



## INCLUSION AND d/DEAF AND HARD OF HEARING STUDENTS: A QUALITATIVE META-ANALYSIS

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### ABSTRACT

*This study investigated the prominent perspectives on the effects of inclusion on d/Deaf and hard of hearing (d/Dhh) students. A systematic search of databases and journals was conducted. The researchers identified 23 studies that met the inclusion criteria, and other articles were analyzed to support the interpretations and provide suggestions for the improvement of inclusion. Inclusion of d/Dhh students in general education classrooms is controversial because of the students' unique language and communication needs. In addition, there are contradictory findings regarding the effects of inclusion on academic achievement and social development. These inconsistent findings were primarily due to the use of different research methodologies, different measurements and tests, and the diverse experiences of the home and school environments. Based on the findings of this study, recommendations for further research are suggested.*

**Keywords:** Inclusion, Academic Achievement, Perspective, Social Interaction

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### INCLUSION AND D/DEAF AND HARD OF HEARING STUDENTS: A QUALITATIVE META-ANALYSIS

The number of d/Deaf and hard of hearing (d/Dhh) students who are educated in general education classrooms has increased in several countries (Eriks-Brophy & Whittingham, 2013). In the United States (USA), for example, most d/Dhh students are educated in general education classrooms with typical (hearing) peers (e.g., Johnson, 2013; Salend, 2001). Information from the U.S. Department of Education (2013) indicated that about 19.4% of students

spend 40% to 70% of their day in general education classrooms whereas 61.8% spend 80% or more of their day in general education classrooms. In addition, about 13.8% of students spend less than 40% of the day in general education classrooms, and about 2.9% are in separate schools for students with disabilities. About 2.1% are educated in separate residential facilities or regular private schools, such as homebound/hospital placements, and correctional facilities.

Similarly, the majority of d/Dhh students in England receive their education in general education classrooms with typical peers (Power, 2002).

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According to Eatough (2000), in 1998, most students with moderate to profound hearing loss were educated in general public schools, and only 20% were educated in special schools for d/Dhh students. At present, about 85% of d/Dhh students are educated in mainstream schools in England whereas 3% receive their education in special schools for d/Dhh children and 12% in special schools not specifically for d/Dhh children (Consortium for Research in Deaf Education, 2017).

It has been asserted that the number of students in general education classrooms will continue to grow in light of legislation that supports inclusion in several countries, including developing countries. In addition, researchers predict an increase in the inclusion of d/Dhh students due to the effectiveness of early identification, early amplification, and early intervention programs (Antia, Jones, Reed, & Kreimeyer, 2009; Standley, 2005; also, see discussion in Wang & Engler, 2010). The expected increase of students who are educated in general education classrooms is attributed to factors such as financial pressures, parental expectations, and technological developments (Angelides & Aravi, 2007; Antia et al., 2009).

Given the increase in the number of d/Dhh students in general education classrooms, several questions that address a number of important aspects of the inclusion of d/Dhh students have been raised (e.g., Antia, Jones, Luckner, Kreimeyer, & Reed, 2011). For example: Does inclusion positively affect the academic and social development of d/Dhh students? Can these students access the general education curriculum? Are there barriers that inhibit the inclusion of students? Are general education classroom teachers qualified to teach d/Dhh students in their classrooms? If so, are they willing to collaborate with special education teachers of d/Dhh students? In general, the answers to these questions may be influenced by quality indicators associated with research such as demography, the nature of the researchable questions, validity of instruments, research designs, and so on (e.g., see discussions of research and deafness in Easterbrooks, 2017; Luckner, 2017; Mitchell, 2017; Paul & Wang, 2017). Other factors include the nature of the constructs being measured (e.g., language and literacy development) and the sociocultural contexts of schools (e.g., teacher-student interactions; teacher competency).

In this article, we synthesize a selection of primary (i.e., original, empirical) and secondary (i.e., research reviews) investigations to address the following three questions:

1. What are the prominent perspectives on the effects of inclusion for d/Dhh students?
2. Are the research findings on the effects of inclusion consistent or inconsistent?
3. What are the salient suggestions to enhance the inclusion of d/Dhh students?

Based on the analysis of findings involving the above three questions, a few recommendations for further research are suggested.

This is a qualitative meta-analysis of studies, influenced by interpretations of existing theories and models (Collins & Fauser, 2005; also see, Luckner, 2017). Qualitative meta-analysis is a rigorous narrative analysis of primary and secondary research findings and can be undertaken by a multi-disciplinary team (Greenhalgh, Potts, Wong, & Bark, Swinglehurst, 2009). The various approaches to this type of research have engendered a variety of labels such as qualitative meta-analysis, meta-synthesis, meta-data analysis, meta-ethnography, meta-study, meta-summary, meta-method, metatheory, and grounded formal theory (Timulak, 2007). For the present study, this analysis should extend the knowledge base on inclusion for d/Dhh children and adolescents. To the best of our knowledge, this is a seminal study utilizing this type of analysis on the above research questions.

## METHOD

### Search Procedures

We reviewed and analyzed the literature in three stages. First, several electronic search engines were used, including Education Full Text (Wilson), ERIC, EBSCOhost, ProQuest, and PsycInfo, to obtain relevant articles. In addition, selected individual journals with published research on d/Dhh children such as *American Annals of the Deaf*, *Deafness & Education International*, the *Journal of Deaf Studies & Deaf Education*, and the *Volta Review* were perused. Specific key phrases and words included *inclusion of deaf and hard of hearing students*, *academic achievement of deaf students in general education classroom*, *full inclusion*, *social inclusion*, *interaction of deaf students in general education classroom*, *access to the general education curriculum*, and the *challenges of including deaf and hard of hearing students*. Second, after selecting studies from the above search engines, the reference list of each study was reviewed to locate additional sources. Third, all selected articles were reviewed, and articles that did not meet the inclusion criteria were excluded.

The criteria for including studies in this meta-analysis were as follows:

1. Because there are few studies that have examined the inclusion of d/Dhh students, studies conducted between 1985 and 2017, inclusive, were selected. The debate and research on inclusion emerged during the late 1980s (e.g., Paul & Ward, 1996; Winzler, 2009).
2. Due to the dearth of primary empirical studies, two broad types of research were considered; primary empirical investigations and secondary research reviews.
3. Participants should be, at least, students who were d/Deaf and hard of hearing or teachers of d/Deaf and hard of hearing students.

4. Articles were reviewed if the issues concern the inclusion of students who were d/Deaf and hard of hearing in general-education classrooms.

### ANALYSIS

The systematic search of databases and journals yielded 23 studies that met the inclusion criteria. Each selected article was analyzed with respect to providing information pertaining to one or more of the research questions listed above. Below are summaries of the research articles, presented in a Table format.

Table 1. Summary of the Reviewed Studies

Author & Date	Country	Research purpose	Methods	Participants	Findings
Afzali-Nomani (1995)	USA (Kansas)	To investigate the effects of full inclusion on the academic achievement and social development of D/HH and hearing children.	The researcher used a non-experimental research design. Specifically, a multiple regression analysis was performed to optimally combine scores on the five educational conditions scales to enhance prediction of each of the six criteria.	55 teachers of d/Dhh students and general education teachers who were employed in public school districts. These teachers should have experiences teaching in full inclusion programs.	The teachers were asked to rate the effects of inclusion on d/Dhh students based on three criteria: academic achievement, social adjustment, and self-confidence/esteem. Findings show that inclusion has a positive impact on the academic achievement of students with hearing loss. However, the positive effects of inclusion on d/Dhh students increase when students receive social encouragement, when teachers support the program, and when there is a full range of placement options.
Angelides and Aravi (2006)	Cyprus	To investigate the experiences of d/Dhh students in inclusive education schools and in special schools.	The study followed an interpretive model of research based on the three basic premises of symbolic interactionism: 1) human beings act toward things on the basis of the meanings the things have for them, 2) the meanings of such things derive from, or arise out of, the social interaction that one has with one's fellows, 3) these meanings are handled in, and modified through, an interpretative process used by the person.	20 individuals with hearing loss that ranged from mild to profound in inclusive schools and in special schools.	The researchers investigated the experiences of 20 d/Dhh students in inclusive schools and in special schools. Deaf and hard of hearing participants reported that the inclusive schools provided more opportunities for learning than special schools. Also, the researchers asserted that including d/Dhh students in inclusive classrooms obliged teachers to differentiate their instruction to meet students' needs. Further, the inclusion of d/Dhh students led teachers to develop collaborations between themselves in order to facilitate the learning of not only d/Dhh students, but also of all children. Finally, the inclusion of d/Dhh students led teachers to the development of more inclusive practices, which influence all students in the school.

Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Antia, Jones, Luckner, Kreimeyer, and Reed (2011)	USA (Arizona and Colorado)	To examine the social skills and problem behaviors of d/Dhh students who attended general education classrooms.	The researchers used a non-experimental research design. Specifically, the researcher used descriptive analysis to describe the social interaction.	191 students with mild to profound hearing loss who attended general education classrooms for 2 or more hours per day.	The results showed that the average change over 5 years in social skills and problem behaviors of d/Dhh students was not significant. The most consistent predictors of social outcomes for d/Dhh students were the students' classroom communication and participation in extracurricular activities.
Antia, Jones, Reed, and Kreimeyer (2009)	USA (Arizona and Colorado)	To examine the academic achievement of d/Dhh students who attend general education classrooms.	Non-experimental research design using a teacher rating scale-the Academic Competence Scale of the Social Skills Rating System. Also, the researchers used both normative and classroom academic data to determine the academic progress of d/Dhh students.	197 students with mild to profound hearing loss who attended general education classrooms for 2 or more hours per day.	The scores of d/Dhh students on standardized achievement tests indicated that, those students' academic achievement was in the average or above-average range in math and reading.
Antia, Kreimeyer, and Eldredge (1994)	ASU (Arizona, California, Oregon, Washington State, Pennsylvania, and the District of Columbia)	To examine the effects of two social skills intervention conducted by Antia and Kreimeyer (1987, 1988) on the peer social interactions.	The researchers adapted the social skills intervention for d/hh children in segregated preschool programs for use in inclusive situations by providing opportunities for children without hearing loss to learn sign language during the intervention sessions, if necessary.	105 young children with and without hearing loss from 13 different preschools, kindergarten, and 1st-grade programs.	The interactions between students with hearing loss and typical hearing students were increased after the intervention was implemented. The results showed that using long-term interventions within small, stable groups of children with and without hearing loss is effective.
Batten, Oakes, and Alexander (2014)	N/A	To investigate whether teachers had the attitudes, knowledge, and teaching skills proposed to support the effective inclusion of students in regular classrooms.	A systematic literature review using a wide range of electronic databases.	The researchers reviewed and analyzed 14 qualitative, quantitative, or mixed-design studies with participants aged 4–19 years old with hearing loss. Specifically, seven of these studies included d/Dhh children aged from 4 to 12, whereas three studies included d/Dhh children aged from 12 to 19. Also, eight studies included participants with cochlear implants, with one study including bilateral cochlear implants.	The researchers conducted a systematic literature review to explore factors associated with social interaction between d/Dhh children and hearing peers. The study found that child's age, communicational competency, and level of mainstreaming was positively associated with peer interactions.

## Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Eriks-Brophy & Whittingham, (2013)	Ottawa, Canada	To examine teachers' attitudes toward the inclusion of d/Deaf and hard of hearing students.	Non-experimental research design, using survey research.	The participants included 63 teachers in general education classrooms.	The researchers found that teaching experience and having family members with a disability most affected the attitudes of these teachers. The participants also indicated that their teacher education programs had insufficiently prepared them to teach these students effectively.
Holt (1994)	USA	To investigate reading comprehension and mathematics computation achievement of d/Dhh students in a variety of school settings.	Data were collected by Gallaudet University Center for Assessment and Demographic Studies during its 1990 standardization of the 8th Edition Stanford Achievement Test. The researchers used descriptive and inferential methods to analyze the relationships among achievement scores.	A sample of d/Dhh students, ages 6 through 21, selected for a project that produced special norms for the Stanford Achievement Test, 8th Edition (SAT8).	The results indicated that the scores on reading comprehension and mathematics of d/Dhh students who are educated with hearing students in general education classroom were higher than in segregated settings. However, it was not known whether the higher achievement is due to inclusion or whether students were selected for inclusion due to their higher achievement levels.
Hung and Paul (2006)	USA (Ohio)	To examine whether the inclusion of d/Dhh students affects attitudes of typical hearing students. Specifically, it explored the effects of factors such as contact experience, closeness, class norms, and demographical information (class setting, grade level, and gender) on typical hearing students' attitudes toward inclusion of d/Dhh students in general education classrooms.	This study utilized a correlational research design, entailing a survey approach with direct group administration to collect data.	Students with and without hearing loss in general education classroom in middle and high schools.	The findings revealed that including d/Dhh students in general education classrooms increases contact between d/Dhh students and typical hearing students. This effective contact between students is a significant reason that typical hearing students have positive attitudes toward students with hearing loss.

Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Johnson and Johnson (2012)	USA	To compare cooperative and individualistic learning experiences between hearing students and students with hearing loss and their effects on interactions and relationships between the students.	The researcher used an experimental design to compare the two groups of students.	10 d/Dhh students in 3rd-grade and 20 hearing students were the participants.	The results showed that students involved in cooperative learning experiences performed higher on measures of interactions and interpersonal attractions between typical hearing and d/Dhh students than did students involved in individualistic learning experiences.
Kluwin (1993)	USA	To examine the effects of inclusion on the achievement and grade point average (GPA) of d/Dhh students.	The research used a comparison design, and data was collected via the Annual Survey Data and Annual Survey of Hearing Impaired Children and Youth.	451 students, with hearing loss, range from mild to profound, from 15 public school programs.	The results showed that inclusive education for d/Dhh students has a positive effect on their academic achievement. Specifically, d/Dhh students who attended general education classrooms have higher scores on the achievement tests. The researcher concluded that including students with hearing loss in general education classrooms is important to engage these students in a high-quality academic atmosphere.
Kluwin and Moores (1989)	USA	To examine the mathematics achievement of d/Dhh adolescents in mainstream and self-contained classrooms.	Descriptive research design, using a survey to collect data.	215 d/Dhh students with an average age of 16.7 years and 63 teachers.	The results indicated that d/Dhh students' background factors have a significant impact on their mathematics achievement. Also, it was found that interpreters have no specific effect on mathematics achievement of d/Dhh students in mainstream classrooms. Finally, the results showed that the quality of instruction is the prime determinant of achievement, regardless of placement.
Kluwin and Moores (1985)	USA	To examine the relative effects of placement in an integrated class on the mathematics achievement of d/Dhh adolescents.	Comparison research design with a questionnaire to collect data was used.	36 d/Dhh students in mainstream mathematics classes were compared with 44 d/Dhh students in self-contained classrooms. All students in mainstream mathematics and self-contained classes were matched on mathematics ability, reading ability, degree of hearing loss, and social adjustment.	The results showed that d/Dhh students in inclusive classrooms performed significantly better than the students in the self-contained classes. Further, the results identified four factors, including higher expectations, exposure to greater quantities of demanding material, availability of individual support, and training in academic content for regular mathematics teachers, for the differences in mathematics achievement between students in inclusive classroom and those in self-contained classes.

Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Leigh (1999)	USA	To examine the effects of inclusion on the personal development of d/Dhh students.	Descriptive research design was used. Data were collected, using a 12- item open-ended questionnaire.	34 d/Dhh adults, who typically depend on speech as the preferred communication method, at the Oral Hearing-Impaired Section (OHIS) of the Alexander Graham Bell Association.	Participants emphasized that their educational experiences contributed to the change in their perception about themselves. Further, half of the participants indicated they changed their self-labels because their perceptions of the personal definition of hearing loss had changed.
Marschark, Shaver, Nagle, & Newman (2015)	USA	To investigate the effects of factors, including the characteristics of d/Dhh students, the characteristics of their family environments, and their experiences, on the academic achievement of d/Dhh students in secondary schools.	The researchers analyzed data from the National Longitudinal Transition Study-2 (NLTS2), funded by the U.S. Department of Education in 2000. Specifically, they used cross-wave, cross-instrument weight appropriate for multiple waves of NLTS2 data and multiple instruments to accommodate for design effects and the complex nature of the data set.	500 d/Dhh who received their education in regular secondary school or state-sponsored special schools designed for d/Dhh students.	The findings indicated a significant relationship between the independent variables, including having an additional diagnosis of a learning disability, having a mild hearing loss, being African American or Hispanic, and the dependent variable-academic achievement of d/Dhh students.
McCain and Antia (2005)	USA	To examine the communication participation, academic achievement, and social behavior of five d/Dhh students, five d/Dhh students with additional disabilities, and 18 nondisabled, typical hearing peers in a co-enrolled, Grade 3-4-5 combination classroom.	The researchers used a mixed-model Analysis of Variance (ANOVA) with the four CPQ scores as the repeated measure and the three groups as the between-subjects measure to analyze data.	5 d/Dhh students, 5 d/Dhh students with additional disabilities, and 18 nondisabled, hearing peers.	The findings indicated that d/Dhh students were not significantly different from their typical hearing peers in communication participation and social behavior. The researchers found differences in academic achievement, but d/Dhh students made steady academic progress over 3 years. Also, the findings showed that d/Dhh students with additional disabilities were significantly different from their typical hearing peers, but not from their d/Dhh peers in all areas. Finally, the researchers concluded that co-enrollment is a possible beneficial model of inclusion for d/Dhh students.
Musselman & Mootilal (1997)	Canada	To examine the social adjustment of d/Dhh adolescents enrolled in segregated, partially integrated, and mainstream settings.	Comparison research design with a questionnaire to collect data was used.	39 d/Dhh adolescents enrolled in segregated settings, 15 deaf adolescents in partially integrated settings, 17 deaf adolescents in mainstream settings, and 88 typical hearing students.	d/Dhh students in segregated classrooms exhibited the lowest levels of adjustment overall. Also, partially integrated students exhibited better adjustment than mainstream students with deaf peers; mainstream students reported better adjustment than did partially integrated students with typical hearing peers, exhibiting the same levels of adjustment as those of typical hearing peers.

## Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Powers (2003)	England	To investigate student and family factors that affect academic achievements of d/Dhh children.	The researcher used a survey to collect data. For data analysis, the researcher used inferential and descriptive methods.	82 d/Dhh students who were educated in mainstream schools.	The findings showed the complexity of interpreting statistical results, especially on the effects of degree of hearing loss.
Reed, Antia, and Kreimeyer (2008)	USA (Arizona and Colorado)	To examine the variables that affect the academic success of d/Dhh students in general education classrooms.	The researchers used a qualitative research design, and data were collected as part of a large longitudinal study of academic and social progress of d/Dhh students in general education classrooms.	25 students with mild to profound hearing loss who attended general education classrooms.	The results indicated that the academic achievement of d/Dhh students is influenced by factors such as student self-advocacy and motivation, high family and school expectations, families' ability to help with homework, and good communication between professionals.
Richardson, Marschark, Sarchet, and Sapere (2010)	USA	To investigate the experiences of d/Dhh students in general education classrooms versus in separate education classrooms.	The researchers used two surveys to collect data. Data were analyzed by using chi square tests and logistic regression analysis.	217 d/Dhh students who studied at Rochester Institute of Technology (RIT).	Findings indicated that students in separate classrooms prefer to communicate with typical hearing students using sign, speech and sign, or notes. Also, those students reported that they prefer to use sign or speech and sign to communicate with teachers in mainstream classes. On the other side, students in inclusive education classrooms prefer to use an interpreter or speech to communicate with typical hearing students as well as their teachers.
Stinson and Liu (1999)	USA	To identify the key issues concerning participation of d/Dhh students in general education classrooms.	This study used a qualitative approach to collect data and report the results.	40 teachers of d/Dhh students and educational interpreters.	The researchers reported that there are many factors that influence d/Dhh student's participation in general education classrooms, including their degree of hearing loss, teachers' attitudes, and teachers' abilities to engage students in their lessons.
Wauters and Knoors (2008)	Netherlands	To examine social integration of d/Dhh children in inclusive settings.	A structural equation modeling was used. The researchers used two instruments to measure peer relations in the various classrooms: peer ratings and peer nominations.	18 d/Dhh students (56% female, 44% male) and 344 hearing students (52% female, 48% male) in Grade 1–5 participated in the study.	The findings showed that d/Dhh children were similar in their peer acceptance and friendship relations, but there were differences in social competence. Specifically, d/Dhh children scored lower than typical hearing children on prosocial behavior and higher on socially withdrawn behavior. In addition, the structural equation modeling showed peer acceptance, social competence, and friendship relations to be stable over time, and the structure of interrelations between variables on two measurements were found to be the same for d/Dhh and typical hearing participants.



Continuation of table 1.

Author & Date	Country	Research purpose	Methods	Participants	Findings
Xie, Potmešil, and Peters (2014)	N/A	To describe how d/Dhh children interact with hearing peers in inclusive education classrooms.	A systematic literature review using a wide range of electronic databases.	21 studies were reviewed and analyzed.	The study found that d/Dhh students faced challenges in communicating, initiating/entering, and maintaining interactions with typical hearing peers in inclusive education classrooms. Also, these students needed effective interventions to assist them to continue in the general education classrooms.

## RESULTS

The results of the meta-analysis are reported for each research question.

### 1) What are the prominent perspectives on the effects of inclusion for d/Dhh students?

The literature review reveals much controversy on the inclusive education of d/Dhh students. Several researchers (Angelides & Aravi, 2006; Innes, 1994; Powers, 2003) indicated that there is ongoing debate over whether d/Dhh students should be considered differently from the situation of other students with disabilities. In other words, the unique language and communication needs of d/Dhh students may pose challenges that are different from those of students with other types of disabilities (e.g., Xie, Potmesil, & Peters, 2014). d/Dhh students often experience difficulties in understanding instructions and other information from teachers. Particularly, some students with hearing loss may not understand up to 25% of the verbal classroom instructions and interactions.

Hung (2005; also see, Hung & Paul, 2006) also cited researchers who argued that the best educational setting for d/Dhh students is one in which a signed language is used solely or in conjunction with a spoken language (e.g., signed system). These researchers believe that a number of d/Dhh students experience difficulty in general education classrooms because these students prefer an educational setting that represents the d/Deaf community with an emphasis on Deaf culture and signed language. Thus, including these d/Dhh children in general education classrooms may negatively influence their peer relationships and their academic achievement.

On the other hand, a number of researchers believe that there is no essential need for a special education classroom (and curriculum) for d/Dhh students because they can succeed academically and socially

in general education classrooms with typical (hearing) peers (Afzali-Nomani, 1995; Antia, Jones, Reed, & Kreimeyer, 2009; Johnson & Johnson, 2012; Kluwin, 1993). This argument is supported by the basic tenet of the qualitative similarity hypothesis (QSH), which asserts that the learning trajectory of d/Dhh students is developmental similar to that of typical (hearing) students (Paul, Wang, & Williams, 2013). The QSH asserts that the knowledge acquisition process of d/Dhh students is qualitatively similar to that of typical learners with the only exception being that the knowledge acquisition rate of some d/Dhh students might be delayed or slower. Accordingly, the slower knowledge acquisition rate of d/Dhh students, particularly language and literacy development, can be addressed by using instructional and curriculum accommodations and modifications such as Visual Phonics, Cued Speech, and other strategies that have a visual component.

In the reviewed articles, we found a range of perspectives regarding the effects of inclusion on the academic achievement of d/Dhh students. In general, the academic achievement of d/Dhh students was measured through the use of standardized test scores or was based on teachers' perceptions (Antia, Jones, Reed, & Kreimeyer, 2009; McCain & Antia, 2005). Some researchers reported that the academic achievement of d/Dhh students was lower than that of typical hearing students. For example, Holt (1994) reported that d/Dhh students in general education schools performed lower than typical hearing students in reading comprehension and mathematics problem solving.

From another perspective, a number of studies reported that d/Dhh students who are educated in general education classrooms have a higher academic achievement than those who receive their education in special education (i.e., self-contained) classrooms (Afzali-Nomani, 1995; Kluwin, 1993).

Other researchers have also reported a positive effect of inclusion on the academic achievement of d/Dhh students (Afzali-Nomani, 1995; Angelides & Aravi, 2006; Antia, Jones, Reed, & Kreimeyer, 2009; Holt, 1994; Kluwin, 1993; McCain & Antia, 2005). Among the latter group of researchers, there is a consensus that inclusive education provides d/Dhh students with specific high academic goals, entails an effective use of assessments, and presents a rich curriculum, which assists in developing the necessary abilities and skills for academic achievement.

Antia et al. (2009) investigated the academic achievement of 197 students with mild to profound hearing loss who attended a general education classroom for two or more hours per day. The results indicated that the majority of these students scored in the average or above-average range on standardized mathematics, reading, language, and writing achievement tests. Anita et al. also indicated that teachers rated 69–81% of the d/Dhh students in the general education classrooms as average or above average in academic achievement.

Angelides and Aravi (2006) examined the experiences of 20 d/Dhh students in inclusive schools and in special schools (i.e., schools for children with specific disabilities). The researchers found that inclusive schools provided more opportunities for learning than special schools did, and that students in inclusive schools received richer and more thorough instruction than did the students in special schools. Furthermore, the researchers asserted that including d/Dhh students in inclusive classrooms obliged teachers to differentiate their instruction to meet students' needs as well as to develop collaborations between themselves to facilitate the learning of not only d/Dhh students, but also of all the students. The researchers concluded that the inclusion of d/Dhh students led teachers to the development of more effective inclusive practices, which influence all students in the school.

Another issue that has diverse perspectives is the social integration of d/Dhh students in general education classrooms (Antia et al., 2011; Hung, 2005; Hung & Paul, 2006; Musselman & Mootilal, 1997; Wauters & Knoors, 2008). Although the literature on social interactions of d/Dhh students is limited and results are inconsistent (Xie, Potmesil, & Peters, 2014), some researchers indicated that d/Dhh students in general education classrooms tend to face social barriers in terms of making friends and participating in social activities (Antia, Kreimeyer & Eldredge, 1994; Antia & Stinson, 1999; Batten, Oakes & Alexander, 2014; Stinson & Liu, 1999; Xie, Potmesil, & Peters, 2014).

These researchers attributed the social problems of d/Dhh students in general education classrooms to difficulties with their language and communication abilities. Specifically, the researchers asserted that these social problems might vary based on students' degree of hearing loss. For example, students with severe to profound hearing loss may experience more isolation and loneliness in general education classrooms than students who have less severe levels of hearing loss (i.e., hard of hearing). These researchers also asserted that the negative attitudes of teachers and peers in general education classrooms toward d/Dhh students can be a significant reason for social interaction challenges and can limit classroom participation of d/Dhh students. It is reiterated that d/Dhh students' proficiency level of spoken language and communication skills is the most common factor leading to the harboring of negative attitudes among teachers and typical hearing peers (Hung & Paul, 2006).

Antia and Stinson (1999) admitted also that there are social challenges that d/Dhh students face in general education classrooms; however, these researchers asserted that inclusion eliminates the deleterious effects of isolation and the stigma attached to d/Dhh students. Other researchers (Antia, Kreimeyer, & Eldredge, 1994; Batten, Oakes, & Alexander, 2014; McCain & Antia, 2005; Wauters & Knoors, 2008) also emphasized that not all d/Dhh students experience isolation and rejection in inclusive classrooms. They believe that inclusion has a positive impact on d/Dhh students by increasing their access to the typical linguistic and behavioral models of their typical hearing peers. Furthermore, Leigh (1999) argued that inclusion plays an important role in increasing d/Dhh students' self-confidence and in changing their negative self-perceptions. In essence, the above investigators maintained that it is important for teachers and school staff to create effective contexts where d/Dhh students can frequently interact with typical hearing peers. In other words, the role of teachers in inclusive education classrooms is not only to improve d/Dhh students' academic outcomes, but also to increase their social interactions via classroom social activities.

## **2) Are the research findings on the effects of inclusion of d/Dhh students consistent or inconsistent?**

Our review of the research on the inclusion of d/Dhh students in general education classrooms revealed few inconsistent findings that may be the result of the use of different research methodologies or different measurements and tests (Antia, Jones, Reed, & Kreimeyer, 2009).

Another major reason for the inconsistent findings is due to the d/Dhh students' diverse experiences and to differences in the home and school environments. A few researchers (Kluwin & Moores, 1989; Marschark, Shaver, Nagle, & Newman, 2015; Powers, 2003; Reed, Antia, & Kreimeyer, 2008; Richardson, Marschark, Sarchet, & Sapere, 2010) emphasized that there is tremendous variation in d/Dhh children with respect to, for example, degree of hearing loss, factors associated with their home environment (e.g., parental involvement; language and literacy experiences), school context (e.g., teacher competency; teacher and students' attitudes), and their language and communication skills. d/Deaf and hard of hearing children come from different racial, ethnic, and economic backgrounds, and there are other significant factors that can impact findings such as early identification of hearing loss, early intervention services, consistent use of amplification, and family-oriented infant programming (Antia, Jones, Reed, & Kreimeyer, 2009; Powers, 2003; Wang & Engler, 2011). Diversity among d/Dhh children also affects their education and achievement in general education classrooms as well as their communication and interaction with teachers and typical hearing peers (Marschark, Shaver, Nagle, & Newman, 2015; Xie, Potmešil, & Peters, 2014). Thus, conducting research on the inclusion of d/Dhh students requires an understanding of students' individual characteristics, demography, and home and cultural backgrounds to be able to report reliable and valid findings. For example, some studies did not distinguish between students with severe and profound hearing loss and those with less severe hearing (Afzali-Nomani, 1995; Marschark, Shaver, Nagle, & Newman, 2015; Powers, 2003). This difference in degree of hearing loss may have a significant effect on each student's academic achievement and social interaction in general education classrooms. This difference also affects the generalization of findings and the proffering of valid implications.

In addition to factors discussed above, our review revealed that a school's context raises significant factors that contribute to the inconsistent results about the inclusion of d/Dhh students (Antia, Jones, Reed, & Kreimeyer, 2009). For example, d/Dhh students who received their education from highly qualified teachers and in motivated learning environments often exhibited better academic achievement and social interaction than d/Dhh students in other educational settings (Marschark, Shaver, Nagle, & Newman,

2015). Students who were educated in schools that provided them with a variety of learning activities for acquiring and improving language skills and developing their learning readiness from kindergarten to third grade and further also showed better academic achievement and social interaction than d/Dhh students in other educational settings (Marschark, Shaver, Nagle, & Newman, 2015). In essence, researchers must consider the influences that a school's context has on d/Dhh students who are participants in their studies. More specifically, researchers must gather sufficient information about each school's learning environment in terms of possible academic and emotional support such as tutoring, effective instruction, and effective social interactions.

### **3) What are the suggestions to enhance the inclusion of d/Dhh students?**

Our review indicated that a number of d/Dhh students can succeed academically and socially in general education classrooms with typical hearing peers (Afzali-Nomani, 1995; Angelides & Aravi, 2006; Holt, 1994; Kluwin, 1993; Marschark, Shaver, Nagle, & Newman, 2015; Powers, 2003). d/Deaf and hard of hearing students can gain access to general education curriculum when they receive effective and appropriate educational supports and services from staff in schools, in particular, teachers (Antia, Jones, Reed, & Kreimeyer, 2009; Powers, 2003). There is no need to develop special curricula for students; the focus should be on increasing the rate of students' knowledge through differentiation of instruction with the general education curriculum. As mentioned previously, to increase the English literacy acquisition rate for a number of d/Dhh students, researchers have suggested using techniques such as Visual Phonics and Cued Speech, to assist with accessing phonology and other phonological processes, an important component of early literacy development (Paul et al., 2013; Wang, Trezek, Luckner, & Paul, 2008).

Other researchers pointed out the importance of providing support services to d/Dhh students in general education classrooms to assist them in gaining access to the general education curriculum (Afzali-Nomani, 1995; Antia et al., 2011). These researchers indicated that educational interpreting (sign and oral interpreters) is an important support service for d/Dhh students in general education classrooms to facilitate communication with their teachers and classroom peers. Berndsen and Luckner (2012) emphasized the importance of the use of technology.

In other words, the inclusive classroom teachers must have sufficient training in how to use educational technology (e.g., smartboards, Internet, etc.). In addition, these researchers argued that general education classrooms should be equipped with adequate educational technologies and materials to facilitate the roles of teachers in these settings.

Our review revealed that the successful inclusion of d/Dhh students in general education classrooms relates to a number of significant factors; however-as mentioned previously-facilitating and improving the language and communication skills of d/Dhh students is also critical for successful inclusion. For example, Hung (2005; also see Antia, Jones, Luckner, Kreimeyer, & Reed, 2011; Batten, Oakes, & Alexander, 2014; Hung & Paul, 2006; Johnson & Johnson, 2012) emphasized that facilitating the communication and contact between d/Dhh students and typical hearing peers is a significant reason that typical students develop positive attitudes toward d/Dhh students. Similarly, Batten, Oakes, and Alexander (2014) indicated that inclusion of d/Dhh students cannot be successfully achieved without considering and addressing d/Dhh children's experiences, including their language skills. In essence, improving the language and literacy skills of d/Dhh students is not only important for improving their communication with teachers and peers, but also, it provides d/Dhh students with the ability to access the general education curriculum and to participate effectively in assessment programs. The reviewed articles (Antia, Jones, Luckner, Kreimeyer, & Reed, 2011; Antia, Kreimeyer, & Eldredge, 1994; Batten, Oakes, & Alexander, 2014; Hung & Paul, 2006; Musselman & Mootilal, 1997) suggested other important factors-several mentioned previously-that are necessary for d/Dhh students to succeed in general education classrooms. These factors include family involvement, self-determination, extracurricular activities, friendships, social skills, self-advocacy skills, collaboration with early identification and early intervention service providers, high expectations, and preteach/teach/postteach content and vocabulary being learned in the general education classrooms. Several articles that were reviewed (Afzali-Nomani, 1995; Antia, Jones, Reed, & Kreimeyer, 2009; Cochran-Smith, 2003; Luckner & Muir, 2002; Marschark, Shaver, Nagle, & Newman, 2015) agreed that the inclusive education of d/Dhh students cannot succeed unless teachers fulfill their role by effectively participating and collaborating in the inclusion process while providing high-quality instruction. The researchers emphasized that high-

quality instruction is necessary for improving student learning in terms of understanding how, what, and why they learn. For example, Power (2002) indicated teachers must understand the practice of inclusion so that they utilize effective instructional strategies in the general education classroom. This implies that it is not sufficient for inclusive classroom teachers to have knowledge-based content alone to teach students successfully, but they must also understand inclusive practice and methods to communicate and interact with students.

Research on the proficiency and attitudes of teachers in general and special education also revealed critical findings for effective inclusive practices, especially for d/Dhh children and adolescents. For example, some researchers (Afzali-Nomani, 1995; Eriks-Brophy, & Whittingham, 2013) indicated that special education teachers, including teachers of d/Dhh students had sufficient knowledge about the educational practice of inclusion and of the characteristics of students, but they lacked the necessary knowledge and skills to teach content areas such as mathematics, science, and reading. Special education teachers demonstrated better understanding of inclusive education practice and were better at motivating students with disabilities than were general education teachers. These researchers also pointed out that special education teachers exhibited more confidence than did general education teachers in working and collaborating with the parents of children with disabilities. On the other hand, most general education teachers had a good grasp of knowledge-based-content, but they lacked sufficient knowledge about the needs of students with disabilities and of inclusive education practices such as collaborative team-teaching skills and working as a part of an Individual Education plan (IEP) team.

A number of articles, which were not analyzed in this study, also found that general education teachers did not have the skills needed to appropriately and effectively adapt instruction to meet the needs of students with disabilities in general education classrooms. For example, Scruggs and Mastropieri (1996) reported that one third, at most, of general education teachers believed that they had sufficient training, skills, and resources necessary to teach in an inclusive classroom. According to the teachers in this study, their lack of knowledge about the practice of inclusion and of the characteristics of students with disabilities had a pervasive effect on their perceptions and degree of acceptance about including students with disabilities in their classrooms.

This study indicated that general education teachers need more training in the methodology of teaching students with disabilities, implementing collaboration, and using different sources in developing instruction materials. The researchers also argued that general education teachers need more training than did special education teachers in areas such as assessing academic progress, adapting curriculum, developing IEPs, and using assistive technology.

## RECOMMENDATIONS FOR FUTURE RESEARCH

Given the range of factors that needs to be considered, doing inclusive research on children and adolescents who are d/Dhh and on other populations is challenging and controversial (e.g., Allan & Slee, 2008). This assertion can even be gleaned from current textbooks for preparing teachers to work in inclusive classrooms (e.g., Bryant, Bryant, & Smith, 2017). In one sense, research on inclusive education is similar to conducting research on the effectiveness of teacher-education programs for which there is a number of impactful factors. Variables of interest for inclusive education research entail, at least, those associated with the environment (e.g., school, classroom, home), the teacher (e.g., proficiency, attitudes, teacher-student interaction, co-teaching), curriculum (e.g., accessibility), and the student (e.g., demography; factors associated with language, cognition, and the affective domain). Understanding the effects of inclusion on a macro level using group/quantitative research designs cannot be accomplished with one or two investigations. Conducting research on the macro level, including group intervention research, is even more challenging for low-incidence populations such as children and adolescents who are d/Deaf and hard of hearing. If macro-level research is desirable, especially for comparison purposes (e.g., inclusive versus segregated environments), then we recommend that, as much as possible, researchers document adequate information related to demography (e.g., hearing loss, age at onset, amplification usage, etc.) and achievement (e.g., language and communication levels). The documentation of these variable, at least, is critical for proffering evidence-based practices (Council for Exceptional Children, 2014). It is impossible to document or statistically control all factors, as mentioned above, related to inclusive practices. Nevertheless, given our growing understanding of the complexity of inclusion, it is clear that there will be limitations

to macro-level research investigations that need to be highlighted. Recognizing these limitations might diminish the inconsistencies and misinterpretations of findings. We believe that large-scale experimental intervention studies as well as observational, non-experimental investigations might continue to be challenging and rare-albeit we recognize that this is a major approach for evaluating the effectiveness of inclusive programs on a macro level.

There are certainly other types of research designs such as single-case, qualitative, and those associated with action research that can be utilized to evaluate effectiveness for an individual or a small group, who are part of a low-incidence population. These designs, including those associated with research in disability studies seem to be focused on addressing barriers that impede the successful inclusion of individuals in general education classrooms (e.g., Allan & Slee, 2008; Valle & Conner, 2011). In essence, this line of research is not focused on the evaluation of inclusive practices *per se*; rather, it is motivated by the question: What can be done to create a successful inclusive environment for this particular individual?

## LIMITATIONS

Every study has limitations, and the present one is no exception. The validity of a qualitative meta-analysis is dependent on the quality of the selection of studies under review and the accuracy of the interpretations of the present researchers. The focus of this meta-analysis was on the reported findings of primary empirical studies and the balanced interpretations of findings provided by the authors of secondary research reviews.

The meta-analysis of secondary research reviews or of other meta-analyses can pose specific challenges because of the dependence on the reporting of findings based on the quality of studies that were reviewed (e.g., Xie, Potmesil, & Peters, 2014). That is, the interpretations provided in the present study are dependent on the quality indicators or technical merits of investigations that were analyzed by other researchers who conducted the secondary reviews. There are additional caveats to consider when interpreting studies that have utilized surveys (e.g., Eriks-Brophy & Whittingham, 2013; Hung & Paul, 2006; Kluwin, 1993; Powers, 2003). Even with procedures to minimize error, it should be remembered that the survey responses in studies are based on the individual subjective perceptions of participants.

Similar concerns can be raised for investigations that employ the use of self-reports (e.g., Afzali-Nomani, 1995).

The discussion of the above limitations does not diminish the reliability and validity of the investigations that were analyzed. Nevertheless, the conclusions of the present study should be viewed with caution. More important, it is hoped that the present study influences other researchers to conduct similar or additional meta-analyses.

## CONCLUSION

It is critical to conduct evidence-based research to understand the effects of inclusion on individuals who are d/Deaf and hard of hearing. As discussed in this article, research on the effects of inclusive education practices requires the consideration of a number of factors and entails the use of different, and often complex, research designs. Future researchers need to be aware of the diversity of demographics in d/Dhh children and adolescents, and the strengths and limitations of assessments, research designs, and teacher practices. Awareness of these quality indicators (or technical merits) and others should minimize the generalization of findings to dissimilar populations of d/Dhh individuals and should enhance the proffering of effective educational implications.

The manner in which inclusion of d/Dhh children and adolescents should be investigated can become extremely political and may impede our growing understanding of this complex construct if we are not considerate of a variety of perspectives. Nevertheless, as noted by Allan and Slee (2008):

Inclusive education is a political imperative and questions of who gets an education and the character of that education compared with others cannot be construed as apolitical. Closing down the discussion or maintaining the barricades in order to feel more confident about one's dogma is not constructive. The technical and political need not always be antithetical. We would argue that an open and respectful conversation about ideology, choices and the impact of these choices on the subjects and products of the research is timely (p. 99).

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