received for 189 programs stating the email was not valid. A response was received from 29 programs. Three programs opted out of the study, six programs stated that teachers they employed did not meet participation requirements or no students with hearing loss were enrolled in their program, and eight programs stated their requirement of internal review for approval of survey research, but due to lengthy timelines of their review and approval process, those programs were not included in the study. Twelve programs requested study information via email in lieu of a phone call, so phone calls were placed to 505 programs. Some program phone numbers were not valid (43 programs), 70 programs were ineligible to participate (i.e., they had no enrollment of students with hearing loss, they did not include students in pre- through elementary school, or they employed teachers in itinerant roles), four programs required internal approval for research and were therefore not included, and 19 programs opted out during the phone call. Following emails and phone calls, 94 programs agreed to send a link to teachers.

As an incentive (Dillman, Smyth, & Christian, 2014), 25 random participants who chose to share their email received a $10 Amazon gift card. At the conclusion of data collection, the recipients were randomly selected and gift cards were distributed electronically. Participating programs were offered a report of study results.

Instrument and Apparatus

An online survey system, Qualtrics, was used to administer the survey and house the data. The online survey tool utilized in this study was adapted from an instrument used to investigate perceptions of special and general educators related to availability and needed supports and resources when teaching students with disabilities (Werts, Wolery,

Snyder, Caldwell, & Salisbury, 1996; Wolery et al., 1995). A member of the above research team, Dr. Mark Wolery, was contacted, and permission was granted to adapt the survey to deaf educators teaching students who are deaf plus and to retain the format and most of the wording of the questionnaire. This original survey tool is hereafter referred to as the "Wolery questionnaire." The Wolery questionnaire was refined through multiple reviews, pilots, and revisions before its wording and format were finalized. Similarly, the instrument for this study was reviewed first by three scholars in the field of deaf education and then by three teachers of students who are DHH. Selected teachers represented alternative approaches to language instruction for students who are DHH; one teacher specialized in an American Sign Language approach, another in listening and spoken language, and the third had experience teaching students who are deaf plus. Revisions were made based on their feedback about the relevance, wording, and order of questions. Next, when the survey was accessible online, 10 teachers of students with hearing loss, whose assignments range from preschool to sixth grade, participated in a pilot of the survey. Five of them completed the survey on a computer and five of them on a mobile device (Dillman et al., 2014). They reported whether the wording of questions made sense to them, whether multiple-choice options fit their teaching assignment, the length of time it took them to complete the survey, and technological issues experienced, if any. Although the survey was online, and, therefore, sections and questions within sections were represented differently than on paper, the survey in the Appendix represents the content.

The survey began with four filter questions to determine if respondents fit parameters for inclusion in the study. They needed to be in a classroom teacher role

educating one or more students with hearing loss in preschool through sixth grade. Respondents who did not fit these parameters received a message explaining that they did not meet participation requirements, and would not complete the remainder of the survey.

Section One of the survey consisted of four questions relating to teaching experience of participants. The first and fourth question asked the number of years participants had taught students who are DHH and deaf plus, respectively. Questions 2 and 3 asked for the number of students who are DHH and deaf plus taught in the school-year the survey was administered. The third question was a filter question. Each participant's response to the dichotomous question (yes, no) placed them in one of two groups. Group A included teachers who had students who are deaf plus in their class that year. Group B consisted of teachers who did not have a student who is deaf plus in their class. Group A responded to all ensuing sections of the survey, whereas group B answered questions in only two of the remaining sections.

Section Two included a list of 29 supports and resources from the Wolery questionnaire and found in the literature to be helpful to general and special educators when teaching students with disabilities. Inclusion of items on the Wolery questionnaire were generated from the literature and open-ended survey questions to teachers. Items were validated through expert review and relevance of items was investigated via a Likert-scale survey of teachers (Werts, Wolery, Snyder, & Caldwell, 1996). The survey instrument in this study retained most items on the Wolery questionnaire with only minor wording revisions to represent the adaptation to students who are deaf plus. Two unique items were found in an article that summarized needs of deaf educators who taught student who are deaf plus (Owner, 1982): opportunities for joint lesson planning and

additional time to modify instruction. Based on feedback during expert review, one item considered to be irrelevant was removed, one item was added, two similar items were combined, and the wording of three items were revised or moved to other categories of support to improve clarity. The 29 supports and resources were clustered into the following five aggregate categories: (a) training (five items), (b) material and physical resources (six items), (c) additional personnel (11 items), (d) personal supports and resources (three items), and (e) meetings (four items). Teachers in Group A reported whether each of the 29 items of support was needed when teaching students who are deaf plus. They also reported if each support was available in their teaching assignment. Teachers in Group B reported only availability of each item. Response options for both need and availability were: *yes*, *no*, and *I never asked*; *I don't know*

Section Three included one question. It assessed deaf educators' perception of their effectiveness when teaching students who are deaf plus. Participants responded on a 4-point Likert scale: *highly effective*, *effective*, *somewhat effective*, and *not effective*. Only teachers in Group A answered this question.

Section Four investigated teacher perception of significance of disability of one student taught. Only participants in Group A responded to items in this section. Participants who taught more than one student who is deaf plus were asked to consider which student they perceived to have the most significant disabilities. Their responses were relative to that one student. Participants were asked to select, from a list, the student's diagnosed disability or disabilities concomitant to hearing loss. They were also asked to rate for nine areas of development, the significance of disability on a 3-point Likert scale. Each level included a description that represented *no disability, mild or*

moderate disability, or *significant disability*. In the Wolery questionnaire, significance of disability was assessed by means of an adaptation of the ABILITIES Index (Simeonsson & Bailey, 1991). The literature includes an adaptation of the ABILITIES Index for students who are DHH (Karchmer & Allen, 1999). Therefore, with permission, the adapted tool was included in this study. Most of the wording was retained. The nine areas of development were: (a) thinking and reasoning; (b) attention to classroom tasks; (c) social interaction/classroom behavior; (d) expressive communication; (e) receptive communication; (f) vision; (g) use of hands, arms, and legs; (h) balance (dizziness, motion sickness, coordination in the dark); and (i) overall physical health.

Section Five included 12 questions about participants' age, education, professional licensure, professional development training, and details about the setting in which they taught. There were questions about their degree, area of study, coursework, type of classroom (e.g., regular, resource, self-contained), type of school (e.g., public, private, separate or mainstream, in a special, or general, or deaf education setting), type of community (i.e., urban, suburban, rural), and information about auditory and disability status of students primarily taught. Both Group A and Group B responded.

Confidentiality

Steps were taken to maintain confidentiality of participants. Information considered to be sensitive or identifiable were not collected (e.g., name, gender, mailing address, ethnicity, telephone number, income level, or name or address of place of employment). Additionally, specific ages of participants were not requested. Instead, participants selected their age from available age ranges. The survey tool did not record

respondent email address. However, email addresses were needed to enable distribution of the incentive; therefore, at the conclusion of the survey, respondents who wanted to be included in the incentive were invited to share their email address. Email addresses were deleted after the gift card incentives were delivered and received. Spreadsheets containing participant responses were kept on a computer requiring an access passcode. In written reports or presentations, outcomes were reported as a conglomerate.

Procedures

1. The study, including procedures for consent and communication of risk to participants, were submitted to the University of Utah Institutional Review board (IRB), and approval was obtained.
2. The survey was integrated into the Qualtrics online survey system.
3. The online version of the survey was piloted with 10 deaf educators, five on mobile devices and five on desktop computers.
4. An initial email was sent to 723 programs. The email explained that they would receive a phone call unless they opted out of the study by replying to the email or calling a phone number.
5. Sites that did not opt out received a phone call with explanation of the purpose and length of the survey, description of commitment, and criteria for participation.
6. Sites that chose to participate provided the name and email of a representative who sent the survey link to teachers. They also reported the number of deaf educators to whom the survey link was sent, to be used in determination of survey response rate.

7. While on the phone, an email was sent to the site representative. The email invited teachers to take a brief survey and included a link to the online survey.
8. Site representatives forwarded the email to teachers in their program.
9. As teachers received the email from their site representative, each potential participant chose to either opt-in and respond to the survey or opt-out.
10. The 3rd day of data collection, responses from 15 random participants were viewed to identify software glitches. One time per week for the remaining weeks of data collection, responses from three random participants were viewed to identify software glitches.
11. The online survey was available to participants at each site for 3 weeks from the date the initial email was sent. Two follow-up emails were sent to site representatives to be forwarded to the same teachers who received the initial email invite (Dillman et al., 2014). The first reminder was sent 7 days and the second was sent 14 days following the initial email.
12. To aid in confidentiality, no names were collected. When data were exported into a spreadsheet, identification numbers were assigned to participants.
13. At the conclusion of data collection, 25 participants who chose to share their email address were randomly selected to receive a $10 Amazon gift card. Gift cards were distributed electronically.
14. Following the electronic distribution of gift cards, email addresses were removed from the data spreadsheet.
15. Data were organized and analyzed.
16. Results were shared with the researcher's dissertation committee.

17. Results were shared with site representatives from participating programs.
18. Any resulting publications included measures to retain the confidentiality of survey participants.

Data Analysis

Data gathered from survey participants were organized and analyzed. To promote an understanding of participants and the students whom they taught, frequency and proportion data were calculated for demographic information (age), educational background and training (i.e., level of education, area of study, topic and frequency of coursework, topic and frequency of inservice training), descriptions of settings in which participants taught (i.e., region, community type, funding type, separate or inclusive school setting, classroom type, grades taught), and descriptions of concomitant disabilities of students taught (type, number, and functional ability and limitations). Analysis of data utilized calculation and exploration of descriptive statistics, between-group analysis of variance tests (ANOVA), and tests of correlation.

Research Question One

What percent of study participants teach at least one student who is deaf plus? The answer to this research question was calculated by dividing the number of participants who reported that they were teaching a student who is deaf plus by the total number of study participants.

Research Question Two

What supports and resources do study participants report as being available in their current teaching assignment? Participants in Group A and Group B reported which supports and resources they perceived to be available in their current teaching assignment. Participants selected one of three options to report availability of items: *yes* (available), *no* (not available), and *I never asked; I don't know*. Data were calculated individually for each of the 29 items and also for each of the five aggregate categories of supports (i.e., training, physical/material resources, additional personnel, personal supports, and meetings/time for meetings). For each item, a percentage was calculated by dividing the number of teachers who reported that an item was available (yes answers) by the number of teachers who responded to the item (both yes and no answers). A percentage of availability for each category was calculated by averaging the percentages of each item in the category. Calculations were done separately for Group A and Group B. Percentages for uncertainty about availability were also calculated.

Research Question Three

What supports and resources do study participants consider to be needed when they teach a student who is deaf plus? Participants in Group A reported which supports and resources they perceived to be needed when teaching a student who is deaf plus. Participants selected one of three options to report need: *yes* (available), *no* (not available), and *I never asked; I don't know*. Data were analyzed individually for each of the 29 items and also for each of the five aggregate categories of supports (i.e., training, physical/material resources, additional personnel, personal supports, and meetings/time

for meetings). For each item, a percentage was calculated by dividing the number of teachers who reported that an item was needed (yes answers) by the number of teachers who responded to the item (both yes and no answers). A percentage for each category was calculated by averaging the percentages of each item in the category. Percentages for uncertainty about need were also calculated.

Research Question Four

Is there a discrepancy between study participants' perceived availability versus perceived need of supports and resources when teaching students who are deaf plus? Discrepancy measures consisted of the percentage of participants who answered *yes* to need and *no* to availability, or, in other words, those who perceived a support to be needed and not available. Participant responses were analyzed, and if their responses to need and availability met that criteria, they were counted. Discrepancy measures were calculated for the five aggregate categories of supports and resources and also for individual supports and resources. For each item, a discrepancy measure was calculated by dividing the number of teachers who reported that an item was needed and not available by the number of teachers who responded to the item. Discrepancy for each category was calculated by averaging the discrepancy measures of each item in a category. Uncertainty about discrepancy was calculated from numbers of participants who responded *yes* to need and *I never asked; I don't know* to availability. Discrepancy measure calculations required responses to both need and availability, and participants in Group B did not respond to questions about need, so their responses were not included.

Research Question Five

What are differences in perceived need, perceived availability, or discrepancy as a function of the following factors: (a) self-perception of effectiveness when teaching a student who is deaf plus, (b) perception of significance of disability of students taught who are deaf plus, (c) teaching experience, (d) preservice preparation, and (e) participation in inservice training. Three of the five identified factors included two parts; therefore, eight factors were analyzed: (a) perception of effectiveness, (b) significance of disability, (c) years teaching students who are DHH, (d) years teaching students who are deaf plus, (e) amount of coursework about students with disabilities not specific to hearing loss, (f) amount of coursework about students who are deaf plus, (g) participation in inservice training about students with disabilities not specific to hearing loss, and (h) participation in inservice about students who are deaf plus. For each factor, 15 comparison tests were run (three measures for each of five categories of supports). The three measures were the following: (a) percent of teachers who reported that a support was available; (b) percent of teachers who reported that a support was needed; and (c) percent of teachers who reported that an item was needed but not available, or discrepant. The measures were compared across subgroups within the identified factors; subgroups are reported subsequently. Analysis of variance (ANOVA) tests and *t*-tests were utilized (Sirkin, 2006). Measures were proportion data and none of the comparisons met the assumptions of normal data distribution or homogeneity of variance. Proportion measures were transformed using an arcsine calculation (Ahrens, Cox, & Budhwar, 1990; Steel & Torrie, 1980). The assumption of normality of the transformed data was tested using the Shapiro-Wilkes test, and the assumption of normality was violated in only a small

number of comparisons. ANOVA tests are considered to be robust to non-normally distributed data (Laerd Statistics, 2013); therefore, ANOVA tests were used in analysis. Levene's test was used to check the homogeneity of variance assumption. For the few comparisons in which this assumption was violated, factors with three or more subgroups were analyzed using a Welch ANOVA test (Laerd Statistics, 2013a) and factors with two subgroups were analyzed using a *t*-test for equal variances not assumed (Laerd Statistics, 2013b).

Subgroups Within Identified Factors

Self-Perception of Effectiveness When Teaching Students Who Are Deaf Plus

Data for this factor were from responses to the Likert scale in the third section of the survey about self-perception of effectiveness. The data are ordinal and included four subgroups: (a) highly effective, (b) effective, (c) somewhat effective, and (d) not effective.

Perceived Significance of Disability of Students Taught Who Are Deaf Plus

Analysis of this factor utilized functional ability ratings from Section Four of the survey. The 3-point Likert scale on the survey represented the following: responses indicating no function disability received a rating of 1, responses indicating a mild to moderate functional limitation received a rating of 2, and responses indicating a significant functional delay received a rating of 3. There were nine domains for which level of function was reported. An average rating across the nine domains was calculated

for each participant. Then an overall average rating was calculated by dividing the sum of individual participant ratings by the number of participants in Group A. Subgroups within this factor were determined by comparing individual average ratings to the overall average rating. The *less significant disabilities* group included participants whose individual average rating was less than the overall average rating. The *more significant disabilities* group included participants whose individual average rating was equal to or greater than the overall average rating. Measures of need and discrepancy were compared between these two subgroups. Measures availability were compared between three subgroups, and the additional subgroup represented teachers of students who had no concomitant disability, or Group B participants.

Teaching Experience

Analysis of teaching experience included separate analysis for number of years teaching students who are DHH and number of years teaching students who are deaf plus. Participants reported their years of experience teaching students who are DHH as well as teaching students who are deaf plus. Data are nominal and included five subgroups: (a) 1-2 years, (b) 3-5 years, (c) 6-10 years, (d) 11-17 years, and (e) 18 or more years. An element that contributed to determination of how subgroups were divided was the common practice that teachers in their initial years of teaching receive mentoring, coaching, or additional monetary or training support (Claycomb & Hawley, 2000; Ingersoll, 2012).

Amount of College Coursework

Survey inquiry of amount of coursework included two topics of study: coursework about students with disabilities and about students who are deaf plus. Data are nominal and included three subgroups: (a) those who received no coursework, (b) 1-2 classes, or (c) 3 or more classes.

Participation in Inservice Training

There were two topics of investigation related to inservice: inservice about students with disabilities and inservice about students who are deaf plus. Data are nominal and included two subgroups: (a) teachers who had participated in inservice training and (b) teachers who had not participated in inservice training.

Research Question Six

Is there a correlation between self-perception of effectiveness when teaching students who are deaf plus and training received relative to teaching students who are deaf plus? Statistical tests of correlation were utilized to find associations between perceived teacher effectiveness and training received. Data on perceived effectiveness are ordinal data gathered on a Likert scale with four levels: highly effective, effective, somewhat effective, and not effective. Four types of training were investigated: (a) participation in inservice about teaching students with disabilities, (b) participation in inservice training about teaching students who are deaf plus, (c) amount of college coursework about teaching students with disabilities, and (d) amount of college coursework about teaching students who are deaf plus. Data related to college

coursework are nominal and included three levels (i.e., no classes, 1-2 classes, and 3 or more classes. Data related to inservice are nominal and dichotomous (i.e. participated in inservice training or had not participated in inservice training). A Pearson's Chi-square test was utilized in analysis of relationship between effectiveness and coursework (Hays, 1994). The relationship between effectiveness and participation in inservice training was analyzed with a linear-by-linear chi-square test which can be utilized in correlations of ordinal data with dichotomous nominal data (Agresti, 1996; Howell, 2001). Responses for participation in inservice training were dichotomous (yes, no) and nominal in type.

Research Question Seven

Which areas of study in preservice programs include coursework related to students with disabilities or students who are deaf plus? Descriptive statistics were explored to determine the amount of college coursework included in preservice program areas of study. Subgroups for amount of coursework included the following: (a) no classes, (b) 1-2 classes, and (c) 3 or more classes. Area of study was analyzed separately for coursework type: (a) amount of coursework about students with disabilities and (b) amount of coursework about students who are deaf plus. Study participants described their area of study by selecting from 14 multiple-choice options. Participants could mark more than one area of study; therefore, responses resulted in a large array of combinations. Sorting of area of study data into subgroups occurred after the survey closed based on participant responses. Therefore, subgroups for area of study are reported in the results section.

CHAPTER 3

RESULTS

Included in this section are data collected from the online survey regarding the perceptions of educators about the need and availability of supports and resources in their teaching of students who are deaf plus. Information about study participants and concomitant disabilities of students taught are presented below, followed by the following: (a) the percent of participants who taught students who are deaf plus; (b) perception of availability of supports and resources when teaching students who are deaf plus; (c) perception of need for supports and resources when teaching students who are deaf plus; (d) uncertainty about provision of supports and resources, (e) discrepancy between need versus availability of supports and resources; (f) comparisons of need, availability, and discrepancy between subgroups within identified factors; (g) relationship between perceived effectiveness and training received; (h) amount of college coursework in areas of study, and (i) an incidental finding.

Participants

Ninety-four programs agreed to send links to teachers. A response rate was calculated of the percent of eligible programs that agreed to send a survey link to teachers. In summary, 403 of 723 programs could potentially send a link to teachers (an

initial email was sent to 723 programs minus 232 programs that never received the initial email or phone call [invalid emails or phone numbers] and 88 programs that were not eligible for participation [e.g., employed itinerant teachers, no preschool or elementary students, required internal approval to conduct research]). Of the remaining 403 programs, 22 programs opted out, 287 programs either never responded or communication ceased prior to them agreeing to send a link to teachers, and 94 agreed to send a link. This resulted in a 23% response rate (94 of 403 programs). It is noted that some of the 287 programs that did not respond may have been ineligible; however, they were included in the count of 403 potentially eligible programs.

Programs were asked to report when the link had been sent as well as the number of teachers to whom the survey was sent. Gathering this information was problematic. Some programs did not respond with a number. Some programs did not have the infrastructure to send the survey link to only teachers of students with hearing loss, so they sent it to all of their teachers. Some programs encouraged teachers in itinerant roles to share the survey with classroom teachers of students on their caseloads and were unable to track how many teachers received the survey link from teachers in itinerant roles. Contact persons from 35 programs did not share the number of teachers to whom the survey was sent. Programs that provided the statistic reported that the survey link was sent to 671 teachers.

Based on the Qualtrics system, 295 teachers followed the link to the survey. Forty-one teachers did not proceed beyond the initial consent page, and 38 teachers indicated that they did not meet participation requirements. Of the remaining 216 teachers, 28 teachers did not proceed beyond Section 1. Of the 188 teachers who

proceeded to Section 2, 184 of them completed the survey. During review of data, it was discovered that 17 participants did not meet participation requirements and were therefore removed (14 teachers did not teach students in preschool or elementary school, and three teachers stated that they were teaching in an itinerant or related services role). Data from 167 participants were included in analyses. A response rate for participants was calculated; however, due to logistical challenges described in the previous section, the number of teachers who received a link to the survey is unknown, and, therefore, the accuracy of the statistic is incomplete. A response rate was calculated from the information programs provided. Of the 671 teachers who reportedly received a link to the survey, 295 teachers followed the link, equaling a 44% response rate. Complete surveys were obtained from 183 teachers, reflecting a 27.3% rate for completed surveys.

Participants were divided into two groups. Group A included 115 teachers currently teaching at least one student who is deaf plus. Group B consisted of 52 teachers of students who are deaf or hard of hearing with no accompanying disability. Table 3.1 includes frequency and percent measures related to participant age, level of college degree, settings in which participants taught (e.g., region of the United States, type of community, funding type), and teaching assignment (classroom type, students taught, grades taught). This information is presented for all participants and also for Group A participants and Group B participants, separately.

The average number of years participants taught students who are DHH was 11.8 years for both Group A and Group B. The average number of years participants taught students who are deaf plus was 9 years for Group A and 5.1 years for Group B. Both groups had participants in their 1st year of teaching students who are DHH and who are

deaf plus. Participants in Group A and Group B with the most experience teaching students who are DHH had taught for 41 years and 38 years, respectively. Participants from each group with the most experience teaching students who are deaf plus had taught them for 40 years (Group A) and 27 years (Group B). The number of students who are deaf plus in classrooms of participants ranged from 1 one to 23 students, and at the time of the survey, participants taught, on average, three students who are deaf plus. For each participant, the number of students who are deaf plus was divided by the total number of students taught who are either DHH or deaf plus, which resulted in a percentage for each participant of students taught who are deaf plus. Percentages ranged from 6.7% to 95%. The average percentage of students who are deaf plus in participants' classrooms was 30% of students with hearing loss.

Concomitant Disabilities of Students Taught

Survey participants responded to questions about the concomitant disability of a student. Participants who taught more than one student who is deaf plus described the student they considered to have the most significant disabilities. Accordingly, study data about significance, type, and number of disabilities represented one student per participant with the most significant disabilities and may not be representative of the general population of students who are deaf plus. Therefore, data cannot be compared to data from national demographic surveys.

Participants selected one or more disabilities from a list to describe concomitant disability type. Data are in Table 3.2. Slightly fewer than half of participants in the survey taught students with hearing loss and concomitant speech or language disorder. Around

one-third of participants taught students who are DHH-LD, DHH-ID, or DHH with a disability not listed in the survey (participants selected “other”). About a quarter of participants taught students with hearing loss and ADD/ADHD. Around 20% of participants taught students with hearing loss and low vision or legal blindness, orthopedic impairment, or autism. Only 8% of participants taught students who are DHH with emotional disturbance. Less than 2% of participants taught students who are DHH with traumatic brain injury or with Usher syndrome.

Data related to the number of disabilities accompanying hearing loss are in Table 3.3. Thirty percent of participants taught a student with only one disability accompanying hearing loss. Twenty-three percent of participants taught a student with two disabilities accompanying hearing loss. Slightly fewer than half of participants taught a student with three or more disabilities accompanying hearing loss.

Across nine domains, participants also rated the functional abilities of students on a 3-point Likert scale. Frequency and percent data of ratings are in Table 3.4.

Percent of Participants Who Teach Students Who Are Deaf Plus

Research Question 1: What percent of study participants taught at least one student who is deaf plus? Of the 167 survey participants, 115 (68.9%) of them were teaching at least one student who is deaf plus.

Perception of Availability of Supports and Resources

Research Question 2: What supports and resources do study participants report as being available in their current teaching assignment? Table 3.5 shows availability data

from participants in Group A and Group B for individual items and averages for categories of supports. This table also includes percentages of participants who did not know if items were available. In every category except additional personnel, a higher percentage of participants not teaching students who are deaf plus (Group B) perceived supports and resources to be available compared to participants teaching students who are deaf plus (Group A). The category of supports with the largest difference between Group A and Group B in perceived availability was Category 5: Meetings. For both groups of participants, the category of supports related to training had the lowest percentage of participants who perceived items to be available. When supports and resources were ranked from largest percentage of participants who considered the support to be available to the lowest, the same 10 supports were at the top of the list for Group A and Group B, although not in the same order. This ranking can be found in Table 3.6. Half of the 10 most available supports were related to additional personnel. No items related to training were on the list of most available supports; however, training supports were 4 of the 10 supports considered to be least available by participants in Group A and Group B. No items related to personal support were in the bottom 10 least available supports. *Regular contact or consultation with a speech-language pathologist* (95.5%), *an occupational therapist* (85.2%), and *a nurse* (86.1%); *feeling supported by a supervisor or principal* (86.1%), and a *part- or full-time paraprofessional* (88.7%) were among the supports perceived as most available. Supports considered by participants in Group A to be least available were *regular contact or consultation with someone knowledgeable about students who are deaf plus* (34.8%), *additional time to plan lessons* (27%), *written information on how to adapt the curriculum* (32.2%), *beginning of the year inservice*

training (21.7%), and *access to university courses* (37.4%).

Perception of Need for Supports and Resources

Research Question 3: What supports and resources do study participants consider necessary when they teach a student who is deaf plus? Data about need for items and categories of items are in Table 3.5. All but one support was considered to be needed by more than half of teachers surveyed. Compared to other categories, items related to personal supports had the highest percent of participants who perceived items as needed. The lowest percent of participants perceived items related to additional personnel as needed. Every category had at least an average of 74% of participants who perceived supports and resources in that category to be needed. Table 3.7 includes a list of supports and resources ranked highest to lowest according to percentage of participants' perceived need. Six supports were considered to be needed by at least 90% of participants teaching a student who is deaf plus. These top six supports include every item in the personal supports category (i.e., *a principal/supervisor who is supportive of you teaching students who are deaf plus*, *feeling support from families of students in class*, and *additional lesson planning time to modify instruction and materials for students who are deaf plus*), *a part- or full-time paraprofessional*, and two supports related to meetings (i.e., *regular team meetings with specialists to discuss students who are deaf plus*, and *the family of a student who is deaf plus is available to discuss coordination of efforts*). Twelve supports and resources were perceived as needed by 80-89% of participants. Only six supports had fewer than 70% of participants who perceived them to be needed. Four of the six supports related to personnel, one was from the category of training, and one support pertained to

physical/material resources. The only support perceived as needed by fewer than 50% of participants was *volunteers in the classroom*.

Uncertainty About Provision of Supports and Resources

When responding to availability or need of items on the survey, some participants selected *I never asked; I don't know*. During the pilot of the survey, teacher feedback included a request that the then dichotomous response options (yes, no) be adjusted to include a third option, *I never asked; I don't know*. Responses of *I never asked; I don't know* became a method to measure uncertainty in teacher perception of need and availability of supports, and captured that additional facet of teacher perception. One effect of including the third option was its impact on other measures in the study; each teacher who reported uncertainty lowered the percentage of teachers who answered either yes or no to need or availability. Responses of uncertainty, therefore, impacted perceived need, availability, and discrepancy measures, and therefore, study outcomes. It is unknown how different the findings of this study would have been if survey options had remained dichotomous.

Table 3.5 illustrates that availability of supports related to training was an area of uncertainty for a higher percentage of participants when compared with other categories of supports. Fewer participants reported that they were uncertain about availability of resources pertaining to personal support and additional personnel. There were two items for which more than 35% of participants were uncertain about availability: *access to special education journals* (35.7% of participants) and *access to university courses about teaching students who are deaf plus* (37.4%). More than one-fourth of participants were

uncertain about availability of two supports: *written information on how to adapt instruction to meet the needs of students who are deaf plus* (25.2%) and *opportunities to attend conferences about teaching students who are deaf plus* (27.0%). Slightly less than one-fourth of participants (24.3%) were uncertain about availability of *opportunities to observe other teachers*. Each of these supports of highest uncertainty are related to training or physical/material supports.

Table 3.5 also included the percent of participants who did not know if items were needed. Items of support with the lowest percentage of participants uncertain about need related to personal supports were *a supportive principal or supervisor* (0.9%) and *feeling supported by families of students* (0.9%). Items with the highest percentage of participants uncertain about need included items from every category of supports except personal supports: *access to special education journals* (20%), *access to university courses* (21.7%), *regular contact or consultation with a social worker,* (19.1%), *release time for meetings* (17.4%), and *volunteers in the classroom* (15.7%).

Discrepancy Between Need Versus Availability of Supports and Resources

Research Question 4: Is there a discrepancy between study participants' perceived availability and perceived need of supports and resources when teaching students who are deaf plus? Discrepancy data for categories and for individual items are in Table 3.5. Table 3.8 includes crosstab data for responses to need and availability for individual items. Crosstab data for categories are in Table 3.9. Compared to other categories, items related to training had the highest percentage of responses representing discrepancy. The additional personnel category had the lowest discrepancy. Table 3.10 includes items

ranked from highest to lowest discrepancy score. Two items had a discrepancy measure greater than 50%, which meant more than half of the participants thought these supports were needed and not available: *additional lesson planning time to modify instruction and materials for students who are deaf plus* (58.3%), and *beginning-of-the-year inservice training about teaching students who are deaf plus* (51.3%). *Regular contact or consultation with someone knowledgeable about children who are deaf plus* was also one of the top ranked items for which a high level of discrepancy was reported (39.1%). Six other supports and resources had a discrepancy measure that exceeded 30%, representing that at least one-third of participants considered these items to be needed and not available. These seven items included two items each from the categories of training, physical/material resources, and meetings. Nine supports and resources had a lower than 15% discrepancy score, which means that a low percentage of participants felt the resource was less available than needed. Six of the nine least discrepant supports were from the category of additional personnel, two were related to physical/material resources, and one pertained to personal supports. None of the items related to training or meetings were among the supports considered to be least discrepant.

Comparisons of Need, Availability, and Discrepancy Between Subgroups Within Identified Factors

Research Question 5: What are differences in perceived need, perceived availability, or discrepancy measures as a function of the following factors: (a) self-perception of effectiveness when teaching a student who is deaf plus, (b) perception of significance of disability of students taught who are deaf plus, (c) teaching experience, (d) preservice preparation, and (e) inservice training? Fifteen comparison tests were run

for each of eight factors (i.e., perception of effectiveness, significance of disability, years teaching students who are DHH, years teaching students who are deaf plus, amount of coursework about students with disabilities not specific to hearing loss, amount of coursework about students who are deaf plus, participation in inservice training about students with disabilities not specific to hearing loss, and participation in inservice about students who are deaf plus). Statistical tests utilized are ANOVA, Welch's ANOVA, or *t*-tests. Data relevant to these tests are in Table 3.11. In the following sections, reported *t*-value, *F*-ratio and *p*-value statistics are results of tests using transformed arcsine data whereas mean, standard deviation, and upper and lower bound statistics reported are back-transformed arcsine data (Steel & Torrie, 1980). If the assumption of equal variances was violated, the statistic for equal variances not assumed was reported.

Self-Perception of Effectiveness When Teaching a Student Who is Deaf Plus

The factor of effectiveness included ordinal data and consisted of four subgroups: highly effective, effective, somewhat effective, and not effective. Three subgroups were included in analysis because no participants reported that they were not effective when teaching students who are deaf plus. The frequency and percent data for subgroups are in Table 3.12. The bar graph in Figure 3.1 includes availability, need, and discrepancy data for subgroups within this factor. The highly effective group considered supports in every category to be more available versus the effective or somewhat effective groups. The effective group considered supports in every category to be more available than participants in the somewhat effective group. A reverse trend was seen for perceived discrepancy in every category other than additional personnel. Fifteen one-way between-

subjects ANOVAs compared the effect of perception of effectiveness on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in three conditions: highly effective, effective, and somewhat effective. The post hoc analyses performed on ANOVA comparisons with significant results utilized the Tukey-Kramer method, which accounted for unbalanced group sizes. There was a significant effect of perception of effectiveness on perceived availability of supports related to physical/material resources at the $p<.05$ level for the three conditions [$F(2, 111) = 4.177$, $p = .018$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the highly effective condition ($M = .71$, $SD = .14$) was significantly different than the somewhat effective condition ($M = .46$, $SD = .09$). However, the effective condition ($M = .53$, $SD = .09$) did not significantly differ from the highly effective and somewhat effective conditions. There was a significant effect of perception of effectiveness on perceived availability of items related to personal supports at the $p<.05$ level for the three conditions [$F(2, 111) = 5.511$, $p = .005$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the highly effective condition ($M = .76$, $SD = .23$) was significantly different than the effective condition ($M = .62$, $SD = .25$) and from the somewhat effective condition ($M = .57$, $SD = .22$). However, the effective condition did not significantly differ from the somewhat effective condition. There was a significant effect of perception of effectiveness on perceived availability of supports related to meetings at the $p<.05$ level for the three conditions [$F(2, 111) = 4.539$, $p = .013$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the highly effective condition ($M = .66$, $SD = .29$) was significantly different

than the somewhat effective condition (M = .38, SD = .36). However, the effective condition (M = .52, SD = .31) did not significantly differ from the highly effective and somewhat effective conditions. There was a significant effect of perception of effectiveness on perceived discrepancy of items related to personal supports at the $p<.05$ level for the three conditions [$F(2, 111) = 3.559$, $p = .032$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the highly effective condition (M = .18, SD = .22) was significantly different than the somewhat effective condition (M = .37, SD = .26). However, the effective condition (M = .31, SD = .28) did not significantly differ from the highly effective and somewhat effective conditions.

These results suggest a relationship between perception of effectiveness when teaching students who are deaf plus and perception of availability of supports related to physical/material, personal supports, and meetings. It may be that when participants perceive they are highly effective, they perceive availability of supports in these categories to be more available. It may also be that when participants perceive supports to be more available, their perception of their effectiveness increases.

Perception of Significance of Disability of Students Taught Who Are Deaf Plus

Average of ratings on the Likert scale for each participant ranged from 1 to 3. The overall average rating was 1.96, with a mode of 2.0. Participants whose individual rating was less than the mean rating of 1.96 were in the *less significant disability* group. Participants with individual ratings equal to or greater than the average rating of 1.96 were in the *more significant disability* group. The frequency and percent data for each level are in Table 3.13. The bar graph in Figure 3.2 includes availability, need, and

discrepancy data for subgroups. A lower percentage of participants who perceived less significant disabilities in students reported less need and less discrepancy of supports in every category compared to teachers who perceived disabilities to be more significant. Five one-way between-subjects ANOVAs compared the effect of perception of significance of disability on perceptions of availability of supports and resources in five categories of supports in three conditions: no disability, less significant disability, and more significant disability. Two of the five comparisons showed statistically significant differences between subgroups. There was a significant effect of perceived significance of disability on perceived availability of supports related to physical/material resources at the $p<.05$ level for the three conditions [$F(2, 164) = 3.118$, $p = .047$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the less significant disability condition ($M = .63$, $SD = .11$) was significantly different than the more significant condition ($M = .48$, $SD = .09$). However, the *no additional disability* condition ($M = .55$, $SD = .07$) did not significantly differ from the less significant and more significant conditions. There was a significant effect of perceived significance of disability on perceived availability of items related to personal supports at the $p<.05$ level for the three conditions [$F(2, 164) = 3.429$, $p = .035$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the less significant disability condition ($M = .75$, $SD = .10$) was significantly different than the more significant condition ($M = .60$, $SD = .14$). However, the no additional disability condition ($M = .69$, $SD = .11$) did not significantly differ from the less significant and more significant conditions.

These results suggest that perception of significance of disability when teaching

students who are deaf plus had an effect on perception of availability of supports related to physical/material resources and meetings. Specifically, results suggested that when teachers perceive that the disabilities of their students have a less significant impact on functional domains, they perceive availability of supports related to physical/material resources and personal supports to be more available than teachers who perceive that disabilities of their students have a more significant impact on functional domains.

Ten independent-samples *t*-tests compared two measures (need and discrepancy) in five categories of supports (i.e., training, physical/material, personnel, personal, and meetings) in less significant disability and more significant disability conditions. Four of the 10 comparisons showed statistically significant differences between groups. There was a significant difference in perceived discrepancy in the category of physical/material resources for less significant disability (M = .11, SD = .10) and more significant disability (M = .26, SD = .12) conditions; $t(113) = -3.15$, p = .002, 95% CI [0.10, 0.00]. There was a significant difference in perceived discrepancy in the category of personal supports for less significant disability (M = .17, SD = .12) and more significant disability (M = .29, SD = .19) conditions; $t(113) = -1.98$, p = .050, 95% CI [0.09, 0.00]. There was a significant difference in perceived need for supports and resources in the category of additional personnel for less significant disability (M = .71, SD = .08) and more significant disability (M = .84, SD = .06) conditions; $t(113) = -3.27$, p = .002, 95% CI [0.07, 0.00]. Levene's test was violated for the need measure in Category 5: Meetings, so the *t*-test for unequal variances was used. There was a significant difference in perceived need for supports and resources in the category of meetings for the less significant disability (M = .90, SD = .16) and more significant disability (M = .84, SD = .06) conditions; $t(91.37) = -$

2.41, p = .018, 95% CI [0.08, 0.00].

These results suggest that perception of significance of disability when teaching students who are deaf plus had an effect on perception of need for supports related to personnel and meetings. Specifically, results suggested that when teachers perceive that disabilities of their students have a more significant impact on functional domains, they perceive supports related to personnel and meetings to be more needed than teachers who perceive that disabilities of their students have a less significant impact on functional domains. These results also suggest that perception of significance of disability when teaching students who are deaf plus has an effect on perception of perceived discrepancy of supports in the categories of physical/material resources and personal supports. When teachers perceive disabilities of their students have a less significant impact on functional domains, they perceive items related to physical/material resources and personal supports to be less discrepant than teachers who perceive that disabilities of their students have a more significant impact on functional domains.

Teaching Experience

Analysis was done separately for number of years teaching students who are DHH and number of years teaching students who are deaf plus. The frequency and percent data for each level within each variable are in Table 3.14.

Number of Years Teaching Students Who Are DHH

The bar graph in Figure 3.3 includes availability, need, and discrepancy data for subgroups within this factor. For three categories of support (training, personal support,

and meetings), when comparing three subgroups (1-2 years, 3-5 years, and 6-10 years), perceived need rises and perceived availability decreases with teaching experience, and, as a result, discrepancy is lowest for participants who have taught for fewer years and greatest for participants who taught for 6-10 years. Fifteen one-way between-subjects ANOVAs compared the effect of experience teaching students who are DHH on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in five conditions: 1-2 years, 3-5 years, 6-10 years, 11-17 years, and 18+ years. One comparison was statistically significant. There was a significant effect of teaching experience on perceived discrepancy of supports related to training at the $p<.05$ level for the five conditions [$F(4, 110) = 4.38$, $p = .003$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the 1-2 years condition ($M = .09$, $SD = .16$) was significantly different from the 6-10 years condition ($M = .46$, $SD = .13$) and from the 11-17 years condition ($M = .42$, $SD = .20$). The 6-10 years and 11-17 years conditions did not differ from one another, and the 3-5 years condition ($M = .16$, $SD = .18$) and the 18+ years condition ($M = .30$, $SD = .14$) did not significantly differ from any other conditions.

Number of Years Teaching Students Who are Deaf Plus

The bar graph in Figure 3.4 includes availability, need, and discrepancy data for subgroups within this factor. Although not exactly replicated, discrepancy data for participants teaching students who are deaf plus follows a similar pattern as was observed for subgroups within the other factor related to teaching experience. Perceived discrepancy for supports in every category except physical/material resources was lower

for teachers who had taught for 1-2 years compared to teachers who had taught for 3-5 years. Fifteen one-way between-subjects ANOVAs compared the effect of experience teaching students who are deaf plus on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in five conditions: 1-2 years, 3-5 years, 6-10 years, 11-17 years, and 18+ years. One comparison was statistically significant, and is was the same one significant for years teaching students who are DHH. There was a significant effect of teaching experience on perceived discrepancy of supports related to training at the $p<.05$ level for the five conditions [$F(4, 110) = 2.86$, $p = .027$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the 1-2 years condition ($M = .12$, $SD = .17$) was significantly different than the 11-17 years condition ($M = .44$, $SD = .21$). The 3-5 years condition ($M = .35$, $SD = .11$), 6-10 years condition ($M = .38$, $SD = .17$), and the 18+ years condition ($M = .30$, $SD = .21$) did not significantly differ from any other conditions.

These results suggest that experience teaching either group of students had an effect on perceived discrepancy of supports related to training. Specifically, these results suggest that teachers who have taught for 1-2 years perceive supports related to training to be less discrepant than teachers who have taught for 6-10 years or for 11-17 years.

Preservice Preparation

Analysis was done separately for number of classes about students with disabilities and number of classes about students who are deaf plus. Frequency and percent data for each subgroup within each factor are in Table 3.15.

College Coursework Related to Students With Disabilities

The bar graph in Figure 3.5 includes availability, need, and discrepancy data for subgroups within this factor. Upon visual analysis, it was observed that compared to participants who had no classes or who had 3 or more classes, a larger percentage of teachers who had 1-2 classes about students with disabilities reported that supports in three categories (personal/material, personnel, and personal) were discrepant. Fifteen one-way between-subjects ANOVAs compare the effect of amount of college coursework about teaching students with disabilities on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in three conditions: no classes, 1-2 classes, and 3 or more classes. One of the 15 comparisons showed statistically significant differences between subgroups. There was a significant effect of amount of college coursework about students with disabilities on perceived need of supports related to meetings at the $p<.05$ level for the three conditions [$F(2, 112) = 3.61$, $p = .030$]. Post hoc comparisons using the Tukey-Kramer method indicated that the mean score for the no classes condition ($M = .77$, $SD = .23$) was significantly different than the 1-2 classes condition ($M = .96$, $SD = .09$) and the 3 or more classes condition ($M = .96$, $SD = .11$). However, the 1-2 classes condition did not significantly differ from the 3 or more classes condition.

These results suggest that amount of coursework about students with disabilities had an effect on perceived need for supports related to meetings. Specifically, teachers who have had no classes about teaching students with disabilities perceive supports related to meetings to be less needed when teaching a student who is deaf plus compared to teachers who have had 1-2 classes or 3 or more classes.

College Coursework Related to Students Who Are Deaf Plus

The bar graph in Figure 3.6 includes availability, need, and discrepancy data for subgroups. A pattern was observed. Participants who had 3 or more classes about students who are deaf plus considered physical/material, personnel, and personal supports to be less discrepant than either group of teachers with fewer classes. Fifteen one-way between-subjects ANOVAs compared the effect of amount of college coursework about teaching students who are deaf plus on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in three conditions: no classes, 1-2 classes, and 3 or more classes. Results showed no statistically significant differences between groups.

Inservice Training

This factor included two separate analyses for responses to two separate topics of inservice training (i.e., participation in inservice trainings about students with disabilities and participation in inservice trainings about students who are deaf plus). Frequency and percent data for subgroups within each factor are in Table 3.16.

Participation in Inservice Training Pertaining to
Students With Disabilities

The bar graph in Figure 3.7 includes availability, need, and discrepancy data for subgroups within this factor. Higher percentages of participants with no inservice training perceived supports in every category except additional personnel to be discrepant and lower percentages of the same group perceived supports in the same categories to be available. Fifteen independent *t*-tests compared the effect of participation in inservice

training about students with disabilities on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in two conditions: had inservice and had no inservice. Three of the 15 comparisons showed statistically significant differences between subgroups. There was a significant difference in perceived availability in the category of physical/material resources for the inservice (M = .61, SD = .11) and no inservice (M = .41, SD = .08) conditions; $t(113) = 3.37$, p = .001, 95% CI [0.01, 0.12]. There was a significant difference in perceived availability in the category of personal supports for the inservice (M = .72, SD = .13) and no inservice (M = .57, SD = .09) conditions; $t(113) = 2.12$, p = .036, 95% CI [0.00, 0.09]. There was a significant difference in perceived discrepancy in the category of physical/material resources for the inservice (M = .15, SD = .11) and no inservice (M = .28, SD = .13) conditions; $t(113) = -2.30$, p = .023, 95% CI [0.09, 0.00].

Participation in Inservice Training Pertaining to Students Who Are Deaf Plus

The bar graph in Figure 3.8 includes availability, need, and discrepancy data for subgroups within this factor. Trends in Figure 3.8 are similar those seen in Figure 3.7. Upon visual analysis, participants who participated in inservice training about students who are deaf plus perceived supports to be less discrepant and more available in every category of supports except those pertaining to personnel. Fifteen independent *t*-tests compared the effect of participation in inservice training about students with disabilities on three measures (i.e., need, availability, and discrepancy) in five categories of support (i.e., training, physical/material, personnel, personal, and meetings) in two conditions: had inservice and no inservice. Seven of the 15 comparisons showed statistically

significant differences between conditions. There was a significant difference in perceived availability in the category of training resources for the had inservice (M = .48, SD = .15) and had no inservice (M = .21, SD = .10) conditions; $t(113) = 4.52$, p = .000, 95% CI [0.03, 0.18]. There was a significant difference in perceived availability in the category of physical/material resources for the had inservice (M = .68, SD = .12) and had no inservice (M = .49, SD = .09) conditions; $t(113) = 3.02$, p = .003, 95% CI [0.00, 0.10]. There was a significant difference in perceived availability in the category of personal supports for the had inservice (M = .77, SD = .14) and had no inservice (M = .53, SD = .11) conditions; $t(113) = 2.14$, p = .034, 95% CI [0.00, 0.09]. There was a significant difference in perceived availability in the category of meetings for the had inservice (M = .71, SD = .21) and had no inservice (M = .46, SD = .21) conditions; $t(113) = 2.73$, p = .007, 95% CI [0.00, 0.18]. There was a significant difference in perceived discrepancy in the category of training supports for the had inservice (M = .18, SD = .18) and had no inservice (M = .37, SD = .17) conditions; $t(113) = -2.31$, p = .022, 95% CI [0.13, 0.00]. There was a significant difference in perceived discrepancy in the category of personal supports for the had inservice (M = .13, SD = .17) and had no inservice (M = .28, SD = .16) conditions; $t(113) = -2.24$, p = .027, 95% CI [0.12, 0.00]. There was a significant difference in perceived discrepancy in the category of meetings for the had inservice (M = .11, SD = .21) and had no inservice (M = .27, SD = .19) conditions; $t(113) = -2.37$, p = .019, 95% CI [0.15, 0.00].

Relationship Between Perceived Effectiveness and Training Received

Research Question 6: Is there a correlation between self-perception of effectiveness when teaching a student who is deaf plus and training received relative to teaching students who are deaf plus? Crosstab representation of frequency and percent data for effectiveness and amount of coursework is in Table 3.17. Crosstabs of frequency and percent data for participation in inservice training and effectiveness rating are in Table 3.18. A Pearson chi-square test did not find a statistically significant relationship between effectiveness rating and college coursework about teaching students who are deaf plus, χ^2 (4, N = 114) = 6.58, p = .16. A Pearson chi-square tests found a statistically significant relationship between effectiveness rating and college coursework about teaching students with disabilities not specific to hearing loss, χ^2 (4, N = 114) = 15.31, p = .004. A linear-by-linear chi square test found a statistically significant relationship between effectiveness rating and inservice training about teaching students who are deaf plus, $\chi^2_{\text{Linear-by-linear}}$ (1, N = 114) = 4.69, p = .030. A linear-by-linear chi square test found a statistically significant relationship between effectiveness rating and inservice training about teaching students with disabilities not specific to hearing loss, $\chi^2_{\text{Linear-by-linear}}$ (1, N = 114) = 4.23, p = .040. Bar graphs representing the linear-by-linear relationships are in Figure 3.9.

Amount of College Coursework and Area of Study

Research Question 7: Which areas of study in preservice programs include coursework related to students with disabilities or students who are deaf plus? Frequency and percent data of participants who selected each area of study are in Table 3.19.

Participants could select more than one area of study, so frequencies tallied to more than 167 participants. Due to its nonspecific nature, participant selections of *other* could not be categorized into specific areas of study. Five of 14 areas of study on the survey were selected by at least 15 participants, and were included in analysis: (a) general education, (b) special education, (c) deaf education, (d) communication disorders, and (e) early intervention/early childhood education. Participant selections resulted in 23 unique combinations of these five areas of study that were then sorted, based on similar characteristics, into eight categories. The following combinations of areas of study resulted: (a) general education with no special education or deaf education (GE); (b) any combination of special education and general education with no deaf education (SE); (c) any combination of deaf education and general education with no special education (DE); (d) any combination with special education and deaf education (S&D); (e) any combination of GE, SE, DE with early intervention/early childhood (EC); (f) any combination of GE, SE, DE with communication disorders (CD); (g) any combination of GE, SE, DE with both early childhood/early intervention and communication disorders (EC&CD); and (h) other combinations. Each participant was represented in only one of the eight categories. Frequency and percent data for these areas of study are in Table 3.20. Due to the limited number of participants in the *other* category, it was not included in analysis of amount of coursework. For each of the seven categories of area of study, participant responses to amount of coursework were tallied.

Coursework About Students With Disabilities

Crosstab data for area of study and amount of coursework about teaching students with disabilities are in Table 3.21. More than half of participants who studied SE, S&D, EC, CD, and EC&CD had 3 or more classes about students with disabilities not specific to deafness. More than half of participants who studied GE and DE had 1-2 classes related to students with disabilities other than deafness.

Coursework About Students Who Are Deaf Plus

Crosstab data for amount of coursework about teaching students who are deaf plus and area of study are in Table 3.21. Fifty percent or more of participants who studied GE, SE, DE, S&D received no coursework about students who are deaf plus. More than 50% of teachers who studied EC or EC&CD had 1-2 classes about students who are deaf plus. A plurality rather than a majority was observed in data for the CD area of study; 40% of participants reported having had no classes about teaching students who are deaf plus, and 40% of them reported having had 1-2 classes about teaching students who are deaf plus. No area of study included a high percentage of participants who had 3 or more classes related to teaching students who are deaf plus. The highest measures were for participants who studied CD (20%) and participants who studied S&D (18.2%).

Incidental Finding

One additional outcome of the study, not specifically targeted by one of the seven research questions, is the relationship between teacher rating of effectiveness and rating of significance of disabilities of students taught. Participants were asked to rate

themselves as being highly effective, effective, or somewhat effective when teaching students who are deaf plus. They were also asked to rate the functional abilities of one student they taught who is deaf plus. If they taught more than one student who is deaf plus, they were asked to consider which student had the most significant delays and report on that one student. Data on effectiveness and significance of delay were based on teacher report and were not validated with any other assessment. Compared to participants who rated themselves as being effective or highly effective, participants who rated themselves as being somewhat effective rated students they taught as having more significant disabilities. Of the 24 participants who rated themselves as highly effective, 54% taught a student with less significant delays and 46% of them taught students with more significant delays. This can be compared to the 28 participants who rated themselves as somewhat effective; 32% of participants taught students with less significant delays, whereas 68% of participants taught students with more significant delays. No determination can be made about causality.

Table 3.1
Frequency distribution table of demographic and other variables related to participants, programs, and teaching assignments

	Both groups (n = 167)		Group A (n = 115)		Group B (n = 52)	
Variable	Fz	%	Fz	%	Fz	%
Age of participant						
Younger than 30	28	16.8	14	12.2	14	26.9
Age 30-39	49	29.3	39	33.9	10	19.2
Age 40-49	40	24.0	28	24.3	12	23.1
Age 50+	50	29.9	34	29.6	16	30.8
Region of the United States						
Northeast	14	8.4	11	9.6	3	5.8
Midwest	51	30.5	35	30.4	16	30.8
South	49	29.3	35	30.4	14	26.9
West	54	32.3	34	29.6	19	36.5
Program community type						
Urban	40	24.0	31	32.2	9	17.3
Suburban	76	45.5	51	44.3	25	48.1
Rural	39	23.4	24	20.9	15	28.8
Combination	12	7.2	9	7.8	3	5.8
Program funding type						
Public	129	77.2	92	80.0	37	71.2
Private	31	18.6	19	16.5	12	23.1
Both	7	4.2	4	3.5	3	5.8
Participant level of education						
None	0	0.0	0	0.0	0	0.0
Associate’s	0	0.0	0	0.0	0	0.0
Bachelor’s	42	25.1	27	23.5	15	28.8
Master’s	117	70.1	81	70.4	36	69.2
Doctorate/ABD	8	4.8	7	6.1	1	1.9

Table 3.1 continued

Variable	Both groups (*n* = 167) Fz	%	Group A (*n* = 115) Fz	%	Group B (*n* = 52) Fz	%
Program setting						
Separate school: DHH	95	56.9	68	59.1	27	51.9
Separate school: disabilities	5	3.0	3	2.6	2	3.8
General education	45	26.9	28	24.3	17	32.7
Other	22	13.2	16	13.9	6	11.5
Classroom assignment of participant						
Regular	64	38.3	41	35.7	23	44.2
Self-contained	85	50.9	62	53.9	23	44.2
Resource	7	4.2	4	3.5	3	5.8
Other	11	6.6	8	7.0	3	5.8
Hearing and disability status of majority of students taught						
Deaf or hard of hearing + typically developing	108	64.7	71	61.7	37	71.2
Deaf or hard of hearing + disabilities	30	18.0	28	24.3	2	3.8
Hearing + typically developing	20	12.0	9	7.8	11	21.2
Hearing + disabilities	9	5.4	7	6.1	2	3.8
Grades currently taught						
Pre-K	43	25.7	22	19.1	21	40.4
Kindergarten	19	11.4	11	9.6	8	15.4
Grades 1-3	46	27.5	41	35.7	5	9.6
Grades 4-6	46	27.5	30	26.1	16	30.8
Other combination	13	7.8	11	9.6	2	3.8

Note: Regular classrooms are those not categorized as self-contained or resource classrooms and may be in general or deaf education settings.

Table 3.2
Frequency distribution table of disability types
accompanying hearing loss

Type of disability (participants selected all that applied)	Group A (n = 115) Fz	%
ADD/ADHD	30	26.1
Autism	26	22.6
Emotional Disturbance	9	7.8
Learning disability	39	33.9
Legal blindness	3	2.6
Low vision	21	18.3
Intellectual disability	37	32.2
Orthopedic impairment	25	21.7
Speech or language disorder	54	47.0
Traumatic brain injury	2	1.7
Usher syndrome	2	1.7
Other condition	42	36.5

Table 3.3
Frequency distribution table of number of
concomitant disabilities per student

Number of disabilities accompanying hearing loss	Group A (n = 115) Fz	%
One disability	35	30.4
Two disabilities	27	23.5
Three disabilities	30	26.1
Four disabilities	11	9.6
Five disabilities	7	6.1
Six disabilities	3	2.6
Seven disabilities	2	1.7

Table 3.4
Frequency distribution table of perceived delay in functional domains of students taught who are deaf plus (Group A only, *n* = 115)

	No functional disability		Mild to moderate limitation		Significant functional delay	
Domain	Fz	%	Fz	%	Fz	%
Thinking and reasoning	15	13.0	42	36.5	58	50.4
Attention to classroom tasks	9	7.8	51	44.3	55	47.8
Social interaction/ classroom behavior	21	18.3	63	54.8	31	27.0
Expressive communication	9	7.8	49	42.6	57	49.6
Receptive communication	11	9.6	64	55.7	40	34.8
Vision	71	61.7	33	28.7	11	9.6
Use of hands, arms, and legs	59	51.3	51	44.3	5	4.3
Balance	64	55.7	37	32.2	14	12.2
Overall physical health	63	54.8	45	39.1	7	6.1

Note: Participants rated functionality of one student they considered to have the most significant delays in each of nine domains. Balance included dizziness, motion sickness, and coordination in the dark.

Table 3.5
Percent (%) of reported availability, need, and discrepancy of supports and resources

	Group A						Group B	
	Available		Needed		Discrepancy		Available	
Category 1: Training	Yes	Don't know	Yes	Don't know	†	‡	Yes	Don't know
1. Beginning-of-the-year inservice training	21.7	9.6	77.4	7.8	51.3	5.2	23.1	19.2
2. Ongoing inservice training or consultation	40.0	6.1	87.0	3.5	44.3	3.5	40.4	15.4
3. Opportunities to attend conferences	40.9	27.0	87.0	6.1	29.6	20.0	55.8	25.0
4. Opportunities to observe other teachers	45.2	24.3	77.4	10.4	24.3	13.9	32.7	28.8
5. Access to university courses	16.5	37.4	62.6	21.7	33.0	14.8	26.9	40.4
Category totals	32.9	20.9	78.2	9.9	36.5	11.5	35.8	25.8
Category 2: Material and physical resources								
6. Physical layout of the classroom adapted	81.7	7.8	88.7	5.2	7.8	1.7	75.0	15.4
7. Accessible bathroom within close vicinity	80.0	0.0	79.1	2.6	13.9	0.0	80.8	1.9
8. Access to special education journals	36.5	35.7	62.6	20.0	17.4	14.8	53.8	23.1
9. Written information on how to adapt	32.2	25.2	84.3	10.4	39.1	14.8	44.2	32.7
10. Extra money for materials and supplies	40.0	14.8	88.7	6.1	41.7	9.6	17.3	36.5
11. Reduced class size	55.7	7.8	84.3	5.2	29.6	3.5	61.5	7.7
Category totals	54.3	15.2	81.3	8.3	24.9	7.4	55.4	19.6
Category 3: Additional personnel								
12. Volunteers in the classroom	49.6	11.3	43.5	15.7	13.9	1.7	59.6	19.2
13. A part-time or full-time paraprofessional	88.7	2.6	92.2	2.6	4.3	1.7	71.2	3.8
Regular contact or consultation with:								
14. a speech-language pathologist	96.5	1.7	86.1	2.6	0.9	0.9	100.0	0.0
15. a physical therapist	79.1	5.2	85.2	4.3	13.9	1.7	75.0	9.6

Table 3.5 continued

	Group A						Group B	
	Available		Needed		Discrepancy		Available	
Category 3: Additional personnel (continued)	Yes	Don't know	Yes	Don't know	†	‡	Yes	Don't know
Regular contact or consultation with:								
16. an occupational therapist	85.2	1.7	86.1	4.3	12.2	0.0	80.8	7.7
17. a psychologist	60.0	7.8	67.8	14.8	18.3	3.5	50.0	15.4
18. a nurse	86.1	2.6	80.9	7.0	7.0	0.0	75.0	3.8
19. a social worker	40.0	16.5	53.0	19.1	20.0	0.9	44.2	17.3
20. a special educator outside the area of deafness	47.0	13.0	64.3	11.3	16.5	8.7	53.8	21.2
21. a behavior specialist	47.0	14.8	73.9	8.7	29.6	7.0	50.0	13.5
22. someone with knowledge of students who are deaf plus	34.8	13.9	80.0	10.4	39.1	9.6	44.2	21.2
Category totals	64.9	8.3	73.9	9.2	16.0	3.2	64.0	12.1
Category 4: Personal support								
23. Supportive principal or supervisor	86.1	2.6	99.1	0.9	11.3	1.7	88.5	3.8
24. Additional lesson planning time	27.0	7.8	89.6	5.2	58.3	5.2	19.2	9.6
25. Feel support from families of students	78.3	0.0	97.4	0.9	20.0	0.0	86.5	0.0
Category totals	63.8	5.2	95.4	2.3	29.9	2.3	64.7	4.5
Category 5: Meetings and time for meetings								
26. Regular meetings with team of specialists	48.7	12.2	91.3	3.5	34.8	10.4	51.9	13.5
27. Family available to discuss coordination	62.6	10.4	93.0	6.1	26.1	5.2	73.1	17.3
28. Meet to plan lessons jointly, brainstorm ideas, share experiences, and problem-solve	48.7	12.2	86.1	7.8	33.9	7.0	57.7	15.4
29. Release time for meetings	48.7	17.4	74.7	18.3	24.3	4.3	63.5	11.5
Category totals	52.2	13.1	86.3	8.7	29.8	6.7	61.6	14.4

Note: In discrepancy columns, † = percent of teachers who answered yes to need and no to availability; ‡ = percent of teachers who answered yes to need and 'I don't know' to availability

Table 3.6
Percent (%) of teacher reported need ranked largest to smallest

			Needed		
Cat	Rank	Item of support	Yes	No	Don't know
4	1	Supportive principal or supervisor	99.1	0.0	0.9
4	2	Feel support from families of students	97.4	1.7	0.9
5	3	Family available to discuss coordination efforts	93.0	0.9	6.1
3	4	Part-time or full-time paraprofessional	92.2	5.2	2.6
5	5	Regular meetings with team of specialists	91.3	5.2	3.5
4	6	Additional lesson planning time	89.6	5.2	5.2
2	7	Physical layout of the classroom adapted	88.7	6.1	5.2
2	7	Extra money for materials and supplies	88.7	5.2	6.1
1	9	Ongoing inservice training or consultation	87.0	9.6	3.5
1	9	Opportunities to attend conferences	87.0	7.0	6.1
3	11	Speech-language pathologist *	86.1	11.3	2.6
3	11	Occupational therapist *	86.1	9.6	4.3
5	11	Meet to plan lessons jointly, brainstorm ideas, share experiences, problem-solve	86.1	6.1	7.8
3	14	Physical therapist *	85.2	9.6	4.3
2	15	Written information on how to adapt	84.3	5.2	10.4
2	15	Reduced class size	84.3	10.4	5.2
3	17	Nurse *	80.9	12.2	7.0
3	18	Someone with knowledge of students who are deaf plus *	80.0	9.6	10.4
2	19	Accessible bathroom within close vicinity	79.1	18.3	2.6
1	20	Beginning-of-the-year inservice training	77.4	14.8	7.8
1	20	Opportunities to observe other teachers	77.4	12.2	10.4
5	22	Release time for meetings	74.7	7.0	18.3
3	23	Behavior specialist *	73.9	17.4	8.7
3	24	Psychologist *	67.8	17.4	14.8
3	25	Special educator outside the area of deafness *	64.3	24.3	11.3
1	26	Access to university courses	62.6	15.7	21.7
2	26	Access to special education journals	62.6	17.4	20.0
3	28	Social worker *	53.0	27.8	19.1
3	29	Volunteers in the classroom	43.5	40.9	15.7

Note: Cat = Category. Asterisk (*) indicates supports including regular contact or consultation with these related service professionals.

Table 3.7
Percent (%) of teacher reported availability ranked largest to smallest

			Group A availability			Group B availability		
Cat	Rank	Items of support	Yes	No	Don't know	Yes	No	Don't know
3	1	Speech-language pathologist *	96.5	1.7	1.7	100.0	0.0	0.0
3	2	Part-time or full-time paraprofessional	88.7	8.7	2.6	71.2	25.0	3.8
3	3	Nurse *	86.1	11.3	2.6	75.0	21.2	3.8
4	3	Supportive principal or supervisor	86.1	11.3	2.6	88.5	7.7	3.8
3	5	Occupational therapist *	85.2	13.0	1.7	80.8	11.5	7.7
2	6	Physical layout of the classroom adapted	81.7	10.4	7.8	75.0	9.6	15.4
2	7	Accessible bathroom within close vicinity	80.0	20.0	0.0	80.8	17.3	1.9
3	8	Physical therapist *	79.1	15.7	5.2	75.0	15.4	9.6
4	9	Feel support from families of students	78.3	21.7	0.0	86.5	13.5	0.0
5	10	Family available to discuss coordination	62.6	27.0	10.4	73.1	9.6	17.3
3	11	Psychologist *	60.0	32.2	7.8	50.0	34.6	15.4
2	12	Reduced class size	55.7	36.5	7.8	61.5	30.8	7.7
3	13	Volunteers in the classroom	49.6	39.1	11.3	59.6	21.2	19.2
5	14	Regular meetings with team of specialists	48.7	39.1	12.2	51.9	34.6	13.5
5	14	Meet to plan lessons jointly, brainstorm ideas, share experiences, problem-solve	48.7	39.1	12.2	57.7	26.9	15.4
5	14	Release time for meetings	48.7	33.9	17.4	63.5	25.0	11.5
3	17	Special educator outside the area of deafness *	47.0	40.0	13.0	53.8	25.0	21.2
3	17	Behavior specialist *	47.0	38.3	14.8	50.0	36.5	13.5
1	19	Opportunities to observe other teachers	45.2	30.4	24.3	32.7	38.5	28.8
1	20	Opportunities to attend conferences	40.9	32.2	27.0	55.8	19.2	25.0
1	21	Ongoing inservice training or consultation	40.0	53.9	6.1	40.4	44.2	15.4
2	21	Extra money for materials and supplies	40.0	45.2	14.8	17.3	46.2	36.5
3	21	Social worker *	40.0	43.5	16.5	44.2	38.5	17.3
2	24	Access to special education journals	36.5	27.8	35.7	53.8	23.1	23.1
3	25	Someone with knowledge of students who are deaf plus *	34.8	51.3	13.9	44.2	34.6	21.2
2	26	Written information on how to adapt	32.2	42.6	25.2	44.2	23.1	32.7
4	27	Additional lesson planning time	27.0	65.2	7.8	19.2	71.2	9.6
1	28	Beginning-of-the-year inservice training	21.7	21.7	9.6	23.1	57.7	19.2
1	29	Access to university courses	16.5	46.1	37.4	26.9	32.7	40.4

Note: Cat = Category; Asterisk (*) indicates supports including regular contact or consultation with these related service professionals.

Table 3.8
Cross tabulation of frequency (Fz) and percent (%) of responses
by need and availability of individual supports and resources

Available	Needed: Yes Fz	Yes %	No Fz	No %	Never asked/ don't know Fz	Never asked/ don't know %	Row totals Fz	Row totals %
1. Beginning-of-the-year inservice training about teaching students who are deaf plus								
Yes	24	20.9	1	0.9	0	0.0	25	21.7
No	59	51.3	15	13.0	5	4.3	79	68.7
Never asked / don't know	6	5.2	1	0.9	4	3.5	11	9.6
Column totals	89	77.4	17	14.8	9	7.8	115	100.0
2. Regular and ongoing inservice training or consultation about teaching students who are deaf plus								
Yes	45	39.1	1	0.9	0	0.0	46	40.0
No	51	44.3	9	7.8	2	1.7	62	53.9
Never asked / don't know	4	3.5	1	0.9	2	1.7	7	6.1
Column totals	100	87.0	11	9.6	4	3.5	115	100.0
3. Opportunities to attend conferences about teaching students who are deaf plus								
Yes	43	37.4	3	2.6	1	0.9	47	40.9
No	34	29.6	2	1.7	1	0.9	37	32.2
Never asked / don't know	23	20.0	3	2.6	5	4.3	31	27.0
Column totals	100	87.0	8	7.0	7	6.1	115	100.0
4. Opportunities to observe other teachers who serve students who are deaf plus								
Yes	45	39.1	6	5.2	1	0.9	52	45.2
No	28	24.3	5	4.3	2	1.7	35	30.4
Never asked / don't know	16	13.9	3	2.6	9	7.8	28	24.3
Column totals	89	77.4	14	12.2	12	10.4	115	100.0

Table 3.8 continued

Available	Needed: Yes Fz	Needed: Yes %	Needed: No Fz	Needed: No %	Needed: Never asked/ don't know Fz	Needed: Never asked/ don't know %	Row totals Fz	Row totals %
5. Access to university courses about teaching students who are deaf plus								
Yes	17	14.8	2	1.7	0	0.0	19	16.5
No	38	33.0	10	8.7	5	4.3	53	46.1
Never asked / don't know	17	14.8	6	5.2	20	17.4	43	37.4
Column totals	72	62.6	18	15.7	25	21.7	115	100.0
6. Physical layout of the classroom adapted to address needs related to the accompanying disability								
Yes	91	79.1	3	2.6	0	0.0	94	81.7
No	9	7.8	2	1.7	1	0.9	12	10.4
Never asked / don't know	2	1.7	2	1.7	5	4.3	9	7.8
Column totals	102	88.7	7	6.1	6	5.2	115	100.0
7. Accessible bathroom within close vicinity of the classroom								
Yes	75	65.2	14	12.2	3	2.6	92	80.0
No	16	13.9	7	6.1	0	0.0	23	20.0
Never asked / don't know	0	0.0	0	0.0	0	0.0	0	0.0
Column totals	91	79.1	21	18.3	3	2.6	115	100.0
8. Access to professional special education journals and periodicals								
Yes	35	30.4	4	3.5	3	2.6	42	36.5
No	20	17.4	11	9.6	1	0.9	32	27.8
Never asked / don't know	17	14.8	5	4.3	19	16.5	41	35.7
Column totals	72	62.6	20	17.4	23	20.0	115	100.0

Table 3.8 continued

9. Written information on how to adapt the classroom and curriculum								
	Needed							
	Yes		No		Never asked/ don't know		Row totals	
Available	Fz	%	Fz	%	Fz	%	Fz	%
Yes	35	30.4	2	1.7	0	0.0	37	32.2
No	45	39.1	2	1.7	2	1.7	49	42.6
Never asked / don't know	17	14.8	2	1.7	10	8.7	29	25.2
Column totals	97	84.3	6	5.2	12	10.4	115	100.0
10. Extra money for materials and supplies to address needs of the student(s) who is(are) deaf plus								
	43	37.4	3	2.6	0	0.0	46	40.0
No	48	41.7	2	1.7	2	1.7	52	45.2
Never asked / don't know	11	9.6	1	0.9	5	4.3	17	14.8
Column totals	102	88.7	6	5.2	7	6.1	115	100.0
11. Reduced class size								
Yes	59	51.3	4	3.5	1	0.9	64	55.7
No	34	29.6	7	6.1	1	0.9	42	36.5
Never asked / don't know	4	3.5	1	0.9	4	3.5	9	7.8
Column totals	97	84.3	12	10.4	6	5.2	115	100.0
12. Volunteers in the classroom								
Yes	32	27.8	20	17.4	5	4.3	57	49.6
No	16	13.9	22	19.1	7	6.1	45	39.1
Never asked / don't know	2	1.7	5	4.3	6	5.2	13	11.3
Column totals	50	43.5	47	40.9	18	15.7	115	100.0

Table 3.8 continued

13. A part-time or full-time paraprofessional								
	Needed							
	Yes		No		Never asked/ don't know		Row totals	
Available	Fz	%	Fz	%	Fz	%	Fz	%
Yes	99	86.1	3	2.6	0	0.0	102	88.7
No	5	4.3	3	2.6	2	1.7	10	8.7
Never asked / don't know	2	1.7	0	0.0	1	0.9	3	2.6
Column totals	106	92.2	6	5.2	3	2.6	115	100.0
14. Consultation or regular contact with a speech-language pathologist								
Yes	97	84.3	13	11.3	1	0.9	111	96.5
No	1	0.9	0	0.0	1	0.9	2	1.7
Never asked / don't know	1	0.9	0	0.0	1	0.9	2	1.7
Column totals	99	86.1	13	11.3	3	2.6	115	100.0
15. Consultation or regular contact with a physical therapist								
Yes	80	69.6	10	8.7	1	0.9	91	79.1
No	16	13.9	1	0.9	1	0.9	18	15.7
Never asked / don't know	2	1.7	1	0.9	3	2.6	6	5.2
Column totals	98	85.2	12	10.4	5	4.3	115	100.0
16. Consultation or regular contact with an occupational therapist								
Yes	85	73.9	11	9.6	2	1.7	98	85.2
No	14	12.2	0	0.0	1	0.9	15	13.0
Never asked / don't know	0	0.0	0	0.0	2	1.7	2	1.7
Column totals	99	86.1	11	9.6	5	4.3	115	100.0

Table 3.8 continued

Available	Needed: Yes Fz	Needed: Yes %	Needed: No Fz	Needed: No %	Needed: Never asked/ don't know Fz	Needed: Never asked/ don't know %	Row totals Fz	Row totals %
17. Consultation or regular contact with a psychologist								
Yes	53	46.1	12	10.4	4	3.5	69	60.0
No	21	18.3	8	7.0	8	7.0	37	32.2
Never asked / don't know	4	3.5	0	0.0	5	4.3	9	7.8
Column totals	78	67.8	20	17.4	17	14.8	115	100.0
18. Consultation or regular contact with a nurse								
Yes	85	73.9	9	7.8	5	4.3	99	86.1
No	8	7.0	4	3.5	1	0.9	13	11.3
Never asked / don't know	0	0.0	1	0.9	2	1.7	3	2.6
Column totals	93	80.9	14	12.2	8	7.0	115	100.0
19. Consultation or regular contact with a social worker								
Yes	37	32.2	7	6.1	2	1.7	46	40.0
No	23	20.0	18	15.7	9	7.8	50	43.5
Never asked / don't know	1	0.9	7	6.1	11	9.6	19	16.5
Column totals	61	53.0	32	27.8	22	19.1	115	100.0
20. Consultation or regular contact with a special educator outside the area of deafness								
Yes	45	39.1	4	3.5	5	4.3	54	47.0
No	19	16.5	23	20.0	4	3.5	46	40.0
Never asked / don't know	10	8.7	1	0.9	4	3.5	15	13.0
Column totals	74	64.3	28	24.3	13	11.3	115	100.0

Table 3.8 continued

21. Consultation or regular contact with a behavior specialist (or behavior consultant)								
	Needed							
	Yes		No		Never asked/ don't know		Row totals	
Available	Fz	%	Fz	%	Fz	%	Fz	%
Yes	43	37.4	10	8.7	1	0.9	54	47.0
No	34	29.6	8	7.0	2	1.7	44	38.3
Never asked / don't know	8	7.0	2	1.7	7	6.1	17	14.8
Column totals	85	73.9	20	17.4	10	8.7	115	100.0
22. Consultation or regular contact with someone knowledgeable about children who are deaf plus or an expert in the area of "deaf plus"								
Yes	36	31.3	2	1.7	2	1.7	40	34.8
No	45	39.1	9	7.8	5	4.3	59	51.3
Never asked / don't know	11	9.6	0	0.0	5	4.3	16	13.9
Column totals	92	80.0	11	9.6	12	10.4	115	100.0
23. Principal/supervisor who is supportive of you teaching students who are deaf plus								
Yes	99	86.1	0	0.0	0	0.0	99	86.1
No	13	11.3	0	0.0	0	0.0	13	11.3
Never asked / don't know	2	1.7	0	0.0	1	0.9	3	2.6
Column totals	114	99.1	0	0.0	1	0.9	115	100.0
24. Additional lesson planning time to modify instruction and materials for students who are deaf plus								
Yes	30	26.1	1	0.9	0	0.0	31	27.0
No	67	58.3	5	4.3	3	2.6	75	65.2
Never asked / don't know	6	5.2	0	0.0	3	2.6	9	7.8
Column totals	103	89.6	6	5.2	6	5.2	115	100.0

Table 3.8 continued

Available	Needed: Yes Fz	Needed: Yes %	Needed: No Fz	Needed: No %	Needed: Never asked/ don't know Fz	Needed: Never asked/ don't know %	Row totals Fz	Row totals %
25. You feel support from families of students in your class								
Yes	89	77.4	0	0.0	1	0.9	90	78.3
No	23	20.0	2	1.7	0	0.0	25	21.7
Never asked / don't know	0	0.0	0	0.0	0	0.0	0	0.0
Column totals	112	97.4	2	1.7	1	0.9	115	100.0
26. Regular team meetings with specialists to discuss the student(s) who is(are) deaf plus								
Yes	53	46.1	2	1.7	1	0.9	56	48.7
No	40	34.8	4	3.5	1	0.9	45	39.1
Never asked / don't know	12	10.4	0	0.0	2	1.7	14	12.2
Column totals	105	91.3	6	5.2	4	3.5	115	100.0
27. Family of student(s) who is(are) deaf plus available to discuss coordination of efforts related to their child (e.g., sharing details of child's progress, brainstorming, addressing barriers)								
Yes	71	61.7	0	0.0	1	0.9	72	62.6
No	30	26.1	1	0.9	0	0.0	31	27.0
Never asked / don't know	6	5.2	0	0.0	6	5.2	12	10.4
Column totals	107	93.0	1	0.9	7	6.1	115	100.0
28. Opportunities for joint lesson planning or to brainstorm ideas for individualization of instruction and materials, to share experiences, and for shared problem-solving								
Yes	52	45.2	2	1.7	2	1.7	56	48.7
No	39	33.9	4	3.5	2	1.7	45	39.1
Never asked / don't know	8	7.0	1	0.9	5	4.3	14	12.2
Column totals	99	86.1	7	6.1	9	7.8	115	100.0

Table 3.8 continued

29. Release time for meetings

	Needed							
	Yes		No		Never asked/ don't know		Row totals	
Available	Fz	%	Fz	%	Fz	%	Fz	%
Yes	53	46.1	3	2.6	0	0.0	56	48.7
No	28	24.3	4	3.5	7	6.1	39	33.9
Never asked / don't know	5	4.3	1	0.9	14	12.2	20	17.4
Column totals	86	74.8	8	7.0	21	18.3	115	100.0

Note: Regular contact means at least once per month

Table 3.9
Cross tabulation of frequency (Fz) and percent (%) of responses
by need and availability of categorized supports and resources

Category 1: Training (5 items x 115 participants = 575 responses)								
	Needed							
	Yes		No		Never asked/ don't know		Row totals	
Available	Fz	%	Fz	%	Fz	%	Fz	%
Yes	174	30.3	13	2.3	2	0.3	189	32.9
No	210	36.5	41	7.1	15	2.6	266	46.3
Never asked/ don't know	66	11.5	14	2.4	40	7.0	120	20.9
Column totals	450	78.3	68	11.8	57	9.9	575	100.0
Category 2: Physical and material resources (6 items x 115 participants = 690 responses)								
Yes	338	49.0	30	4.3	7	1.0	375	54.3
No	172	24.9	31	4.5	7	1.0	210	30.4
Never asked/ don't know	51	7.4	11	1.6	43	6.2	105	15.2
Column totals	561	81.3	72	10.4	57	8.3	690	100.0
Category 3: Additional Personnel (11 items x 115 participants = 1265 responses)								
Yes	692	54.7	101	8.0	28	2.2	821	64.9
No	202	16.0	96	7.6	41	3.2	339	26.8
Never asked/ don't know	41	3.2	17	1.3	47	3.7	105	8.3
Column totals	935	73.9	214	16.9	116	9.2	1265	100.0
Category 4: Personal support (3 items x 115 participants = 345 responses)								
Yes	218	63.2	1	0.3	1	0.3	220	63.8
No	103	29.9	7	2.0	3	0.9	113	32.8
Never asked/ don't know	8	2.3	0	0.0	4	1.2	12	3.5
Column totals	329	95.4	8	2.3	8	2.3	345	100.0
Category 5: Meetings and time for meetings (4 items x 115 participants = 460 responses)								
Yes	229	49.8	7	1.5	4	0.9	240	52.2
No	137	29.8	13	2.8	10	2.2	160	34.8
Never asked/ don't know	31	6.7	2	0.4	27	5.9	60	13.0
Column totals	397	86.3	22	4.8	41	8.9	460	100.0

Table 3.10
Percent (%) of teacher reported discrepancy ranked largest to smallest

			Discrepant		
Cat	Rank	Items of support	Yes	No	Not certain
4	1	Additional lesson planning time	58.3	26.1	5.2
1	2	Beginning-of-the-year inservice training	51.3	20.9	5.2
1	3	Ongoing inservice training or consultation	44.3	39.1	3.5
2	4	Extra money for materials and supplies	41.7	37.4	9.6
2	5	Written information on how to adapt	39.1	30.4	14.8
3	5	Someone with knowledge of students who are deaf plus *	39.1	31.3	9.6
5	7	Regular meetings with team of specialists	34.8	46.1	10.4
5	8	Meet to plan lessons jointly, brainstorm ideas, share experiences, and problem-solve	33.9	45.2	7.0
1	9	Access to university courses	33.0	14.8	14.8
1	10	Opportunities to attend conferences	29.6	37.4	20.0
2	10	Reduced class size	29.6	51.3	3.5
3	10	Behavior specialist *	29.6	37.4	7.0
5	13	Family available to discuss coordination	26.1	61.7	5.2
1	14	Opportunities to observe other teachers	24.3	39.1	13.9
5	14	Release time for meetings	24.3	46.1	4.3
3	16	Social worker *	20.0	32.2	0.9
4	16	Feel support from families of students	20.0	77.4	0.0
3	18	Psychologist *	18.3	46.1	3.5
2	19	Access to special education journals	17.4	30.4	14.8
3	20	Special educator outside the area of deafness *	16.5	39.1	8.7
2	21	Accessible bathroom within close vicinity	13.9	65.2	0.0
3	21	Volunteers in the classroom	13.9	27.8	1.7
3	21	Physical therapist *	13.9	69.6	1.7
3	24	Occupational therapist *	12.2	73.9	0.0
4	25	Supportive principal or supervisor	11.3	86.1	1.7
2	26	Physical layout of the classroom adapted	7.8	79.1	1.7
3	27	Nurse *	7.0	73.9	0.0
3	28	Part-time or full-time paraprofessional	4.3	86.1	1.7
3	29	Speech-language pathologist *	0.9	84.3	0.9

Note: Cat = Category; Yes = reported as needed but not available; No = reported as needed and available; Not certain = reported as needed but uncertain of availability; Asterisk (*) indicates supports including regular contact or consultation with these related service professionals.

Table 3.11
Statistical[a] comparisons of perceived availability, need, and discrepancy of supports and resources in categories for investigated factors

Self-perception of effectiveness when teaching a student who is deaf plus

	Availability	Need	Discrepancy
Support category	$F(2,111)=$	$F(2,111)=$	$F(2,111)=$
Training	2.602	2.520	1.854
Physical/Material	4.177*	.320	2.466
Personnel	1.133	.431	.225
Personal support	5.511**	.017	3.559*
Meetings	4.539*	.144	1.592

Perception of significance of disability of students taught who are deaf plus

	Availability	Need	Discrepancy
Support category	$F(2,164)=$	$t(113)=$	$t(113)=$
Training	†(2,100.517)= .137	-1.67	-1.48
Physical/Material	3.118*	-.82	-3.15**
Personnel	†(2,105.612)= .197	-3.27***	-1.71
Personal support	3.429*	-.31	-1.98*
Meetings	1.534	‡(91.37)= -2.41*	-1.34

Number of years teaching students who are deaf or hard of hearing

	Availability	Need	Discrepancy
Support category	$F(4,110)=$	$F(4,110)=$	$F(4,110)=$
Training	1.003	1.407	4.382**
Physical/Material	†(4,50.742)= 1.383	1.111	2.099
Personnel	.261	.779	1.181
Personal support	.161	†(4,47.717)= 1.034	.834
Meetings	.284	†(4,48.411)= 1.510	1.836

Number of years teaching students who are deaf plus

	Availability	Need	Discrepancy
Support category	$F(4,110) =$	$F(4,110) =$	$F(4,110) =$
Training	.672	1.203	2.865*
Physical/Material	†(4,48.744)= 1.660	.929	†(4,48.863)= .920
Personnel	.283	1.075	†(4,48.333)= 2.292
Personal support	.443	†(4,52.023)= 1.020	.626
Meetings	.832	†(4,52.867)= 1.914	1.544

Table 3.11 continued

Amount of college coursework about students with disabilities

	Availability	Need	Discrepancy
Support category	$F(2,112)$ =	$F(2,112)$ =	$F(2,112)$ =
Training	.406	.185	.196
Physical/Material	2.222	1.159	1.248
Personnel	1.760	.222	1.253
Personal support	.810	†(2,25.518)= 1.441	†(2,31.006)= 3.278
Meetings	.666	3.607*	.155

Amount of college coursework about students who are deaf plus

	Availability	Need	Discrepancy
Support category	$F(2,112)$=	$F(2,112)$=	$F(2,112)$=
Training	1.752	.664	.393
Physical/Material	.960	.239	.496
Personnel	1.874	.742	.795
Personal support	2.672	†(2,33.815)= .913	2.641
Meetings	.718	†(2,36.004)= 2.029	.124

Participation in inservice training about teaching students with disabilities

	Availability	Need	Discrepancy
Support category	$t(113)$ =	$t(113)$ =	$t(113)$ =
Training	1.69	- .32	‡(70.18)= -1.57
Physical/Material	3.37***	.01	-2.30*
Personnel	- .01	- .32	.54
Personal support	2.12*	‡(44.66)= 1.26	-1.31
Meetings	1.37	1.92	- .67

Participation in inservice training about teaching students who are deaf plus

	Availability	Need	Discrepancy
Support category	$t(113)$ =	$t(113)$ =	$t(113)$ =
Training	4.52***	- .24	-2.31*
Physical/Material	3.02**	- .10	-1.83
Personnel	‡(48.82)= - .38	- .89	.31
Personal support	2.14*	‡(55.33)= - .93	-2.24*
Meetings	2.73**	.04	-2.37*

Notes: a = ANOVA and t-tests; † = Welch's ANOVA; ‡ = Equal variances not assumed
* ≤ .05, ** ≤ .01, *** ≤ .001

Table 3.12
Frequency distribution table of participants in subgroups related to effectiveness rating (Group A only)

	Group A (n = 115)	
Effectiveness rating subgroup	Fz	%
Not effective	0	0.0
Somewhat effective	28	24.3
Effective	62	53.9
Highly effective	24	20.9
No response	1	0.9

Table 3.13
Frequency distribution table of participants in subgroups related to significance of disability rating

	Group A (n = 115)		Group B (n = 52)	
Rated significance of disability	Fz	%	Fz	%
No concomitant disability (Group B only)	-	-	52	100.0
Less significant disabilities (Group A only)	53	46.1	-	-
More significant disabilities (Group A only)	62	53.9	-	-

Table 3.14
Frequency distribution table of participants in subgroups related to teaching experience

Years teaching students who are deaf or hard-of-hearing	Both groups (n = 167)		Group A (n = 115)		Group B (n = 52)	
Subgroup	Fz	%	Fz	%	Fz	%
1-2 years	31	18.6	19	16.5	12	23.1
3-5 years	29	17.4	16	13.9	13	25.0
6-10 years	34	20.4	28	24.3	6	11.5
11-17 years	33	19.8	28	24.3	5	9.6
18+ years	40	24.0	24	20.9	16	30.8
Years teaching students who are deaf plus	(n = 167)		(n = 115)		(n = 52)	
Subgroup	Fz	%	Fz	%	Fz	%
1-2 years	52	31.1	27	23.5	25	48.1
3-5 years	36	21.6	27	23.5	9	17.3
6-10 years	35	21.0	25	21.7	10	8.7
11-17 years	25	15.0	21	18.3	4	3.5
18+ years	19	11.4	15	13.0	4	3.5

Table 3.15
Frequency distribution table of participants in subgroups related to amount of college coursework

Amount of college coursework about students with disabilities not specific to hearing loss	Both groups (n = 167)		Group A (n = 115)		Group B (n = 52)	
Number of courses	Fz	%	Fz	%	Fz	%
None	16	9.6	11	9.6	5	9.6
1-2 classes	64	38.3	43	37.4	21	40.4
3 or more classes	87	52.1	61	53.0	26	50.0
Amount of college coursework about students who are deaf plus	(n = 167)		(n = 115)		(n = 52)	
Number of courses	Fz	%	Fz	%	Fz	%
None	82	49.1	57	49.6	25	48.0
1-2 classes	67	40.1	44	38.2	23	44.2
3 or more classes	18	10.8	14	12.2	4	7.7

Table 3.16
Frequency distribution table of participants in subgroups related to participation in inservice training

Participation in inservice training about students with disabilities	Both groups (n = 167)		Group A (n = 115)		Group B (n = 52)	
Inservice training	Fz	%	Fz	%	Fz	%
Yes	117	70.1	81	70.4	36	69.2
No	50	29.9	34	29.6	16	30.8
Participation in inservice training about students who are deaf plus	(n = 167)		(n = 115)		(n = 52)	
Inservice training	Fz	%	Fz	%	Fz	%
Yes	53	31.7	36	31.3	17	32.7
No	114	68.3	79	68.7	35	67.3

Table 3.17
Cross tabulation of frequency (Fz) and percent (%) of participants by effectiveness rating and amount of college coursework

Amount of coursework about students with disabilities	Self-perceived effectiveness rating							
	Highly effective		Effective		Somewhat effective		Row totals	
Amount courses	Fz	%	Fz	%	Fz	%	Fz	%
No classes	0	0.0	8	7.0	3	2.6	11	9.7
1-2 classes	5	4.4	21	18.4	17	14.9	43	37.7
3+ classes	19	16.7	33	29.0	8	7.0	60	52.6
Column totals	24	21.1	62	54.4	28	24.6	114	100.0
Amount of coursework about students who are deaf plus	Self-perceived effectiveness rating							
	Highly effective		Effective		Somewhat effective		Row totals	
Amount courses	Fz	%	Fz	%	Fz	%	Fz	%
No classes	11	9.7	29	25.4	17	14.9	57	50.0
1-2 classes	7	6.1	26	22.8	10	8.8	43	37.7
3+ classes	6	5.3	7	6.1	1	0.9	14	12.3
Column totals	24	21.1	62	54.4	28	24.6	114	100.0

Table 3.18
Cross tabulation of frequency (Fz) and percent (%) of participants
by effectiveness rating and participation in inservice training

Participation in inservice training about students with disabilities

	Self-perceived effectiveness rating							
	Highly effective		Effective		Somewhat effective		Row totals	
Amount courses	Fz	%	Fz	%	Fz	%	Fz	%
Yes	21	18.4	42	36.8	17	14.9	80	70.2
No	3	2.6	20	17.5	11	9.6	34	29.8
Column totals	24	21.1	62	54.4	28	24.6	114	100.0

Participation in inservice training about students who are deaf plus

	Self-perceived effectiveness rating							
	Highly effective		Effective		Somewhat effective		Row totals	
Amount courses	Fz	%	Fz	%	Fz	%	Fz	%
Yes	12	10.5	17	14.9	6	5.3	35	30.7
No	12	10.5	45	39.5	22	19.3	79	69.3
Column totals	24	21.1	62	54.4	28	24.6	114	100.0

Table 3.19
Frequency distribution table of participants
who selected each area of study

	Both groups (n = 167)		Group A (n = 115)		Group B (n = 52)	
Area of study	Fz	%	Fz	%	Fz	%
None	0	0.0	0	0.0	0	0.0
General education	70	41.9	46	40.0	24	46.1
Deaf education	124	74.3	86	75.0	38	73.1
Special education	57	34.1	47	41.0	10	19.2
Early childhood / early intervention	30	18.0	17	14.8	13	25.0
Communication disorders	30	18.0	25	21.7	5	9.6
Educational leadership/administration	12	7.2	11	9.4	1	1.9
Listening and spoken language	14	8.4	7	6.1	7	13.5
Sign language	12	7.2	9	9.4	3	5.8
Deaf studies	10	6.0	7	6.1	3	5.8
Psychology	9	5.4	9	9.4	0	0.0
Child or human development	5	3.0	3	2.6	2	3.8
Family science/systems	2	1.2	1	0.8	1	1.9
Other	28	16.8	18	15.7	10	19.2

Note: Participants could select more than one area of study

Table 3.20
Frequency distribution table of participants in subgroups related to selected areas of study

	Both groups (*n* = 167)		Group A (*n* = 115)		Group B (*n* = 52)	
Categories of areas of study	Fz	%	Fz	%	Fz	%
General education (GE)	15	9.0	7	6.1	8	15.4
Special education (SE)	16	9.6	15	13.0	1	1.9
Deaf education (DE)	56	33.5	34	29.6	22	42.3
Special and Deaf education (S&D)	22	13.2	18	15.7	4	7.7
Communication disorders (CD)	25	15.0	21	18.3	4	7.7
Early childhood/Early intervention (EC)	25	15.0	13	11.3	12	23.1
EC&CD	5	3.0	4	3.5	1	1.9
Other	3	1.8	3	2.6	0	0.0

Note: GE = general education only; SE = any combination special education and general education (no deaf education); DE = any combination deaf education and general education (no special education); S&D = any combination special, general, and deaf education; CD = any combination general, special, deaf education and communication disorders; EC = any combination general, special, deaf education and early intervention /early childhood; EC&CD = any combination general, special, deaf education with early childhood/early intervention and communication disorders

Table 3.21
Cross tabulation of frequency (Fz) and percent (%) of participants by area of study and amount of coursework

Amount of coursework about students with disabilities							
		No classes		1-2 classes		3+ classes	
Area of study	*n*	Fz	%	Fz	%	Fz	%
General education (GE)	15	5	33.3	9	60.0	1	6.7
Special education (SE)	16	2	12.5	2	12.5	12	75.0
Deaf education (DE)	56	3	5.4	32	57.1	21	37.5
Special & Deaf education (S&D)	22	0	0.0	6	27.3	16	72.7
Communication Disorders (CD)	25	2	8.0	10	40.0	13	52.0
Early childhood/Early intervention (EC)	25	2	8.0	4	16.0	19	76.0
EC&CD	5	0	0.0	2	40.0	3	60.0
Amount of coursework about students who are deaf plus							
		No classes		1-2 classes		3+ classes	
Area of study	*n*	Fz	%	Fz	%	Fz	%
General education (GE)	15	12	80.0	1	6.7	2	13.3
Special education (SE)	16	9	56.3	5	31.25	2	12.5
Deaf education (DE)	56	28	50.0	26	46.4	2	3.6
Special & Deaf education (S&D)	22	11	50.0	7	31.8	4	18.2
Communication Disorders (CD)	25	10	40.0	10	40.0	5	20.0
Early childhood/Early intervention (EC)	25	10	40.0	13	52.0	2	8.0
EC&CD	5	1	20.0	4	80.0	0	0.0

Note: GE = general education only; SE = any combination special education and general education (no deaf education); DE = any combination deaf education and general education (no special education); S&D = any combination special, general, and deaf education; CD = any combination general, special, deaf education and communication disorders; EC = any combination general, special, deaf education and early intervention /early childhood; EC&CD = any combination general, special, deaf education with early childhood/early intervention and communication disorders

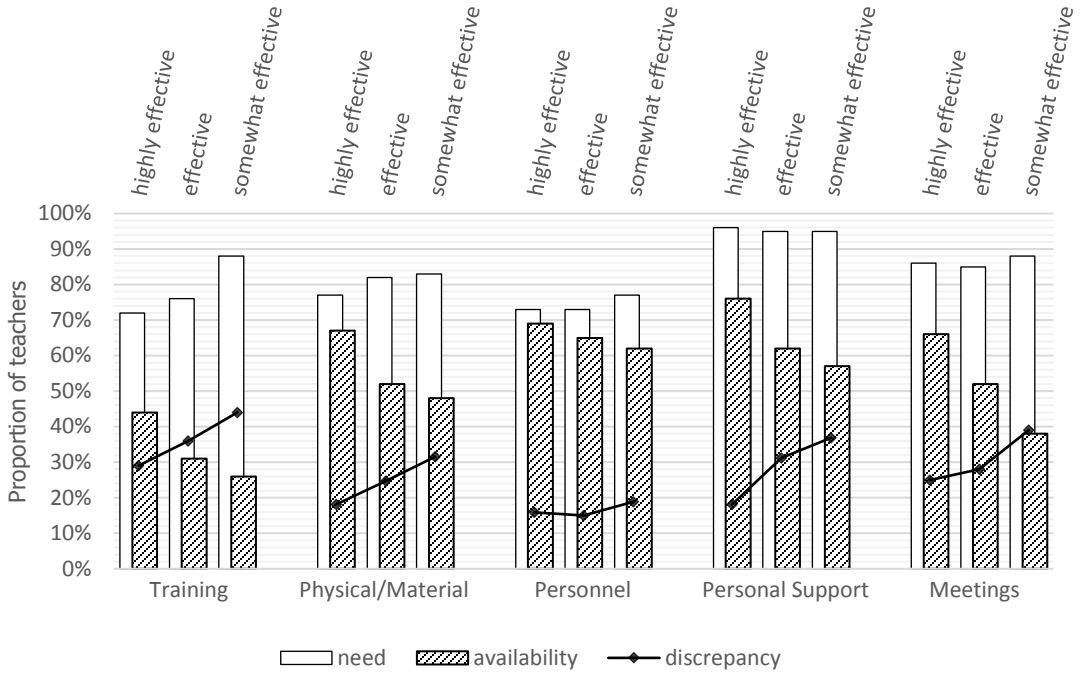

Figure 3.1 Subgroup measures of perceived need, availability, and discrepancy: Self-reported perception of teacher effectiveness

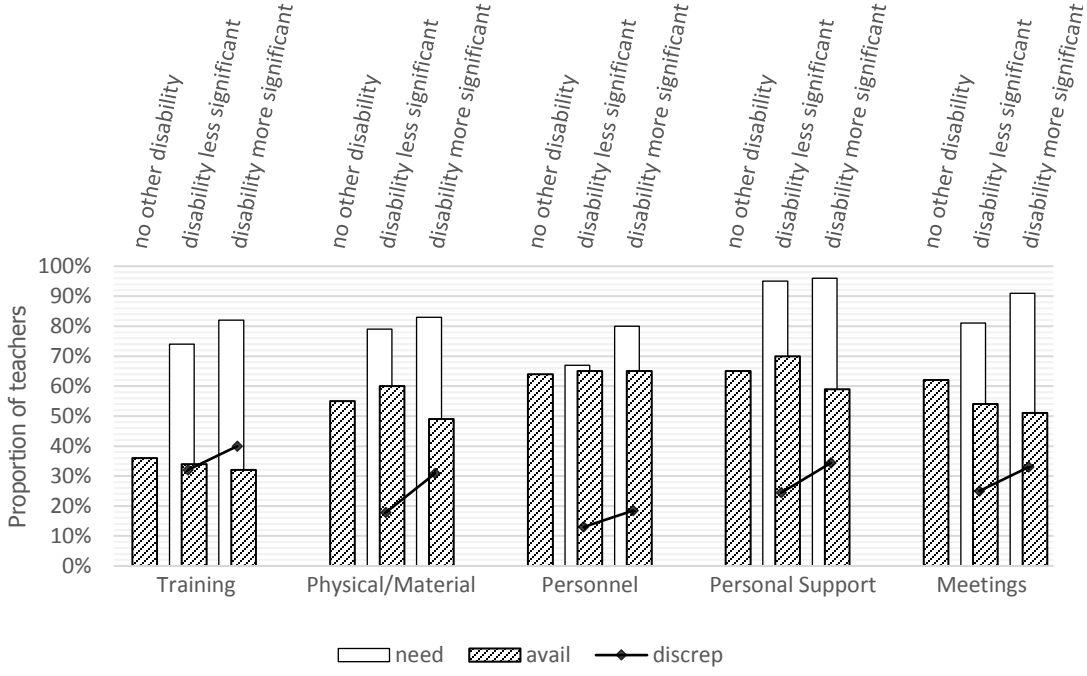

Figure 3.2 Subgroup measures of perceived availability, need, and discrepancy: Perceived significance of disability of one student taught

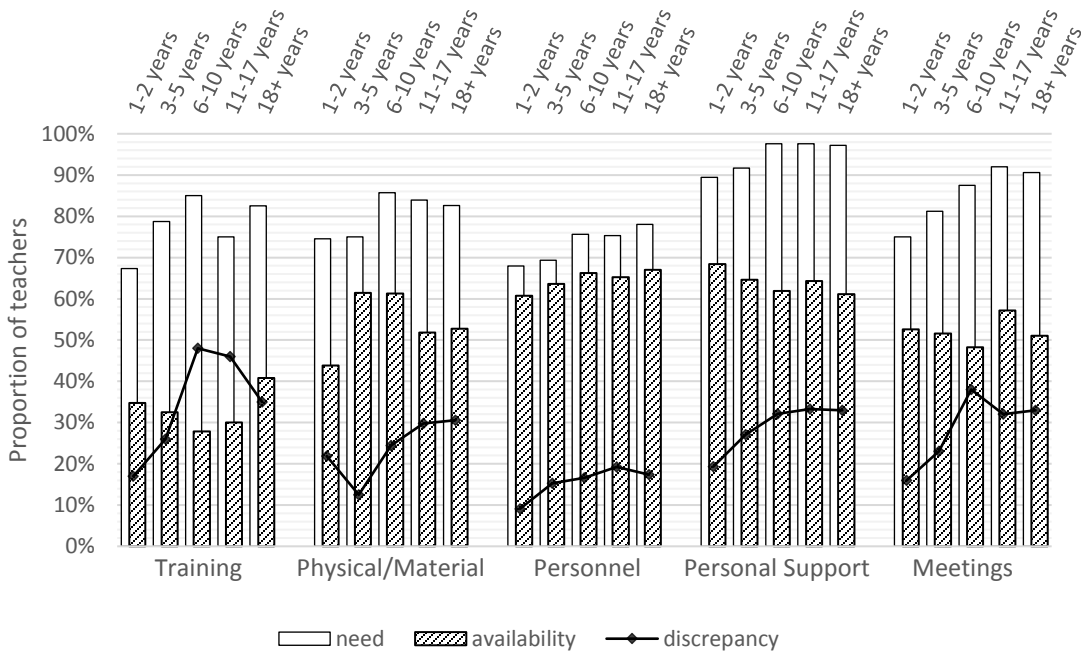

Figure 3.3 Subgroup measures of perceived need, availability, and discrepancy: Number of years teaching students who are deaf or hard-of-hearing

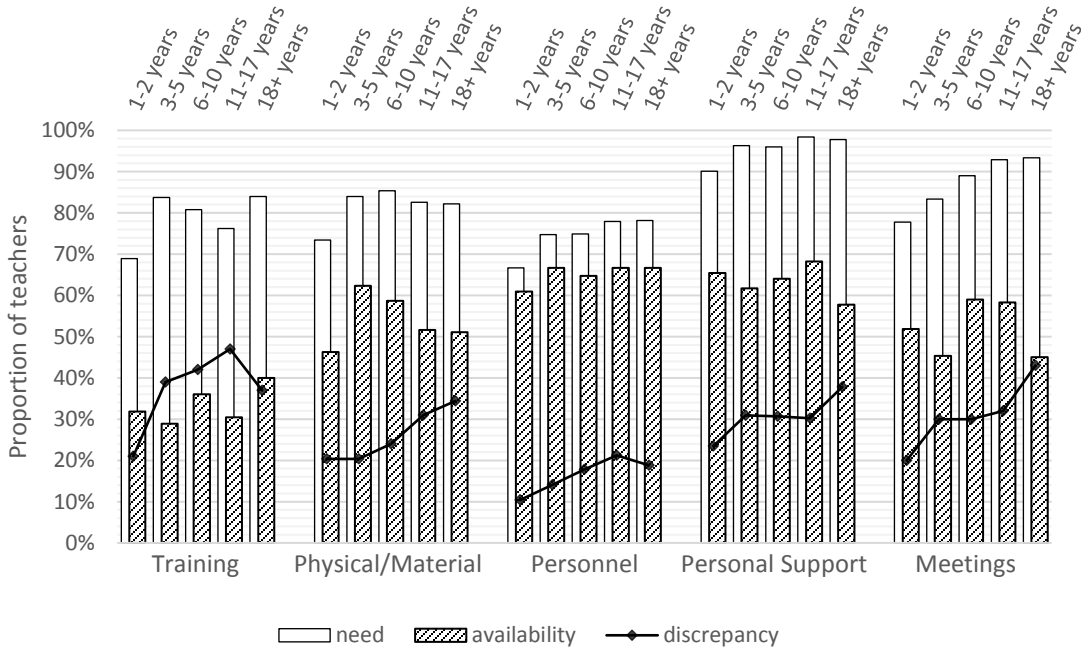

Figure 3.4 Subgroup measures of perceived availability, need, and discrepancy: Number of years teaching students who are deaf plus

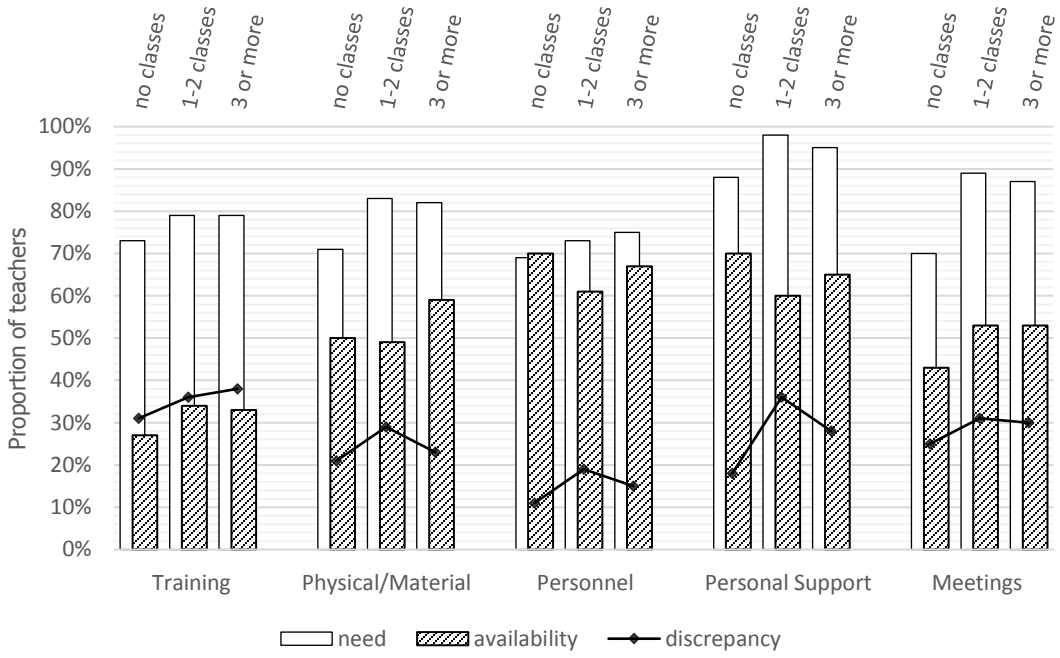

Figure 3.5 Subgroup measures of perceived availability, need, and discrepancy: Amount of college coursework about students with disabilities

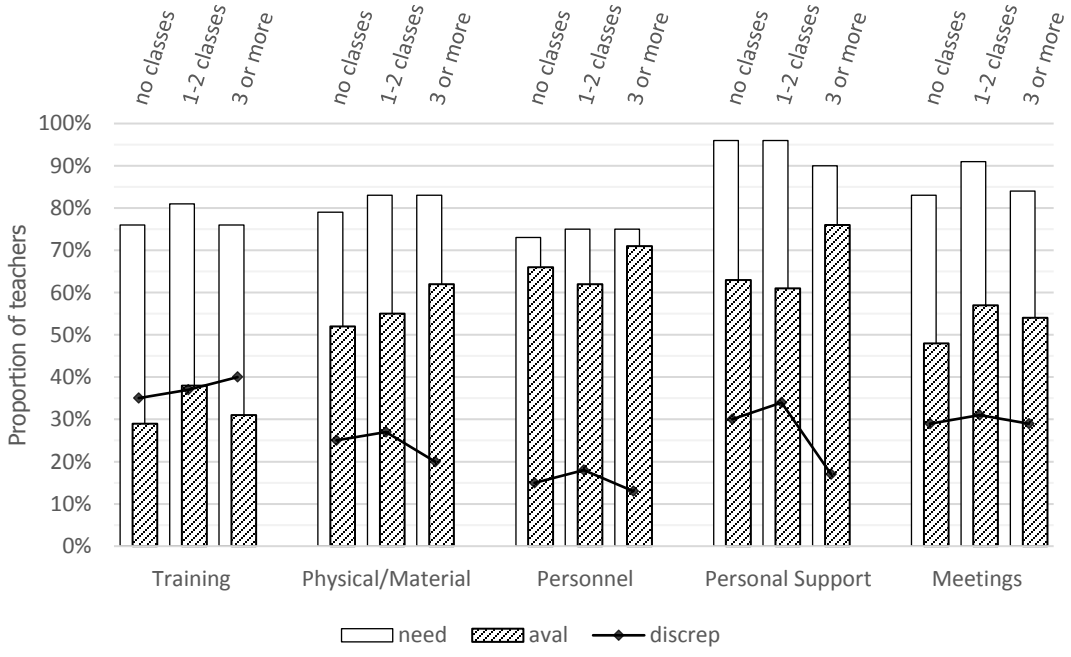

Figure 3.6 Subgroup measures of perceived availability, need, and discrepancy: Amount of college coursework about students who are deaf plus

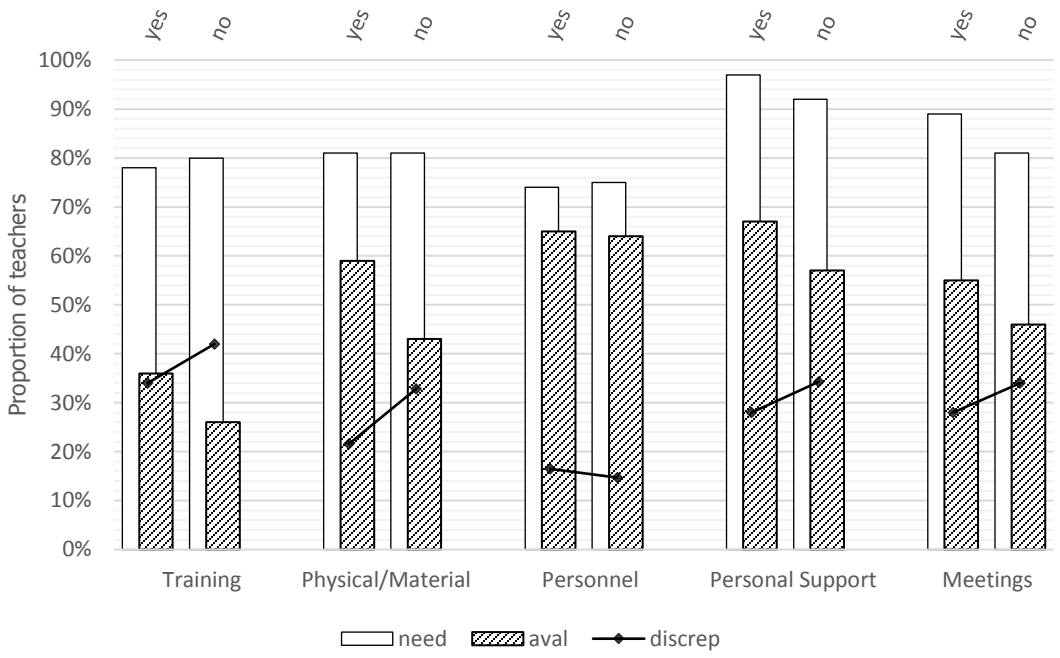

Figure 3.7 Subgroup measures of perceived availability, need, and discrepancy: Participation in inservice trainings about students with disabilities

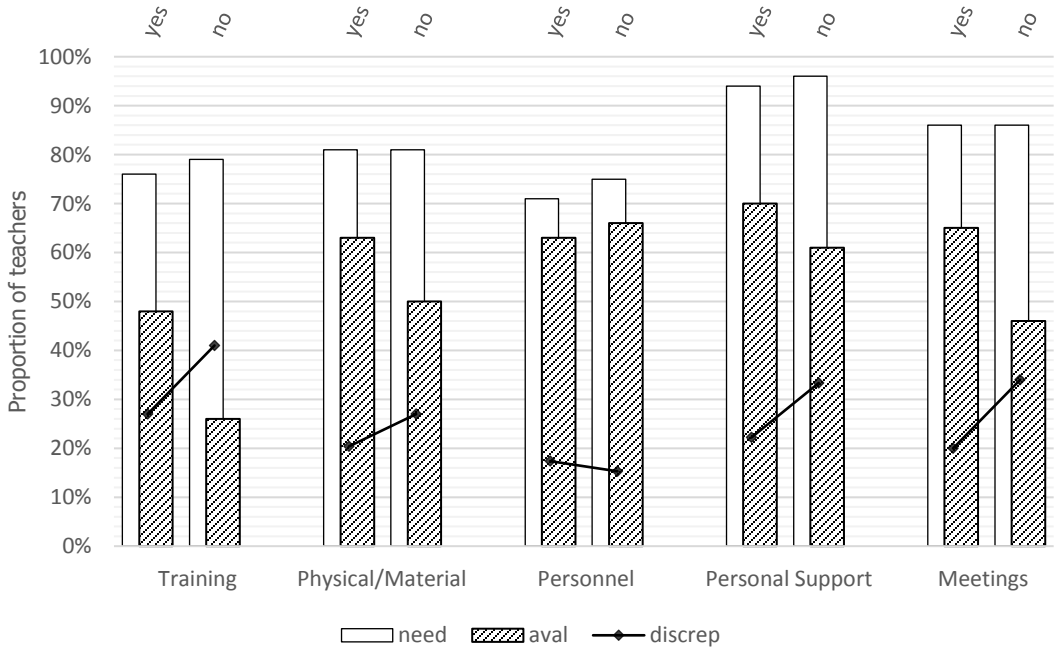

Figure 3.8 Subgroup measures of perceived availability, need, and discrepancy: Participation in inservice trainings about students who are deaf plus

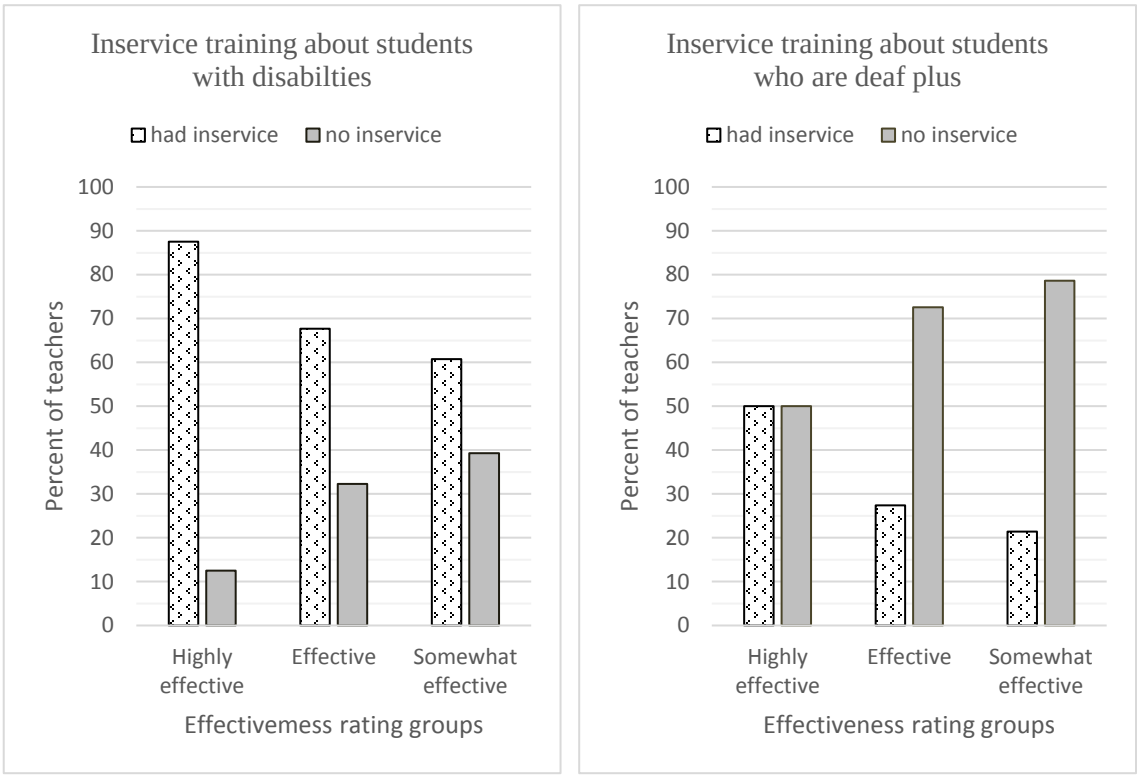

Figure 3.9 Participation in inservice training by effectiveness rating groups

CHAPTER 4

DISCUSSION

While the prevalence of concomitant disabilities in the population of students who are DHH is high, many experts in the field agree that literature regarding educational experiences of students who are deaf plus and those who teach them is limited (Guardino, 2008; Jones & Jones, 2003; Luckner & Carter, 2001; Mauk & Mauk, 1992; Spencer & Marschark, 2010). Extant literature reveals a need for training among teachers regarding effective instructional practices for teaching students who are deaf plus (Harrison, 2007; Jones & Ewing, 2002; LaSasso & Wilson, 2002; Luckner et al., 2003; Rosen, 2009); however, knowledge of evidence-based effective strategies useful for this student population is lacking (Borders & Bock, 2012; Luckner & Carter, 2001). Special education research has found that teacher perception of lack of adequate skills to teach students with disabilities is related to negative teacher attitude and has potential to negatively impact student outcomes (Buell et al., 1999; Sze, 2009). Educational literature also includes findings that provision of support to teachers of students with disabilities improved teacher attitude and perception of effectiveness to teach such students (Buell et al., 1999; Cullen et al., 2010; Forlin et al., 2009; Scruggs & Mastropieri, 1996; Sze, 2009; Werts, Wolery, Snyder, Caldwell, & Salisbury, 1996; Wolery et al., 1995). In an effort to investigate teacher access to needed supports and resources when teaching students who

are deaf plus, this national survey of teachers educating students who are DHH was conducted.

This descriptive study investigated teacher perception of the need for supports and resources and the availability of such supports and resources in the education of students who are deaf plus. More than a dozen significant findings were identified based on survey outcomes. One major finding is that 68.9% of participating teachers reported teaching students who are deaf plus. It may be that teachers of students who are deaf plus were overrepresented as participants because of their interest in the topic of the survey. However, this finding aligns with an outcome of a previous study that more than 50% of teachers of students who are DHH had in their classroom students who were deaf plus (Borders & Bock, 2012). These findings indicate the importance of research that prioritizes increased understanding in the field of special education and deafness of topics related to educational experiences of students who are deaf plus and those who teach them. Discussion of major findings of this study and their implications for practice are organized into the following themes: (a) teacher perception of need and availability, (b) provision of supports, and (c) preparation and training of teachers. Discussion regarding these major findings are followed by study limitations, implications for practice, topics for future research, and concluding remarks.

Teacher Perception of Need and Availability

This study investigated perceptions of participants about which supports and resources are needed when teaching a student who is deaf plus and that are available in their teaching assignments. Discussion of study outcomes ensues as follows: (a)

participant perceptions of need for supports, (b) participant perceptions of availability of supports, (c) uncertainty about need or availability of supports, and (d) the impact of factors on perception of need and availability.

Participant Perceptions of Need for Supports

A major finding was that teachers perceive a need for support when teaching students who are deaf plus. Each of the enumerated supports except one (volunteers in the classroom) was considered to be needed by at least half of participants teaching students who are deaf plus. This finding suggests the importance of provision of supports to teachers of students who are deaf plus. Resources in the category of personal support (Category 4) had the highest percentage of need (95%). The next highest average percentages of need were for physical/material resources (Category 2) and for meetings or time for meetings (Category 5). Although reported need for supports related to training (Category 1) and additional personnel (Category 3) were lower compared to other categories, both were perceived as needed by a large percentage of teachers, 78% and 74%, respectively. Administrators with desires to support teachers of students who are deaf plus could work toward prioritization of supports by conversing with teachers regarding which supports would address their needs, and prioritization could occur based on which supports would most effectively address individual teachers' needs. Teachers also have a role in accessing needed supports as they recognize when they need support, identify which supports are needed, and communicate their needs. In Table 3.6, the supports with the highest percentages of need are *a supportive principal or supervisor*, *feeling support from families of students*, and *family available to discuss coordination*

efforts. The first two are subjective and, therefore, difficult to operationalize. For example, a supervisor may execute the same strategies with multiple teachers, and one may feel supported whereas another may not. Administrators and teachers may choose to dialogue about this and other subjective supports to ensure that availability matches need.

Participant Perceptions of Availability of Supports

A finding related to perceived availability of supports was agreement between both groups of participants—those who were and were not teaching at least one student who is deaf plus—about which supports were most available in their educational settings. This agreement between groups contributes to validation of availability data. Category 3: Additional Personnel and Category 4: Personal Supports had the highest percentages of teachers that reported availability. Training supports (Category 1) was reported to be available by only 32.9% of participants; this was the only category of supports for which perceived availability was below 50%. Although this will be discussed more in a subsequent section dedicated to the topic of training, items of support related to training require access to personnel with specialized knowledge and skills pertinent to teaching students who are deaf plus. This could occur through collaboration with colleges or universities with expertise in the topic.

Availability of supports is dependent on resources. For example, supports such as *extra money* or *extra planning time,* require financial and temporal resources. Others, such as *team meetings to discuss needs of students who are deaf plus,* require temporal and personnel resources. It follows that needed supports may not be immediately available if dependent on budget allocation or preplanning. It is possible for a teacher to

attribute a lack of availability of desired support to a supervisor's lack of concern, when in actuality a supervisor may want to make the support available but does not have the authority or resources to do so. To avoid misunderstandings, it may be beneficial during discussions about supports, for administrators or supervisors to share with teachers reasons why a requested support is not available.

Uncertainty About Need or Availability of Supports

Similar to measures of availability and need, study outcomes related to measures of uncertainty may not be representative of uncertainty in individual programs or of individual teachers. Uncertainty about availability of items also considered to be needed by high percentages of participants is potentially more concerning compared to uncertainty about items not considered to be highly needed. In this investigation, items with the highest percentage of participants uncertain about availability included *access to special education journals* (62.6% of participants reported this item as needed), *access to university courses about teaching students who are deaf plus* (62.6% of participants reported it needed), *written information on how to adapt instruction to meet the needs of students who are deaf plus* (84.3% of participants reported it needed), *opportunities to attend conferences about teaching students who are deaf plus* (87.0% of participants reported it needed), and *opportunities to observe other teachers* (77.4% of participants reported it needed). Supervisors may need to investigate the extent to which teachers know the array of supports available in their program. Even when access to journals or university coursework is available through a program, it is possible that not every teacher in that program knows of their availability. Categories of support with the lowest

percentage of participants uncertain about availability were Category 4: Personal Support (5.2% average) and Category 3: Additional Personnel *(8.3% average)*. Participants were least certain about availability of supports in Category 1: Training (20.9% average). Items for which at least 15% of participants expressed uncertainty about both need and availability included *access to special education journals, access to college coursework, regular contact or consultation with a social worker,* and *release time for meetings*.

Reasons for uncertainty are unknown. Teacher uncertainty about availability of a support likely means they have not asked about availability. This may indicate that they do not perceive the support as needed. It might also mean that they do not know the breadth of supports available in their workplace, or they do not work in a setting in which support of teachers is the culture, or they do not want to be perceived by others as needing support. Uncertainty about need is also difficult to interpret. Similar to uncertainly about availability, it cannot be assumed that a teacher who reports uncertainty about need is communicating that the support is not needed. There are various possible reasons for uncertainty regarding need. For example, 15% of participants were uncertain of the need for volunteers in the classroom. It may be that participants had experience with multiple volunteers, some of whom were helpful, and others who were not. Participants may also be uncertain about the extent to which a support is helpful or needed if they have never received that support. Uncertainty regarding need may also reflect cost-to-benefit perspectives. As an example, although university coursework would be beneficial, a teacher may feel that time or resources required for participation in semester-long class is high and not worth the benefit. When this is the case, universities and programs could partner to explain to them why classes might be worth the benefit or

to offer shorter classes targeted toward educators in classrooms of students who are deaf plus. In summary, findings suggest that teachers may be uncertain about need or availability of supports. This suggests that dialogue between supervisors and teachers regarding need for and availability of supports could alleviate uncertainty and enhance provision of supports.

Impact of Investigated Factors on Perception of Need and Availability

Several factors were investigated to determine their impact on teacher perception of need and availability of supports. Impact of the following factors are addressed in this discussion: (a) teaching experience, (b) inservice training, (c) perception of effectiveness, and (d) perceived significance of disability. Although amount of college coursework was an investigated factor, statistical analysis did not reveal a large number of significant differences between subgroups, nor were patterns identified from visual analysis of the data; therefore, this factor is not discussed.

Impact of Teaching Experience

Need and availability data for subgroups related to teaching experience are in Figure 3.3. Supports in the category of training were less discrepant for teachers who had taught for 1-2 years than teachers who taught for either 6-10 years or 11-17 years. This was true for both factors: (a) number of years teaching students who are DHH and (b) number of years teaching students who are deaf plus. Although this was the only statistically significant difference between groups, a pattern was observed from visual analysis. For three categories of support (training, personal support, and meetings), when

comparing three subgroups (1-2 years, 3-5 years, and 6-10 years), perceived need rises and perceived availability decreases with teaching experience, and as a result, discrepancy was lowest for teachers who have taught for fewer years, and greatest for the group of teachers who taught for 6-10 years. This may be due to the amount of mentoring and support teachers receive in their first years of teaching (Claycomb & Hawley, 2000; Ingersoll, 2012). This finding suggests that there may be a need for continued support of teachers through the first decade of teaching. Although this finding was not exactly replicated for participants teaching students who are deaf plus, a similar pattern was observed. Figure 3.4 reveals that perceived discrepancy for supports in four categories – training, additional personnel, personal support, and meetings – was lower for participants who had taught students who are deaf plus for 1-2 years compared to those who had taught for 3-5 years.

Impact of Inservice Training

Teachers who participated in inservice training perceived several categories of supports to be more available and less discrepant compared to teachers who did not. This was true for both factors: inservice about students with disabilities and inservice about students who are deaf plus. There was not a large difference in perceived need across categories when comparing the two types of inservice training. Upon statistical analysis, it was discovered that inservice training regarding students who are deaf plus was the factor with the highest number of statistically significantly differences in comparisons. Although inservice training was a factor that impacted teacher perceptions of need and availability of supports, it is important to note that inservice training is one of several

approaches on the professional development continuum, alongside coaching, mentoring, and peer networking, to name a few. The literature states that one-time inservice training alone is not sufficient for teacher growth and learning but is effective when paired with other training options (Thomas, 2016; Villegas-Reimers, 2003). There was no description of inservice training on the survey; therefore, teachers answered the question based on their perspective of what activities are included in inservice training.

Impact of Perception of Effectiveness

The survey used in this study was modeled after two studies that investigated teacher perceptions about availability of and need for supports and resources when teaching students with disabilities in inclusive educational settings (Werts, Wolery, Snyder, Caldwell, & Salisbury, 1996; Wolery et al., 1995). Both this study and Wolery et al. (1995) suggest a relationship between teacher perception of effectiveness/success and perception of availability of supports and resources. Participants in the Wolery et al. study (1995) taught in inclusive classrooms and were asked to rate the success of their inclusion experiences. In this study, participants rated their effectiveness when teaching students who are deaf plus. Self-perception of success is different from self-perception of effectiveness; however, conceptually there is overlap. In both Wolery et al. and the current study, teachers who rated themselves as highly effective or highly successful perceived support items to be more available and less discrepant than teachers who rated their teaching experiences as less effective or less successful. Figure 3.1 represents the impact of self-perception of effectiveness on perception of availability and need. The highly effective group considered supports in every category except for additional

personnel to be more available versus the somewhat effective group who considered supports to be less available. The difference was statistically significant in categories of supports related to physical/material supports, personal supports, and meetings. Teachers who perceived themselves to be somewhat effective considered personal supports to be less available than needed at a level that was significantly higher than teachers who rated themselves as highly effective. Perception of availability of supports were subjective and did not measure actual availability of supports.

Impact of Perceived Significance of Disability

A finding of this study related to perceived significance of disability of students taught was similar to a finding of Werts, Wolery, Snyder, Caldwell, and Salisbury (1996). In both studies, significance of disability data was based on teacher perception and was not verified by any other measures. Each study found a relationship between significance of disability and perception of need, availability, or discrepancy of supports. Participants who taught students with more significant delays perceived supports to be less available and more needed, and therefore, more discrepant compared to teachers who taught students with less significant delays. Figure 3.2 includes availability, need, and discrepancy data for subgroups based on perceived significance of disability. Statistical comparison in this study found the difference in discrepancy was significant for categories of supports related to physical/material supports and personal supports, and the difference in need was significant for categories of supports related to additional personnel and meetings. A plausible explanation for increased need for supports in these categories is that instruction of students with more significant disabilities requires a more

collaborative approach, and collaboration occurs through regular consultation with related service professionals or during meetings with colleagues. This study also found that the difference in perceived availability was statistically significant for resources related to physical/material and personal supports.

An incidental finding related to perception of effectiveness and significance of disability was that a larger percentage of teachers in the *somewhat effective* group taught students in the *more significant disabilities* group. In other words, participants who felt they were only somewhat effective also rated students as having more significant delays. No determination can be made about causality. It may be that compared to participants who taught students with less significant delays, participants who taught students with more significant delays confronted a more challenging teaching task, and consequentially, did not consider themselves to be as effective as they could be if their teaching task was not as difficult. Or it could be that participants who were only somewhat effective in their teaching perceived more significant needs in students whereas those who taught more effectively perceived that their students had less significant needs. Data on teacher effectiveness and significance of delay in students are perception measures; both were based on teacher report and were not validated with any other assessment.

In summary, multiple factors may influence teacher perception of availability and need for supports. Educators may require increased levels of support if they teach students with more significant delays, or feel they are less effective teachers or students who are deaf plus, or who have not participated in inservice or other training.

Provision of Support

Provision of supports is dependent on multiple factors. Determination of who is responsible for provision is complex. The 29 supports and resources included on the survey may be the responsibility of administrators, teachers, related service professionals, or families of students. Some need approval from those in other branches of an organizational structure; for example, one resource related to physical and material supports is *changes in the physical environment that address the needs of students who are deaf plus*. Changes to physical environments may need authorization through a physical facilities team. Additionally, the two supports with the second and third highest measure of need both relate to families. It may be supposed that supports that require family availability or engagement are only based on efforts from families and are therefore the sole responsibility of families; however, support from families can be indirectly influenced by efforts of administrators and teachers. Whether in a role of program specialist, trainer, coach, mentor, superintendent, teacher, related service provider, family, student, data specialist, or legislator, individuals can consider their function in provision of each support or resource.

Every support in this study had a positive discrepancy score, which meant teachers reported them to be less available than needed. Some were minimally discrepant (consultation or regular contact with a speech pathologist, 0.9%; a part- or full-time paraprofessional, 4.4%); others were largely discrepant (additional lesson planning time, 58.3%; beginning of the year inservice training, 51.3%). Discrepant supports varied in level of perceived need. *Volunteers in the classroom*, for example, was perceived as available by 49.6% and needed by 43% of participants; therefore, this item was not

highly discrepant or highly needed. Consideration of both measures (need and discrepancy scores) adds dimension to consideration of discrepancy scores in isolation; items with high discrepancy scores and low perceived need may be less concerning than those with high discrepancy that are also highly needed. Table 3.10 is a list of supports from the survey ranked most-to-least discrepant. In the following sections, items with a low discrepancy score are discussed as adequate provision of support, whereas items with a high discrepancy score are discussed as insufficient provision of support.

Adequate Provision of Support

In both this study and Wolery et al. (1995), the need for, and availability of, supports related to additional personnel showed low discrepancy. This finding may indicate that teachers who teach students who are deaf plus have access to needed related service professionals. Supports high in need and low in discrepancy are examples of successful teacher support. Nine supports were rated by fewer than 15% of teachers as discrepant, which means that a large percentage of participants perceived this supports as needed and also available. Six of the nine supports relate to additional personnel: a part-time or full-time paraprofessional, volunteers in the classroom, and regular contact or consultation with related service professionals (i.e., speech-language pathologists, nurses, physical therapists, and occupational therapists). Two of the nine supports relate to physical or material resources (i.e., physical layout of the classroom adapted to meet the needs of students with disabilities and an accessible bathroom within close vicinity of the classroom). A support considered to be discrepant by fewer than 15% of participants is *a principal or supervisor who is supportive of you teaching students who are deaf plus*.

Successful provision of this support is particularly important because it was perceived as needed by 99.1% of teachers, which is the highest measure of need on the survey. This low discrepancy is a result of high perceived availability and implies that participants recognized efforts of administrators to support them in their role of teaching students who are deaf plus.

Insufficient Provision of Support

A support with a high discrepancy score means that a large percentage of teachers reported the supports as less available than needed. In this study and in Wolery et al. (1995), the category of supports with the highest discrepancy were supports related to training (Category 1). Two items of support were considered by more than half of teachers in the survey to be discrepant: (a) beginning-of-the-year inservice training about teaching students who are deaf plus and (b) additional lesson planning time. Four supports were considered by at least 39.1% of teachers to be discrepant: (a) regular and ongoing inservice training about teaching students who are deaf plus, (b) extra money for materials and supplies to address the needs of students who are deaf plus, (c) written information on how to adapt the classroom and curriculum, and (d) consultation or regular contact with someone knowledgeable about students who are deaf plus. Although supports related to additional personnel typically had low discrepancy scores, *consultation or regular contact with someone knowledgeable about students who are deaf plus* was highly discrepant. High discrepancy of this item may be due, in part, to reports in the literature of the limited number of professionals with specialized knowledge and skills to teach students who are deaf plus. As research and dissemination

of research related to this population of students occurs and as availability of training on this topic increases, the number of professionals with specialized knowledge and skills may increase.

Eleven other supports were considered to be discrepant by at least 20% of teachers. Although 5 of the 11 were reported as needed by fewer than 80% of teachers, the remaining six supports were not only highly discrepant, but were also considered to be needed by at least four-fifths of participants. Three of these six supports relate to meetings or time for meetings (i.e., regular team meetings with specialists to discuss the student who is deaf plus; opportunities for joint lesson planning or to brainstorm ideas for individualization of instruction and materials, to share experiences, and for shared problem-solving; and family of student who is deaf plus available to discuss coordination efforts related to their child). The remaining three supports were the following: (a) opportunities to attend conferences about teaching students who are deaf plus, (b) reduced class size, and (c) feeling support from families of students who are deaf plus. Two of these six supports involve family participation.

In summary, for some supports, a high percentage of participants felt that availability approached need. Alternatively, for some supports, availability did not meet perceived need. Program administrators seeking for action items could discuss provision of needed supports and consider efforts to initiate or improve provision of supports considered to be needed by teachers in their programs and continue provision of supports that are commensurate with teacher needs.

Preparation and Training of Teachers

This study found that supports in the training category were reported as needed by 78.2% of teachers, available by 32.9% of teachers, and discrepant by 36.5% of teachers. Compared to others, the category of supports related to training had the highest discrepancy score. This aligns with findings in the literature that the preparation and training of teachers of students who are deaf plus are an area of need. A study that surveyed teachers of students who are DHH in the northwestern region of the United States found that 74% of teachers were in preservice programs that did not directly or effectively address practices for teaching students who are deaf plus (Harrison, 2007). Another survey asked faculty and professionals to rank 39 preservice preparation priorities by importance. Meeting the needs of students who are deaf plus was ranked as the most important priority by university faculty and was ranked third in importance by professionals (Luckner et al., 2003). When directors of university deaf educator preservice programs were asked to rank areas of knowledge desired in potential faculty, 61.3% of them ranked working with students who are deaf plus as their first or second most desired (LaSasso & Wilson, 2002). The number of preservice programs with CED certification that specialized in preparation of teachers of students who are deaf plus decreased by 5% between 1986 and 2002 (Jones & Ewing, 2002). The summarized studies relate to training needs in preservice preparation programs. A study found in the literature related to inservice training asked 856 professionals who worked with students who are DHH to rank a list of professional development topics by need, and additional disabilities in students with hearing loss was ranked second (Rosen, 2009). This section includes discussion of the following: (a) college coursework and inservice training and

(b) college coursework and area of study.

Amount of College Coursework and Inservice Training

Participants had more coursework and inservice training about students with disabilities other than hearing loss than about students who are deaf plus. Moreover, the majority of teachers had no coursework about teaching students who are deaf plus. The same was found for inservice training about students who are deaf plus. This may be due to lack of inservice training opportunities related to this population of students or limited access to information or professionals with knowledge of aspects related to the education of students who are deaf plus. Inservice training may be interpreted as participation in a one-time course or workshop; however, research shows that attendance in a class or a workshop without follow-up is not an effective method for teacher training (Thomas, 2016; Villegas-Reimers, 2003).

Area of Study and College Coursework

Studies were found in the literature that focused on topics addressed in preservice preparation programs. One such study found that only 30% of deaf education preservice programs included a class in disabilities other than deafness or a class on behavior, and about the same proportion of programs did not offer coursework on either topic (Borders & Bock, 2012). Another study found that 80% of participating teachers were in programs that did not address the teaching of self-help skills, 92% were in programs that had not addressed life-skills, 48% did not include individualizing content for students who are deaf plus, and 77% had not addressed teaching academics to students who are deaf with

disabilities. Twenty-nine percent of surveyed teachers said their teacher preparation program had not effectively prepared them for their teaching responsibilities (Dodd & Scheetz, 2003). Findings of these studies suggest that topics related to students who are deaf plus are not widely included in preservice preparation programs.

This study counted the number of courses participants had received about students with disabilities or about students who are deaf plus. Data are in Table 3.17. Seven areas of study were identified from analysis of participant responses. Participants who studied general education with no special education or deaf education (GE) or who studied combinations of deaf education and general education with no special education (DE) had fewer classes about disabilities compared to teachers in the other five areas of study. The finding that deaf education programs included fewer courses related to disabilities is consistent with historical categorical approach to teacher preparation of deaf educators in which training did not focus on other disabilities (Brownell et al., 2010; Johnson, 2004). Whether teachers in GE and DE are less prepared to teach students who are deaf plus is unknown.

Compared to other areas of study, participants who studied early intervention/ early childhood (EC) or combinations of GE, DE or special education (SE) with both early childhood/early intervention and communication disorders (EC&CD) had more coursework about students who are deaf plus. It is unknown how much coursework related to students who are deaf plus impacts the experience of teachers. This study also found that teachers who studied combinations of special education and deaf education (S&D) had received no coursework related to students who are deaf plus. This finding implies that after principles are learned in separate disciplines, teachers might generalize

those principles of instruction and apply them to their practice with students who are deaf plus. No area of study included a high percentage of teachers who had 3 or more classes related to teaching students who are deaf plus. One-fifth of teachers who studied combination of GE, SE, DE with communication disorders (CD) had 3 or more classes, and 18.2% of teachers who studied S&D had 3 or more classes.

Study Limitations

There are some limitations to the current study that impact interpretation of outcomes and influence generalization to the population of teachers of students who are deaf plus. First, reported measures of need, availability, significance of disability, and effectiveness rating were based solely on perceptions of participants. Responses were not correlated with student files or supervisor observations of teacher effectiveness. Second, the population size of teachers of students who are DHH or deaf plus is unknown, which inhibited determination of survey sample size. Although this limitation hinders generalization, outcomes of this study contribute to a sparse research base. Third, distribution of the survey to teachers of students with hearing loss was challenging. After multiple unsuccessful attempts to distribute the survey through national professional licensure organization for deaf-educators, a list of educational programs that enroll students who are DHH was utilized. Fourth, programs were invited to send the survey to teachers, and then teachers opted to participate in the survey. This double opt-in method (program level and participant level) may have decreased the number of teachers who gained access to the survey. Participant size may have been greater if a method had been available that facilitated the sending of surveys directly to teachers; however, the extent

to which an alternative method might have impacted participant size is unknown. Fifth, calculation of a response rate was dependent on programs to report the number of teachers to whom they sent the survey. Despite multiple attempts, some programs did not respond with a number of teachers. Other programs were not able to direct the link to teachers in their programs who met participation requirements, and instead, the link was sent to every teacher in the program and the teachers determined if they met participation requirements as explained on initial pages of the online survey. Sixth, extant literature includes little information related to where students who are deaf plus are receiving their education, who is educating them, or with whom they are educated (peers). Therefore, although demographic and program information reported in this survey reveals details about study participants, the extent to which these details are representative of actual placements of students who are deaf plus is unknown. Seventh, developmental delay is an eligibility label that pertains to young children that was not included as an option on the survey. Given the large proportion of participants who taught in preschool, it is likely that participants taught students with this disability label, and yet were restricted to the "other" option when reporting their student's concomitant disability. Eighth, the list of accompanying disability options on the survey included *other*; however, there was no write-in option for teachers to report the specific type of disability. Finally, participants reported disability label and significance of delay for only one student; therefore, no comparison could be made with data in the literature on prevalence of concomitant disabilities in students who are deaf plus. Additionally, teachers reported on the student they considered to have the most significant disabilities; therefore, disability type and significance of delay data may be skewed toward more significant delays and therefore,

may not representative of the population of students who are deaf plus.

Implications for Practice

Implications for Program Administrators and Teachers

Although the findings of this study suggest potential implications for practice, it should be noted that perceptions of participants in this study regarding need and availability of resources are not representative of every individual program and, therefore, findings should not be applied without first screening needs of teachers in individual programs. Outcomes of this study can be used as a guide in efforts related to provision of support as they provide to supervisors and teachers a starting point regarding items on which to focus. Participants in this study reported several supports for which provision in their educational settings was adequate (e.g., feeling supported by administrators, access to paraprofessionals, consultation with speech-language pathologists, physical layout of the classroom adaptable to the needs of students who are deaf plus). In contrast, the survey also identified items of support for which provision did not meet the level of need (e.g., training needs, meetings, and extra time for planning instruction). Based on findings, through conversations with teachers in their programs, administrators can prioritize which support and resources to include in their array of provision of supports. Teachers can make determinations of which items on the list of supports included in the study would have the greatest impact in their efforts to teach students who are deaf plus, and then communicate to administrators their desire to receive those specific supports.

Implications Related to Training

Results of this study and extant literature strongly suggest that teachers of students who are deaf plus need more training. Program setting (Table 3.1) and area of study data (Table 3.19) align with a statement by Rudelic (2012) that students who are deaf plus may be taught by general, special, or deaf educators. Therefore, teachers across these areas of study and their students would benefit from training about students who are deaf plus. Teachers may desire training on topics related to concomitant disability, interaction of disabilities, elements of appropriate placement, strategies, practices, peer groups, information about how to individualize instruction, or how to adapt or modify the classroom, curriculum, or materials to the needs of students who are deaf plus. Information on these topics could be disseminated to teachers and program administrators in formats that are easily accessible and understood. For example, written information on how to adapt instruction is a support in this study that could be facilitated through printed summaries in formats that can be efficiently disseminated to program administrators and teachers.

Training of teachers may occur through multiple means. Several supports and resources included in this study directly relate to preservice or in-service training (i.e., university courses, beginning of the year or ongoing inservice training, access to journal articles, written material, conferences, and observation of other teachers). Programs could partner with universities to access courses for teachers in a continuing education format, to collaborate on inservice training with follow-up, or to access written materials developed for teachers. Additionally, training may occur as information is imparted via supervisors, other teachers, coaches, mentors, or related service professionals during

consultation and, therefore, collaboration between professionals may be an effective means of addressing training needs of teachers of students who are deaf plus. However, the number of professionals with adequate knowledge and skills to address the needs of students who are deaf plus is unknown. Provision of supports related to training are dependent on individuals with knowledge of strategies with proven effectiveness with students who are deaf plus. It follows that inherent challenges exist in provision of training supports if there is a limited number of professionals with knowledge and skills related to the education of students who are deaf plus.

Topics for Future Research

Study results indicate that teachers need supports when teaching students who are deaf plus. Effective provision of support may depend on additional investigation. Studies could focus on how supports are provided, who provides them, and by what means they are provided. Additionally, levels of provision that effectively address teacher needs or improve student outcomes needs investigation. Little is known about the effectiveness of strategies or practices implemented in the education of students who are deaf plus. Studies with this focus would establish an evidence base of effective practices. These evidence-based practices could be included in trainings. Future studies could also investigate the impact of training at a preservice or at an inservice level, including trainings and workshops accompanied by coaching, mentoring, reflection, or guided application.

Program type, classroom type, and peers are considerations in determination of educational placement. In their description of educational placement, Anastasiou and

Kauffman (2011) also include services, accommodations, and access to teachers with specialized training who can offer specialized instructional methods. In consideration of the legally mandated continuum of placements (IDEA, 2004, Sec. 300.115) for those who are deaf plus, these factors need investigation. Future studies of these elements and their effectiveness would fill gaps in what is known about education of students who are deaf plus, and findings would contribute to the content of supports for teachers of students who are deaf plus.

Several supports depend on knowledge of materials, strategies, or practices that address the needs of students who are deaf plus. To illustrate, the following phrases are borrowed from supports and resources included in the survey: classroom adapted to needs (dependent on knowledge of needs of students who are deaf plus), access to special education journals (dependent on inclusion of articles about students who are deaf plus in journals), information on how to adapt the classroom and curriculum (dependent on knowledge of effective adaptations), materials and supplies that address needs (dependent on which materials and supplies effectively address needs), someone knowledgeable about students who are deaf plus (dependent on access to professionals with such knowledge), planning time to modify instruction and materials (dependent on knowledge of effective modifications of instruction and materials), or meeting to discuss individualization of instruction (dependent on knowledge of how to individualize instruction specific to needs of students who are deaf plus). Although provision of these supports is dependent upon knowledge about materials, strategies, and practices that address needs of students who are deaf plus, discussion of these topics in extant literature is limited. This is, therefore, an implication for those conducting research related to

students who are deaf plus. Accessibility to these training supports may be facilitated through collaboration between supervisors and teachers in programs serving students who are deaf plus and researchers or teachers at local colleges or universities. For example, access to special education journals is a support in this study; articles in professional journals about students who are deaf plus would increase the value of this support to teachers. As future research yields findings related to these elements, there is potential to increase the quality of provision of supports and the quantity of supports provided.

Conclusion

Although not definitive, the outcomes of this study both support prior studies on education of students who are deaf plus and provide new information not found in the literature regarding preferences of teachers related to support when teaching students who are deaf plus. The study identified several items reported as needed by a large percentage of participants that were also reported to be widely available (i.e., feeling supported by administrators, access to paraprofessionals, consultation with speech-language pathologists, physical layout of the classroom adaptable to the needs of students who are deaf plus). In contrast, participants also identified items as needed and not available (i.e., supports related to training needs, meetings, and extra time for planning instruction). Application of findings of this study have implications for professionals in higher education, administrators who support teachers, and teachers of students who are deaf plus. For example, outcomes suggest that additional research is needed related to education of students who are deaf plus, and there is a need for those findings to be disseminated in formats that are accessible to programs and teachers of students who are

deaf plus. As an additional example, study outcomes suggest that factors, such as teaching experience, participation in inservice training, perceived significance of disability of students, and teacher perception of their own effectiveness, impacted participant perceptions of need, availability, and discrepancy of supports; therefore, individual teachers may differ in their perceptions of need and availability of supports. It follows that teachers and supervisors may need to dialogue to discover the level and type of needed support and discuss the array of available supports. There is potential for efficient application of study outcomes to practice, although further research is needed. Outcomes of this study and future studies have potential to impact practice if they are understood and if their implications are considered and carried out.

APPENDIX

Survey adapted from:

Werts, M. G., Wolery, M., Snyder, E. D., Caldwell, N. K., & Salisbury, C. L. (1996). Supports and resources associated with inclusive schooling: Perceptions of elementary school teachers about need and availability. *Journal of Special Education, 30*(2), 187-203. doi:10.1177/002246699603000204

Wolery, M., Werts, M. G., Caldwell, N. K., Snyder, E. D., Lisowski, L. (1995). Experienced teachers' perceptions of resources and supports for inclusion. *Education and Training in Mental Retardation and Developmental Disabilities, 30*(1), 15-26.

Significance of disability rating adapted from:

Karchmer, M. A., & Allen, T. E. (1999). The functional assessment of deaf and hard of hearing students. *American Annals of the Deaf, 144*(2), 67-77. doi:10.1353/aad.2012.0468

Simeonsson, R. J., & Bailey, D. B. (1991). The abilities index. *Chapel Hill: Frank Porter Graham Child Development Center*.

Summary of sections:	Teachers of at least one student who is deaf plus answer all sections
Initial filter section (1 question)	
Section 1: Experience (4 questions)	
Section 2: Supports and resources (29 items)	
Section 3: Perception of effectiveness (1 question)	Teachers not currently teaching a student who is deaf plus answer:
Section 4: Description of disability (10 items)	
Section 5: Setting and teacher information (14 questions)	Section 1, Section 2 (partial), and Section 5

Initial filter section

This survey asks teachers of students with hearing loss about supports and resources available in their current teaching assignments. Questions target classroom teachers in preschool and elementary. To proceed, confirm that your current assignment aligns with participation requirements. Use the following as a guide:

Select "Yes" if the following statements describe your teaching assignment:

- I am a classroom teacher of students who are deaf or hard of hearing.
- My main assignment is as a primary instructor or lead teacher.
- I teach students in preschool or elementary.
- Other than occasional field trips, I teach students at the same site.

Select "No" if <u>any</u> of the following statements are true:

- My main assignment is as an itinerant or consulting teacher.
- I teach only students in grades 7-12.
- I teach only infants and toddlers.
- I travel to multiple sites to teach students (e.g., multiple homes, schools, clinics, or daycare centers).

○ Yes ○ No

Exit comment:

You answered "No" which means you do not meet participation requirements and do not need to proceed. Please confirm you answer by selecting "No", and exiting the survey. Thank you for your willingness to participate. Have a great day. If you accidentally marked "No" to the question on the prior page, select the back button to correct your answer. ○ No

Section 1: Experience (4 items)

1.1 How many years have you been a teacher of students who are deaf or hard of hearing? (Type-in # of years as a whole number. If you have taught a partial year, round up to the nearest whole number.): _____

1.2 How many students who are deaf or hard of hearing are in your class this year? (Type-in #): _____

1.3 A student who is deaf plus is defined as a child who is deaf or hard of hearing with one or more **<u>diagnosed</u>** disabilities accompanying his/her hearing loss.

How many school years <u>prior to this year</u> have you taught at least one student who is deaf plus? (Type in # of years as a whole number. If you have taught a partial year, round up to the nearest whole number. If prior to this school year you have never taught a student who is deaf plus, type in "0".): _____

1.4 Do you currently have a student who is deaf plus in your class? (The disability accompanying hearing loss must be diagnosed): ○ Yes ○ No

↳	1.4a If yes, how many students who are deaf plus are in your class this year? (Type in #): ____

Section 2: Supports and resources (29 items)

You will be presented with 29 supports and resources. You will be asked if each support or resource is <u>available</u> to you in your present teaching assignment. If you are currently teaching students who are deaf plus, you will also be asked if each support or resource is <u>needed</u> when teaching a student who is deaf plus. NOTE: Some supports and resources may be needed for some students who are deaf plus, and not for others. Answer these questions as best you are able based on your experience teaching students who are deaf plus this year as well as in previous years.

Training

1. Beginning-of-the-year inservice training about teaching students who are deaf plus

1a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

1b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

2. Regular and ongoing inservice training or consultation about teaching students who are deaf plus

2a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

2b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

3. Opportunities to attend conferences about teaching students who are deaf plus

3a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

3b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

4. Opportunities to observe other teachers who serve students who are deaf plus

4a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

4b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

5. Access to university courses about teaching students who are deaf plus

5a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

5b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

Material and physical resources

6. Physical layout of the classroom adapted to address needs related to the accompanying disability

6a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

6b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

7. Accessible bathroom within close vicinity of the classroom

7a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

7b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

8. Access to professional special education journals and periodicals

8a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

8b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

9. Written information on how to adapt the classroom and curriculum

9a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

9b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

10. Extra money for materials and supplies to address needs of the student(s) who is(are) deaf plus

10a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

10b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

11. Reduced class size

11a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

11b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

Additional personnel

12. Volunteers in the classroom

12a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

12b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

13. A part-time or full-time paraprofessional

13a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

13b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

In questions 2.14 through 2.22, regular contact = at least once per month

14. Consultation or regular contact with a speech-language pathologist

14a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

14b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

15. Consultation or regular contact with a physical therapist

15a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

15b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

16. Consultation or regular contact with an occupational therapist

16a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

16b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

17. Consultation or regular contact with a psychologist

17a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

17b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

18. Consultation or regular contact with a nurse

18a. Is this available in your current teaching assignment? ○Yes ○No ○I have never asked; I don't know

18b. Is this needed when teaching a student who is deaf plus? ○Yes ○No ○I have never asked; I don't know

19. Consultation or regular contact with a social worker

19a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
19b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

20. Consultation or regular contact with a special educator outside the area of deafness
20a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
20b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

21. Consultation or regular contact with a behavior specialist (or behavior consultant)
21a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
21b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

22. Consultation or regular contact with someone knowledgeable about children who are deaf plus or an expert in the area of "deaf plus"
22a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
22b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

Personal support / resources

23. Principal/supervisor who is supportive of you teaching students who are deaf plus
23a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
23b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

24. Additional lesson planning time to modify instruction and materials for students who are deaf plus
24a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
24b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

25. You feel support from families of students in your class
25a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
25b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

Meetings

26. Regular team meetings with specialists to discuss the student(s) who is(are) deaf plus
26a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
26b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

27. Family of student(s) who is(are) deaf plus available to discuss coordination of efforts related to their child (e.g., sharing details of child's progress, brainstorming, addressing barriers)
27a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
27b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

28. Opportunities for joint lesson planning or to brainstorm ideas for individualization of instruction and materials, to share experiences, and for shared problem-solving
28a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know
28b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

29. Release time for meetings

29a. Is this available in your current teaching assignment? ○Yes ○No
○I have never asked; I don't know

29b. Is this needed when teaching a student who is deaf plus? ○Yes ○No
○I have never asked; I don't know

Section 3: Perception of effectiveness (1 question)

3.1 I rate my effectiveness in the role of teaching students who are deaf plus this year as:

	○	○	○	○
(select one)	Highly effective	Effective	Somewhat effective	Ineffective

Section 4: Description of disability (10 items)

Adapted from: Karchmer, M. A., & Allen, T. E. (1999). The functional assessment of deaf and hard of hearing students. *American Annals of the Deaf, 144*(2), 67-77. doi:10.1353/aad.2012.0468

Think about one student you teach who is deaf plus. If you teach more than one, determine which one you consider to have the most significant disabilities. Rate that one student in the following nine developmental areas:

4.1 Thinking and reasoning

- ○ No disability: Student thinks and reasons, plays games, and solves puzzles and problems comparably to typically developing children the same age.
- ○ Mild or moderate disability: Student is slow to solve age-appropriate puzzles and problems or learn new things but may acquire these intellectual skills with instructional supports.
- ○ Significant disability: Student has considerable difficulty solving age-appropriate puzzles and problems, lags far behind peers, and may require individualized instruction to master even simple tasks.

4.2 Attention to classroom tasks

- ○ No disability: Student usually attends to classroom instruction sufficiently to learn material.
- ○ Mild or moderate disability: Student's attention in class frequently wanders, sufficient to impair instruction, but the student can master classroom tasks with some instructional support.
- ○ Significant disability: Student has extreme difficulty attending to classroom material, even for short periods of time; student may act impulsively or withdraw frequently from classroom activities.

4.3 Social interaction/ classroom behavior

- ○ No disability: Student exhibits social skills and behavior that are appropriate for his/her age.
- ○ Mild or moderate disability: Student exhibits some inappropriate behavior (e.g., fighting, biting, hitting, screaming, sulking, disengaging from others, or refusal to interact with, sit near, or play with others). However, this behavior is not disruptive enough to require frequent separation of the student from the classroom.
- ○ Significant disability: Student exhibits frequent inappropriate social behavior (e.g., fighting, biting, hitting, screaming, sulking, disengaging from others, or refusal to interact with, sit near, or play with others) and is often disruptive of classroom activities. Student frequently needs to be separated from the class.

4.4 Expressive communication

- ○ No disability: Student communicates expressively with his/her teacher and peers fluently and easily.
- ○ Mild or moderate disability: Student has some difficulty expressing himself/herself with the mode of communication generally used in the classroom. However, difficulties can be overcome by repetition and explanation.
- ○ Significant disability: Student has considerable difficulty expressing himself/herself using the mode of communication generally used in the classroom.

4.5 Receptive communication

- ○ No disability: Student comprehends the communication of others in the classroom accurately and easily.
- ○ Mild or moderate disability: Mild or moderate disability: Student has some difficulty comprehending communication from others in the classroom using the mode of communication generally used for classroom interaction. Difficulties can be remediated by repetition and explanation.
- ○ Significant disability: Significant disability: Student has considerable difficulty comprehending communication from others in the classroom, even when accommodations such as interpreters, assistive listening devices, etc., are used.

4.6 Vision

- ○ No disability: Student sees with normal acuity, using corrective lenses if necessary.
- ○ Mild or moderate disability: Even with corrective lenses, student has some difficulty reading small print or seeing the blackboard or objects in visual periphery, and requires minimal additional accommodations, e.g., preferential seating, magnification of reading materials.
- ○ Significant disability: Even with corrective lenses or other accommodations, student cannot see or comprehend visual communication (such as sign language) from across a room; requires significant accommodations, e.g., large print. Braille, mobility training, deaf-blind interpreter.

4.7 Use of hands, arms, and legs

- ○ No disability: Student uses hands, arms, and legs in daily activities as do children who are typically developing (e.g., walks up and down stairs, uses a pencil to write, participates in physical education).
- ○ Mild or moderate disability: Student has some limitations in the use of hands, arms, and/or legs, but is ambulatory and can use hands and arms for simple daily activities.
- ○ Significant disability: Student is non-ambulatory or is significantly limited in his/her use of hands and arms.

4.8 Balance (dizziness, motion sickness, coordination in the dark)

- ○ No disability: Student participates in physical activities without losing balance, falling down, or experiencing dizziness.
- ○ Mild or moderate disability: Student reports dizziness, nausea, falling down, or shows some mild lack of coordination when participating in physical activities.
- ○ Significant disability: Student often stumbles or falls due to lack of balance, and/or frequently reports feeling dizzy or sick while in motion.

4.9 Overall physical health

- ○ No disability: Student has health problems, illnesses, or absences from school due to illness typical for children the same age.
- ○ Mild or moderate disability: Student has frequent or ongoing health problems, but they are either mild or medically controllable and do not significantly impair educational process.
- ○ Significant disability: Student has frequent or ongoing health problems that are either difficult to control medically or result in significant restriction of activities.

4.10 Consider that same student. Which of the following eligibility descriptions match the diagnosed disability accompanying hearing loss? (If more than one, select all that apply)

- ○ ADD / ADHD
- ○ Autism
- ○ Emotional disturbance
- ○ Learning disability
- ○ Legal blindness
- ○ Low vision
- ○ Intellectual disability
- ○ Orthopedic impairment
- ○ Speech or language disorder
- ○ Specific learning disability
- ○ Traumatic brain injury
- ○ Usher syndrome
- ○ Other condition

Section 5: Setting and teacher information (14 questions)

Instructions: Answer the following questions about your work setting and current assignment:

5.1 Which of the following best describes the community in which you teach? (select all that apply)

- ○ Urban ○ Suburban ○ Rural

5.2 Which of the following best describes the primary funding model of the school or program in which you teach? (select all that apply) ○ Private ○ Public

5.3 In what region of the U.S. is your school or program located? (select one)
- ○ Northeast (CT, ME, MA, NH, NJ, NY, PA, RI, VT)
- ○ Midwest (IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI)
- ○ South (AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV)
- ○ West (AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY)

5.4 Which of the following best describes the type of school or program in which you teach? (select all that apply)
- ○ Separate school or program for students who are deaf
- ○ Separate school or program for students with disabilities other than deafness
- ○ General education school (mainstream)
- ○ Other (optional: describe) _____

5.5 Which of the following best describes your teaching role? (select all that apply)
- ○ General or regular classroom teacher (in a deaf school or mainstream setting)
- ○ Self-contained classroom teacher (You provide specialized instruction to students for at least half of a school day; you provide curricular modifications not available in a regular classroom)
- ○ Resource classroom teacher (You provide specialized instruction to students for 1.5 hours or less per day; you provide tutoring or support instruction students receive in a regular classroom)
- ○ Other (optional: describe) _____

5.6 Which of the following best describes students you primarily teach? If students you teach fit more than one category, select the option that represents the majority of students in your classroom. (select one)
- ○ Primarily students who are deaf and typically developing
- ○ Primarily students who are deaf plus
- ○ Primarily students who are hearing and typically developing
- ○ Primarily students who are hearing with disabilities

5.7 Which grade(s) do you currently teach? (select all that apply)

○ Early Intervention, Birth-3	○ Grade 1	○ Grade 4	○ Grades 7-9
○ Preschool	○ Grade 2	○ Grade 5	○ Grades 10-12
○ Kindergarten	○ Grade 3	○ Grade 6	

Instructions: Answer the following questions about yourself:

5.8 Please select your age range: (select one)

○ Younger than age 30	○ 40-49 years
○ 30-39 years	○ 50+ years

5.9 Which of the following represents the highest degree you have attained? (select one)

○ No degree attained	○ Bachelors	○ ABD (all but dissertation)
○ Associates	○ Masters	○ Doctorate

5.10 In what area(s) of study did you receive your degree(s)? (If you have more than one degree, mark all that apply to any of your degrees)

○ No degree attained	○ Sign Language
○ Special education	○ Communication disorders
○ Deaf education	○ Child or human development
○ General education	○ Early intervention or early childhood
○ Family science / systems	○ Listening and spoken language
○ Deaf studies	○ Educational leadership / administration
○ Psychology	○ Other (Optional: describe): _____

5.11 How many of your college classes were specifically related to:

(a) instruction of students with disabilities not specific to deafness? (select one)

○ none ○ 1 class ○ 2 classes ○ 3 classes or more

(b) instruction of students who are deaf plus? (select one)

○ none ○ 1 class ○ 2 classes ○ 3 classes or more

5.12 Since the time you started working in your current school or program, have you received professional development training specific to:

(a) teaching students with disabilities not specific to deafness? ○ Yes ○ No

(b) teaching students who are deaf plus? (select one) ○ Yes ○ No

5.13 In previous teaching jobs, before you started working in your current school or program, did you receive professional development training specific to:

(a) teaching students with disabilities not specific to deafness?

○ Yes ○ No ○ not applicable; I did not teach anywhere prior to my current school or program

(b) teaching students who are deaf plus?

○ Yes ○ No ○ not applicable; I did not teach anywhere prior to my current school or program

5.14 Do you have professional licensure or certification in any of the following? (select all that apply)

○ None
○ State issued teaching license or credential
○ Council on the Education of the Deaf
○ American Speech Hearing Association
○ Listening and spoken language or Alexander Graham Bell
○ American Sign Language interpreter certification
○ Other (optional) If other, describe: _____

↳ 5.14a Describe area of licensure: (select all that apply)

○ Special education ○ Early intervention
○ Deaf education ○ Early childhood
○ General education ○ Other (optional) If other, describe _____

↳ 5.14b Describe area of add-on certification or endorsement: (select all that apply)

○ None ○ Autism
○ Special education ○ American Sign Language specification / teaching certificate
○ Deaf and hard of hearing ○ Listening and spoken language specification
○ English Language Learners ○ Administrative / leadership
○ Behavior ○ Other (optional: describe) _____

↳ 5.14c Describe age/grade specified in licensure:

Either: (select one from [a] AND one from [b]) -OR- (select one from [c])

Range: From ____[a]____ to ____[b]____ No range: _____[c]_____

[a]	[b]	OR	[c]
○ Birth	○ Age 3		○ Preschool
○ Age 3	○ Age 4		○ Elementary
○ Preschool	○ Age 5		○ Elementary: Primary
○ Grade K	○ Age 6		○ Elementary: Intermediate
○ Grade 1	○ Age 7		○ Middle school
○ Grade 4	○ Age 8		○ Junior high
○ Grade 7	○ Age21		○ High School
○ Other	○ Preschool		○ Other
	○ Grade K		○ None
	○ Grade 1		
	○ Grade 2		
	○ Grade 3		
	○ Grade 6		
	○ Grade 12		
	○ Other		

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