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Technology-Based Family Education In ASL/English Bilingual Schools For The Deaf

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TECHNOLOGY-BASED FAMILY EDUCATION IN ASL/ENGLISH BILINGUAL SCHOOLS FOR THE DEAF

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Abstract

More research on how ASL/English bilingual schools for the deaf educate hearing families to apply bilingual education methodology at home is warranted. Given the rising use of technology in schools, its role within these family education programs was the primary focus. Thirty-two participants from 22 different schools completed an online, researcher-developed survey. Follow-up, online interviews were conducted with 7 participants, and artifacts were collected from 10 schools. Qualitative and quantitative descriptions express the study's results based on technology used as an informational and influential tool, counseling and coping tool, diversity tool, and program evaluation tool. Schools are using multiple forms of technology to connect, educate, and support hearing families of deaf children. Email, websites, text messaging, and electronic versions of books / booklets / flyers / brochures are widely used. Social media, online videos, and videophones grant families and educators additional avenues for collaboration. Video messaging, DVD's, CD's, podcasts, and online trainings and meetings are less often applied in family programming. This study provides findings to support the continued improvement of family education programming for hearing families of deaf children. Deaf children, their families, service providers, schools for the deaf, and deaf education service provider training programs stand to benefit from the study's descriptive information.

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CHAPTER 1

INTRODUCTION

Families are students' first and longest-lasting teachers. Most of the time, they can relate to and teach their children, given their similar circumstances, language, culture, and experiences. However, imagine their children are deaf, and the rest of the family is hearing. The family has little to no experience with deaf people. Naturally, they will find it difficult to understand how their children experience the world and how their learning process will differ from their own. In this case, they will need preparation, education, and support for their new roles, especially as they collaborate with educators and other service providers to successfully raise and teach their deaf children (Danklefsen, 2008; Ingber, Al-Yagon, & Dromi, 2010; Joint Committee on Infant Health, 2013; Szymanski, Lutz, Shahan, & Gala, 2013).

Approximately one in every thousand children is deaf. Over 90% of them are born into hearing families (Joint Committee on Infant Health, 2013). Many deaf students have delayed language development, below average academic achievement, and stressed family situations, as a result of limited access to language. Luckner and Velaski (2004) raised the important question of how family educators can increase hearing family involvement in the education of deaf children in order to create healthier family units. To explore this need, this study examined family programming within the deaf education system with an emphasis on the deaf bilingual educational methodology (i.e., American Sign Language and English) within schools for the deaf in the United States.

Medical professionals diagnosing and treating children's hearing conditions are the families' first educators and service providers. Of course, hearing devices and speech/language therapy services are the first and easiest for hearing families to accept. Some families are not

told about sign language or are directed not to use it with their children. However, research now shows sign language does not hinder children's speech development, as is falsely reported by many professionals, but instead can enhance children's learning and speech development (Belisomo, 2015; Danhauer et al., 2006; Marschark & Hauser, 2012). Actually, current research supports the benefit of the bilingual approach, over a monolingual spoken language approach, for all deaf children, regardless of their successes or struggles with hearing aids and cochlear implants (Belisomo, 2015). American Sign Language (ASL) / English bilingual education promotes deaf children's overall well-being, language development, cognitive development, social-emotional skills, and academic achievement (Belisomo, 2015; Mellon et al., 2015; Szymanski, Lutz, Shahan, & Gala, 2013). Furthermore, research literature is available to discuss current practices of family educators using a spoken language approach (oral / auditory / monolingual), while more research literature based on an ASL/English bilingual methodology is warranted.

Some schools for the deaf lack quality educational programming for training families in the ASL/English bilingual methodology. Many deaf education conferences and training programs focus on the medical and spoken language needs of deaf students with less discussion on using an ASL/English bilingual methodology within the home environment to parallel what is provided at the school. Collecting and presenting information on current trends and practices among family educators working with hearing families of preschool through high school deaf students will add to the shared knowledge base for the field of ASL/English bilingual education and the Deaf community. Given technological possibilities are changing how people communicate and interact, this study also focused on how family educators employ technology to deliver family educational programming.

Statement of the Problem

Historically, deaf education has focused on the two opposing communication and educational options of speech versus sign language. Since the 1970's in the United States, deaf education has offered families a third option, speech and sign language simultaneously (i.e., total communication movement), to allow children more opportunities for communication and academic development. This route allows hearing families to continue their comfortable use of spoken English by adding an English-based sign system for allowing their deaf children more visual access to language. Then, in the 1990's, the ASL/English bilingual education movement grew and started showing the educational benefits of providing deaf children two separate languages, English and American Sign Language (ASL) (Marschark & Hauser, 2012).

Some educators shifted from using English-based signed systems to ASL, which has a grammatical structure and set of rules different from English. For the next two decades, research focused on the growing bilingual educational practices in schools (Geeslin, 2007; Golos & Moses, 2013; Marschark & Hauser, 2012). Bilingual principles and practices flourished within schools for the deaf and the Deaf community. However, outside of the Deaf world, in the hearing world, few people were aware of ASL/English bilingualism until its recent emergence within the media and mainstream television. The television series *Switched at Birth* and *America's Next Top Model* and *Dancing with the Stars* deaf champion Nyle DiMarco have brought the ASL/English bilingual movement and Deaf community way of life into the hearing world (Calkins, 2016; Drolsbaugh, 2016).

Within the last ten years, in the United States, some early childhood educators and medical professionals have begun educating families about the ASL/English bilingual option, but most families continue to choose a speech-based approach. Years later, many of these deaf

children are severely delayed in their language development and consequently lag behind in their academic development. At that point, some service providers / practitioners recommend families to use a sign language - based approach. Their children thrive, but rarely can they make up for lost time and catch up to their hearing peers. The students' families then wish they had been advised and educated earlier on using the ASL/English bilingual educational methodology (Geeslin, 2007; Golos & Moses, 2013; Marschark & Hauser, 2012).

With improved medical technology, professionals are now discovering at a younger age deaf children who would not benefit from hearing devices or a spoken language approach and subsequently should begin learning and utilizing sign language early on. The medical reasons are multiple, but include underdeveloped or undeveloped auditory nerves, genetic conditions limiting auditory processing, and earlier detection of health or developmental conditions impeding learning. In past years, this subgroup of deaf children was identified much later, after years of slow progress with intensive speech therapy and hearing aid / cochlear implant use. Now, these children with limited access to sound and spoken language are identified as babies or toddlers (Joint Committee on Infant Hearing, 2013).

Nevertheless, sometimes, medical professionals are unable or unwilling to refer these families to the best sign language resources. If the medical professionals do refer the families, at times, the families do not follow-up to make contact with sign language sources (Danhauer et al., 2006). Eventually, the families enroll their children in school. Many public schools and schools for the deaf do not have an organized family education program or designated family service providers. Families end up uneducated or undereducated on how they can work with their deaf children at home. Consequently, the children continue to fall years behind in their language,

communication, and academic development (Marschark & Hauser, 2012; Szymanski, Lutz, Shahan, & Gala, 2013).

Most hearing families of deaf children are not fluent ASL users and are unfamiliar with Deaf culture and best practices for working with children who are deaf, visual learners (Marschark & Hauser, 2012). While plenty of research and discussion focused on family education programming based on a spoken language and auditory approach is available, less explorative information and research is present pertaining to educating families using an ASL/English bilingual philosophy. Family programming designers at schools for the deaf and Deaf education service provider training programs need more research literature to guide their design and implementation of quality pedagogy and technological approaches to ASL/English bilingual-based family education programming. Their programs also should address the multiple social, psychological, and moral/ethical implications of introducing and supporting hearing families of deaf children as they enter and participate in ASL/English bilingual programs. Furthermore, given the changing technology and family circumstances of today's society, more updated information is necessary to determine effective family education practices.

Each school has its own way of addressing family education, and some approaches are more successful and effective than others. First and foremost, programs and schools for the deaf should educate families to apply the ASL/English bilingual education methodology at home in collaboration with the efforts happening at the school. This study provided findings to support the continued improvement of family education programming for hearing families of deaf children.

Purpose of the Study

The purpose of this qualitative, descriptive study was to collect survey, interview, and artifact data from current family educators at schools for the deaf in the United States utilizing a deaf bilingual educational philosophy (ASL/English) with specific emphasis on how they used technology to provide family programming to address the psychological and emotional needs of hearing families of deaf children within the past three years. These findings serve to inform and educate programs for the deaf and deaf education service provider training programs to guide continuous improvement toward effective family education programming delivery.

Research Questions

Researchers comprehend the numerous factors influencing families' journey through discovering, diagnosing, understanding, accepting, and addressing their children's deafness, which are outlined later in this chapter. Answering these four research questions should add significant information to the literature:

How have ASL/English bilingual family education programs for hearing families with deaf children used technology to…

1. provide influential and informational opportunities to families to equip them with methods and skills to overcome personal or societal barriers?
2. address family needs at various emotional stages towards acceptance?
3. account for variations within the family unit, from working families, blended families, culturally diverse families, to families living in rural areas, or have children with special needs in addition to deafness?
4. evaluate the usefulness and quality of the resources and supports they provide?

Conceptual Framework

Involvement in the Deaf community and use of the ASL/English bilingual approach demonstrates for educators how children can learn American Sign Language as a first or simultaneous language (L1) to bridge to their English language development (L2). The ASL/English bilingual methodology supports the social model of the disability theory and subsequently drove this research development. Disability theory focuses on how people accomplish tasks differently, instead of centering attention on what people with disabilities cannot do in traditional ways. In addition, given the importance of family programming guiding hearing families through their emotional process, the Kubler-Ross grief model provides a structured framework (Anastasiou & Kauffman, 2011; Creswell, 2013). Furthermore, the concept of enabling families to serve their children using a bilingual methodology suggests providing them tools to overcome barriers, as outlined by Bronfenbrenner's multi-system theory of development.

Effective family education planning results when hearing families healthily adapt their common routine practices and language usage to meet the needs of their deaf children for overcoming personal and societal barriers. Healthy productive families promote ASL skills for their deaf children and the rest of the family members to empower the deaf children to communicate and learn as everyone else. They incorporate their deaf children as equal, valued, and contributing members within the family unit. Essentially, the ASL/English bilingual educational model guides these hearing families to become bilingual families, whose use of ASL and written English facilitate their deaf children's language acquisition process (Wilkens & Hehir, 2008).

Theoretical framework

Szymanski, Lutz, Shahan, and Gala's (2013) proposed use of Bronfenbrenner's multi-system theory of development illuminates how family education programming provides families resources to overcome multiple barriers, from individualized and personal to societal. Their perspective asks program planners and professionals to restructure their goals and activities for addressing barriers deaf children face. They organize barriers deaf children face into the five emerging global barriers to 1) child's own self-development, 2) meeting the needs of the students within the school system, 3) accessing qualified professionals and services, 4) collaborative efforts, and 5) developing knowledge and educating parents, professionals, and the general public (Szymanski, Lutz, Shahan, & Gala, 2013). This application of Bronfenbrenner's multi-system theory to deaf education is valuable and poses an opportunity for further exploration and discussion (Bronfenbrenner, 1992; Bronfenbrenner & Evans, 2000; Sontag, 1996). Using Bronfenbrenner's theory and the social model of disability theory to restructure the barriers analogy, based on the hearing family's perspective, provides a guide for examination of the content and effectiveness of family education programs. Figure 1, seen below, illustrates this interpretation of the factors influencing family education programming for hearing families of deaf children using an ASL/English bilingual methodology approach for communication and instruction.

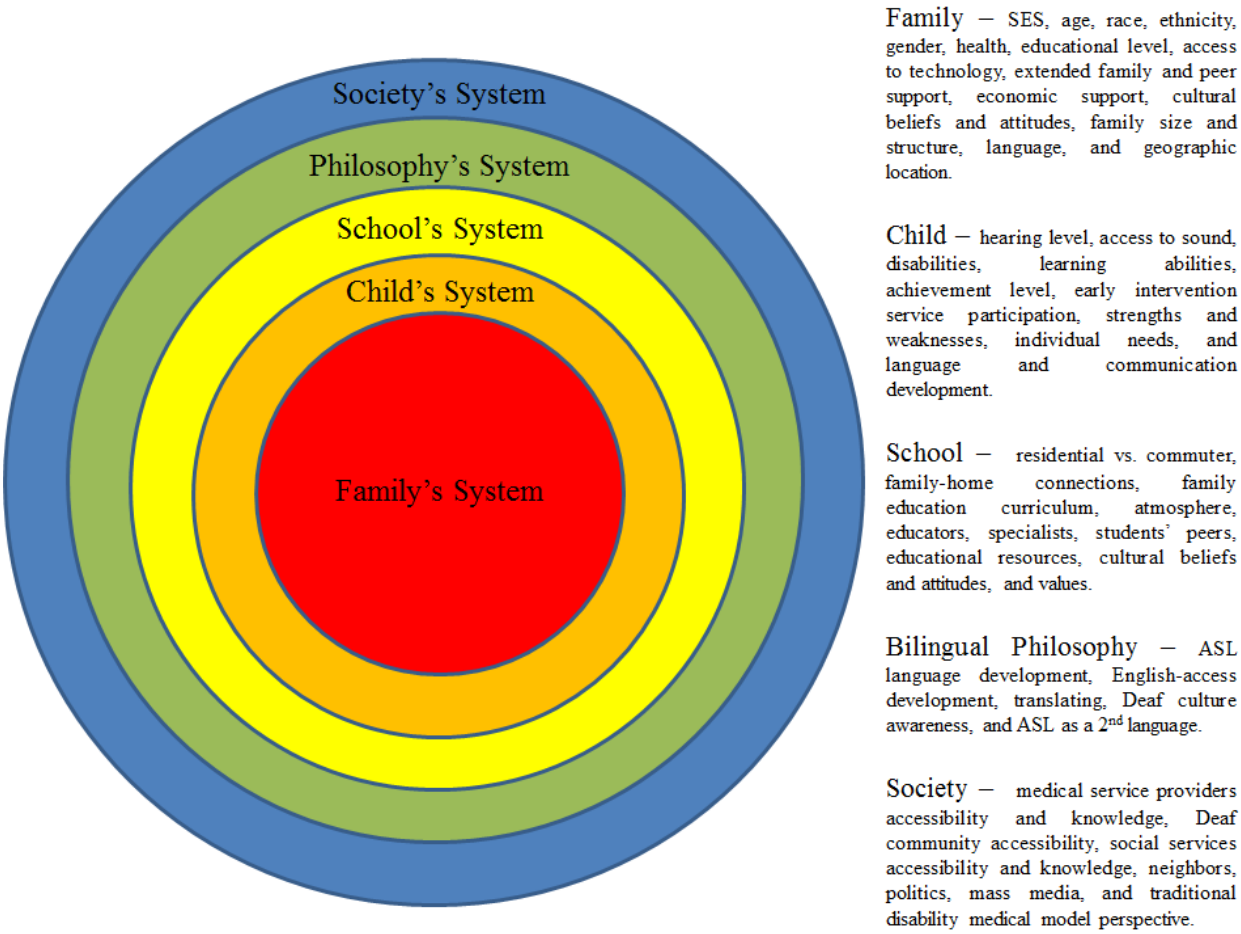

Figure 1. Theoretical framework representation for family education programming for hearing families of deaf children using an ASL/English bilingual approach.

Social model of disability theory

This conceptual framework is also based on the social model of disability theory and the Kubler-Ross grief model. The deaf bilingual methodology philosophy shifts focus from the medical model of what a person with a disability cannot do to a social model on how said person can accomplish anything using different methods and skills to overcome social, structural, and environmental barriers. The social model of disability theory, much like the deaf bilingual education philosophy, requires adaptation for differences over remedies for fixing impairments (Anastasiou & Kauffman, 2011; Creswell, 2013). While audism illustrates the medical model of

disability theory, Deafhood, encouraged by the deaf bilingual philosophy, exemplifies the social model of disability theory. Instead of viewing deaf children through the medical, audist perspective as disabled, the social model of disability theory dictates regarding deaf children as not impaired but having different learning styles and needs. Along these same lines, social constructivism theory has been applied to understanding family education. Family education guides hearing families to construct new ways of thinking and interacting to address the needs of their children (Decker, Vallotton, & Johnson, 2012). Therefore, examination of family education programming within the deaf bilingual education system needed to take into account the different methods and skills provided to the families for enabling their deaf children and family members to overcome barriers and re-adjust the family's common practices to create equal status and access for all, deaf or hearing.

Kubler-Ross grief model

Moreover, family programming should account for families going through a series of emotional stages as they adjust to the realization their children are deaf. They grieve the loss of the hearing children they thought they had and are faced with many unexpected changes. They deal with uncertainty, fear, and confusion. The Kubler-Ross stages of grief theory explains this process within the five stages of denial and isolation, anger, bargaining, depression, and acceptance. Family members will go through the stages in varying orders and time frames. Sometimes, people bounce back and forth between stages. Ultimately, some family members never get to the acceptance stage, but that should remain the goal for family education programming to transform families as they advance with making the necessary adjustments (Bradham, Houston, Guignard, & Hoffman, 2011; Ingber, Al-Yagon, and Dromi, 2010; Northouse, 2013). Family education programming could be assessed based upon how it

effectively addresses family needs at each of these stages and how successfully it pushes and settles families into the acceptance stage.

Assumptions and Limitations

Considering the purpose of this study, programs for the deaf are assumed to be using technology to provide family education programming. It is further expected these programs are meant to guide families toward the acceptance stage of the grief process and do indeed foster understanding and application of the deaf bilingual approach in the home and community environments. Also, multiple factors affect family education programming and its success. This study was limited by how many factors could be considered, with some factors remaining unknown or improperly identified.

Research must consider and collect demographic information to determine extraneous factors. In this case, these factors included the service providers' ages, race, gender, hearing status, and work environment educational level, as well as the family's geographic region, community size, adaptability, structure, and size. The caregivers' professional status, level of education, socioeconomic status, and number of working hours can act as potential factors too, but were not included in this research (Ingber & Most, 2012; Jackson, 2011). Hearing device effectiveness and usage might influence family's perceptions. Having an immediate or distant deaf relative could be a contributing factor as well (Ingber, Al-Yagon, & Dromi, 2010). Research should continue to analyze the complexities of human nature to understand better the current state and how to improve future outcomes.

Additionally, research calls for more studies and exploration to explain the impact of children having other special needs in addition to deafness. Estimates of 35-60% of deaf children have a secondary learning need. These needs include autism spectrum disorders,

learning disabilities, vision conditions, emotional disabilities, health conditions, and mobility factors. Families of children with multiple needs require several forms of family education to address their children's different learning styles and abilities (Marschark & Hauser, 2012; Szymanski, Lutz, Shahan, & Gala, 2013).

Rationale and Significance

The need for designing and implementing effective pedagogy and technological approaches within family education programs for hearing families with deaf children is definitely justified. Students need educational opportunities at school, as well as at home, to build their chances of language development and academic success. Hearing families need to build healthy relationships with their deaf children to promote overall well-being for all family members. The deaf bilingual methodology has been advocated as the best practice for all deaf children. Given today's changing family circumstances and new forms and applications of technology, schools for the deaf and deaf education service provider training programs need guiding support for providing effective family education programming. Most current research does not explore how effectively these programs are educating their hearing families to engage in supportive roles which foster bilingual language development for their children and themselves (Hunt-Gierut, 2011). Moreover, little research investigates the ASL/English bilingual philosophy methodology and curriculum, instead of a spoken language monolingual approach, used by service providers to educate these critical families in the United States.

This research has potential to impact a number of audiences, including deaf education family educators (early intervention through adult education), classroom teachers (early childhood through adult education), educational administrators, service provider training professors, and hearing families of Deaf children, considering or using a bilingual educational

methodology. This audience works directly or indirectly with deaf children and their families, plans and directs family services and practices, and/or participates in the family educational process. These educational leaders, including the families, have the potential to be transformative leaders. However, these service providers and families alike need access to quality ASL/English bilingual training to develop and practice the skills and knowledge in order to accomplish their transformative duties, including applying effective deep and equitable change, reconstructing new knowledge or social/cultural frameworks, emphasizing public and private good, focusing on equity and justice, demonstrating moral courage and activism, and rejecting deficit thinking and blame (Shields, 2010). Additionally, deaf children will indirectly benefit from the improved efforts of the educators and family members in their lives implementing ASL/English bilingual strategies.

Definition of Terms

This section outlines the current definitions and considerations among deaf children and their families to clarify concepts and ensure adequate understanding for reviewing, interpreting, analyzing, and discussing the literature, study methodology, results, and conclusions. The following text describes and explains how this study viewed the terms *deaf, family, family education, effectiveness measures, ASL, Deaf bilingual education philosophy and methodology, audism and Deafhood,* and *language as a problem, right, or resource.*

Deaf

When a child is identified with a hearing loss, the results are reported based on the decibel (dB) level or loudness of sound the child can hear. Newer terminology uses *hearing level* instead of *hearing loss,* given some children never had hearing to lose. This study focused on children who are profoundly *deaf* (i.e. hear at a level of 90dB or more). They are unable to

hear spoken language and common environmental sounds. The sounds they can hear or feel are quite loud. Typically, these children would qualify for powerful hearing aids or surgically-implanted cochlear implants, though some children receive little to no benefit from them and therefore need a visual means of communication and learning.

As a side note, people who are *hard of hearing* have a mild to severe hearing level, benefit from hearing devices, and use a spoken and/or signed means of communication and learning. *Hearing impaired* is an unacceptable term, given its negative connotation and focus on a deficiency or impairment. Furthermore, literature refers to *deaf* as a condition not allowing a person to hear, whereas *Deaf* indicates a person who is culturally deaf, accepted and active in Deaf community, and uses sign (and possibly spoken) language to communicate (Marschark & Hauser, 2012).

Family

For this study, *family* is broadly defined as any blood-related or non-blood related individual whom regularly interacts with the children and/or has a strong influence on the children's upbringing and education. *Family* can include parents, step-parents, siblings, grandparents, aunts, uncles, and cousins. Beyond the immediate and extended family, community members and friends of the family are considered *family* for this study, given their potential impact on the children's learning, directly or indirectly (Ingber, Al-Yagon, & Dromi, 2010; Ingber & Most, 2012; Jackson, 2011).

Family education

For this study, *family education* includes any tangible or intangible resource or service meant to educate families for working with their children. Resources may include human resources from the medical field (i.e., ear-nose-throat specialists, audiologists, hearing aid

technicians, therapists, and family physicians), school setting (i.e., educators, therapists, specialists, and evaluators), and community (i.e., Deaf community members, other families, agencies, associations, and organizations). Family education can occur in a medical or educational center, in the family's home, or various places within the community (i.e. restaurant, play place, or museum). Resources also can be paper-based, event-based, or technologically-based. Paper resources consist of articles, books, training materials, and handouts. Event resources include workshops, trainings, school events, and retreats/camps. However, this study focused on only technology-based resources, even if they are modifications of paper-based or event-based resources.

In addition, technology opens more avenues to resources. Search engines, websites, video resources, and social media are increasing in use and popularity. Some service providers use two-way synchronous communication and training modules to reach families. Services consist of therapy sessions, meetings, workshops/trainings, classes, medical appointments, and social gatherings. All of the above-mentioned resources and services, as well as many more, are a part of *family education*. They can be universal services to support all families with or without deaf children, targeted services for a small group of deaf children and their families with similar needs, and/or specialized services for individual students and families with the most need or specific individual requirements (Behl, Houston, & Stredler-Brown, 2012; Houston & Stredler-Brown, 2012; Ingber, Al-Yagon, & Dromi, 2010; Nicholson, Shapley, Martin, Talkington, & Caraway, 2014; Roulstone, Wren, Bakopoulou, & Lindsay, 2012; Snoddon, 2010).

Effectiveness measures

Prior research attempted to measure program effectiveness and called for more work in this area (Bradham, Houston, Guignard, & Hoffman, 2011; Houston & Stredler-Brown, 2012; Ingber & Dromi, 2010). Bradham, Houston, Guignard, and Hoffman (2011) asked service coordinators to list strengths, weaknesses, opportunities, and threats to evaluate the effectiveness of their EHDI programs. Danklefsen (2008) used service providers and parents' perceptions on collaboration. Ingber, Al-Yagon, and Dromi (2010) collected questionnaires on personality inventory, family orientation of community and agency services, resources for stress, social contacts and social support scale, and family involvement in early intervention. Other possible effectiveness measures are level of parental expectation, parent knowledge, parenting stress levels, parents' perceived support, parents' life satisfaction, children's well-being, and quality of parent-children interactions (Bradham, Houston, Guignard, & Hoffman, 2011; Jackson, Wagner, & Turnbull, 2010; Szymanski, Lutz, Shahan, & Gala, 2013). Nevertheless, Ingber and Dromi (2010) propose a discrepancy exists between actual and desired family-centered practices in family education programs, but effectiveness measures are one way of evaluating this possible trend.

American Sign Language

American Sign Language (ASL) is a distinct language, much more than gestures or pantomime. ASL includes facial expressions, body language, as well as signs which do not parallel a visual concept. ASL conveys any information other languages can. ASL, like English, has regional dialects within the United States. Additionally, a person cannot be signing ASL and speaking English at the same time. This phenomenon would be similar to the impossible task of a person speaking English and Spanish simultaneously. Moreover, in the field of deaf bilingual

education, ASL is equal to English in terms of use and value. Conversely, a major stigma ASL users and deaf bilingual education supporters face is the notion spoken language is superior to sign language (Marschark & Hauser, 2012; Reagan, 2011).

Unlike other languages which are spoken, ASL does not have a written format, though efforts have and are being made to create one. Instead, people usually use English to give close approximations of the meaning ASL conveys. Needless to say, ASL has been a legitimate language of its own, distinct from English, since 1955 when linguist William Stokoe created, compiled, and reported supportive research (Geeslin, 2008; Marschark & Hauser, 2012; Reagan, 2011).

Deaf bilingual education philosophy and methodology

Deaf bilingual education programs around the world use a spoken/written language and signed language prevalent within the country. In the United States, deaf bilingual education supports the acquisition, learning, and use of English and ASL. Educators focus on teaching children to translate back and forth between ASL and written English. For some children who are deaf or hard of hearing and have access to hearing spoken English, a component of ASL/English bilingual education focuses on developing their spoken English listening and speaking skills. For students with less access to comprehending spoken English, ASL/English bilingual education focuses on developing their English speechreading and mouthing skills. Additionally, some students learn ASL as their first language (L1) and subsequently use ASL to bridge to their learning of a second language (L2), or English in this case, while other students develop their L1 and L2 simultaneously from the beginning (Geeslin, 2007; Marschark & Hauser, 2012).

Audism and Deafhood

Audism, like racism or sexism, is a type of discrimination based upon the physical trait of hearing. Audism entails treating those who can hear and/or speak as better than those who do not. Whether they are aware of it or admit it, many medical professionals and deaf educators are audist and treat deaf people as disabled. Deaf bilingual education strives to address and eliminate practices and opinions based in audism. The deaf bilingual philosophy fosters Deafhood, a newer term centering on the perspective of deaf people as not disabled, but instead a cultural and linguistic minority group, who take pride in building their community around a common language (ASL), culture (Deaf), set of traditions, and heritage (Eckert & Rowley, 2013; Wilkens & Hehir, 2008; Young, 1999).

Language as a problem, right, or resource

A number of deaf educators believe learning ASL will interfere with students learning English. In fact, research has shown this outdated view is not supported by research. Instead, the opposite is true. Learning ASL can facilitate the process of learning English as a second language. Both languages can be learned successively or simultaneously. Bilingual students exhibit multiple learning and cognitive advantages over their monolingual counterparts, hearing or deaf (Baker, 2006).

Nover (1995) and Reagan (2011) have examined the issue of resistance to using ASL based on the three perspectives of language-as-problem, language-as-right, and language-as-resource. The language-as-problem perspectives view ASL as a minority language whose differences are interpreted as detrimental to social, economic, and educational development. The language-as-right perspective counters the language-as-problem perspective by supporting one's natural, human, moral, and legal right to use ASL as one's community language. Lastly, the

language-as-resource perspective encourages learning ASL for intrinsic and extrinsic purposes to access the community (Nover, 1995; Reagan, 2011). Hearing families of deaf students have the moral and ethical obligation to understand these perspectives and understand their bilingual children can use ASL and written/visual English as a right and resource in their lives.

Conclusion

Hearing families of deaf children need family programming to educate them on current research and trends, as well as allow them to adapt to their circumstances. Most importantly, research supports the benefits of a deaf bilingual educational methodology for all deaf children, but ample research on family educational programming based on this approach is lacking. Furthermore, technology is changing now family educators work with families and how adults learn. This study explored, by collecting survey/interview/artifact data, how family educators are currently using technology to meet the multiple needs of hearing families with deaf children. This study's conceptual framework is based upon families progressing through the Kubler-Ross stages of grief, toward acceptance of their children being deaf. Additionally, the social model of the disability theory parallels with the deaf bilingual education philosophy. Family programming within this philosophy also should guide families through implementing changes in their everyday practices, meant to address the barriers deaf children and their hearing families face and allow them to construct new ways of thinking based on ability and modifications, instead of disability and impairments.

Chapter 1 introduced this study by explaining the current state of affairs, the purpose of the study, important terminology, as well as reviewed its research questions, conceptual framework, assumptions and limitations, and rationale/significance. This chapter prepared the reviewers' critical understanding for analyzing the study's background through the literature

review, presented next in Chapter 2. Then, Chapter 3, grounded in the literature and conceptual framework, outlines the study's methodology. Next, Chapter 4 highlights and discusses the study's results, leading to the study's conclusions and suggestions for future research and action, reported in Chapter 5.

CHAPTER 2

REVIEW OF THE LITERATURE

Recent research supports deaf students can be successfully taught using bilingual methods focused on learning a spoken/written language and signed language (Belisomo, 2015). However, a majority of deaf students come from hearing families unequipped for meeting their bilingual and visual language learning needs. Therefore, these hearing families depend on service providers to instruct them and support their understanding and application of the deaf bilingual education model (Szymanski, Lutz, Shahan, & Gala, 2013). Following a review of how literature was collected and reviewed, this chapter outlines current trends in the field of deaf education with a more in-depth discussion of the American Sign Language (ASL) / English bilingual education model. Then, the language acquisition process of hearing families is discussed through the stages in family education from diagnosis to future trends. Next, this chapter examines why family education is especially necessary for hearing families of deaf children to engage them in supporting their own skill development, as well as their deaf children's bilingual learning. Lastly, this literature review begins to capture characteristics of current family education programming and research's direction for future studies.

Method of Literature Collection

The researcher was mindful of how literature was collected for this review based on personal bias and selection criteria (Callahan, 2014). This scholar had a deaf bilingual upbringing and presently teaches in an ASL/English bilingual program. Her current program does not include a formalized family education component, and the researcher has observed in her own classroom over the past ten years less than 20% of hearing families use sign language in

their homes. Furthermore, most families do not understand how to bridge learning between the two languages of American Sign Language and English.

Specific selection criteria were utilized for choosing reference works for this review. Online library search engines, snowballing, and serendipitous review of relevant deaf education journals were used to locate works within the last ten years (Callahan, 2014). Initially, the search focused on deaf bilingual programs and family education, but following limited results, it widened to family education programming within the general deaf education system. Search keywords included, but were not limited to, deaf bilingual education, parent education, parent involvement or participation, early intervention, American Sign Language, sign language, family resources, special education services, family support, technology, and effectiveness. Subsequently, most sources focused on spoken language or multiple approaches within family education, instead of just a deaf bilingual education methodology.

Current Trends in Deaf Education

To obtain information on the critical needs of students who are deaf or hard of hearing in the United States, the Clerc Center of Gallaudet University conducted a public input study during the 2010-2011 school year by surveying 775 deaf and hard of hearing children, their families, and the professionals working with them through multiple venues (i.e., conferences, workshops, email, web postings, and ListServs) (Szymanski, Lutz, Shahan, & Gala, 2013). Following analysis of the participants' open-ended responses, the results revealed the perceived barriers to deaf students reaching their full potential are language and communication, availability of quality resources, lack of social interaction, lack of qualified personnel, and family involvement. Too many students are forced into an unsuccessful speech-based program, without access to sign language. Students lack opportunities for productive social interaction with their peers,

educators, and families. Families are not directed to useful resources or denied access to quality personnel, which possibly limits their motivation and ability to be involved in their deaf children's education (Szymanski, Lutz, Shahan, & Gala, 2013). Furthermore, Luckner & Velaski (2004) state families with deaf children have unique reactions and challenges when addressing their children's deafness. They urge service providers to learn more about these issues and how to effectively address them through their services (Luckner & Velaski, 2004).

ASL / English deaf bilingual education

Current research supports the benefit of the deaf bilingual approach, over a monolingual spoken language approach, for all deaf and hard of hearing children (Belisomo, 2015; Mellon et al., 2015). However, most of the family education research literature and family education practices use an auditory-oral approach (Behl, Houston, & Stredler-Brown, 2012; Bradham, Houston, Guignard, & Hoffman, 2011; Danhauer et al., 2006; Houston & Stredler-Brown, 2012; Ingber & Dromi, 2010; Nicholson et al., 2014). Educational programs for the deaf need a greater emphasis on the bilingual approach to improve the students and their caregivers' language skills for enabling learning. Families learning ASL can provide their deaf children richer language experiences and reinforce in the home bilingual learning strategies acquired at school. The bilingual approach offers multiple benefits and opportunities to a diversity of students, deaf or hard of hearing. Further explanation of these benefits and the deaf bilingual curriculum content and methodology aspects is presented in the following sections.

Benefits and opportunities. Research validates the benefits and opportunities available through an ASL / English deaf bilingual educational methodology. It does not limit children to one option for communication and learning, but instead opens multiple opportunities for retrieving information. Information accessibility and personal differences in learning style are

more important than examining hearing and speech deficiencies. Most importantly, the two languages are equally valued, used, taught, and assessed. Deaf bilingual education aims to teach students not only the two prevalent languages of the Deaf and hearing communities, but also the hearing and Deaf cultures. Deaf culture includes a different set of values, habits, and traditions. For example, visual or tactile means for getting someone's attention are favored over sound-based cues. Most hearing families of deaf children do not know American Sign Language or have an understanding of Deaf culture. Therefore, their family education planning must address these insufficiencies for promoting their children's education and language access, acquisition, and learning (Geeslin, 2007; Marschark & Hauser, 2012).

Curriculum. The family education curriculum within an ASL/English bilingual program has multiple aspects. First, American Sign Language instruction at various levels is warranted (i.e. beginner, intermediate, advanced, interpreter). Secondly, Deaf awareness training focuses on better understanding the perspectives, preferences, and culture of Deaf people. Thirdly, bilingual literacy coaching explains how to bridge reading English with signing ASL and teaches families multiple means of translating back and forth between the two languages (Hunt-Gierut, 2011; Snoddon, 2014). Various forms of research support the benefits of ASL print and media book sharing among families and children (Golos & Moses, 2013; Snoddon, 2014; Swanwick & Watson, 2005). An online search reveals more detailed information regarding specific program content, such as parent and Deaf mentorship programs arranged through the Minnesota, Maryland, and New Mexico Schools for the Deaf, as well as the University of California – San Diego teacher preparation program and many more institutions (Dowling, Marquez, Moers, Richmond, & Swann, 2011; Humphries & Allen, 2008; Minnesota Department of Human Services, 2008; New Mexico School for the Deaf, 2013).

The curriculum framework for deaf bilingual education provides instruction in the three main areas of literacy, oracy, and signacy, meant to build students' language abilities through their receptive and expressive language skills. Deaf bilingual education, like general elementary and secondary education, should contain literacy instruction focused on the skills of reading, writing, and typing, as well as oracy instruction concentrated on speechreading and mouthing, along with listening and speaking when appropriate. Signacy instruction emphasizes the receptive language skill development of watching and viewing ASL, as well as the expressive language skill development of sign production. Receptive watching includes comprehending live signers, while receptive viewing is based on recorded ASL productions. Furthermore, just as there exists language planning for literacy and oracy development based around status planning, corpus planning, acquisition planning, and attitude planning, current signacy development concentrates on these same four levels of planning. At this time, deaf education educators and researchers acknowledge the need for increased signacy planning to equate with traditional literacy and oracy planning. For example, ASL curriculum exists for students learning ASL as a second language, but not as a first language. Now, a national committee is working on developing ASL standards for preschool to 12th grade. Various companies are developing video materials for instructional purposes in early intervention through high school settings. Eventually, these resources are meant to benefit not only the deaf students and their service providers, but also the students' families (Nover, Christensen, & Cheng, 1998; Nover, 2000; Nover, Andrews, Baker, Everhart, & Bradford, 2002).

Language Acquisition Stages in Hearing Families

Family education takes place at various times in the life of a child. In the case of a deaf child, family education programming can occur as early as birth, during the early childhood years, or later during school ages. The following sections explore how hearing families with deaf children are addressed during each stage in regards to their language acquisition process.

Education at diagnosis

Families have multiple points of contact along their early journey of discovering and exploring their children's deafness. First of all, the 2009 Early Hearing Detection Intervention (EHDI) Act recommends states conduct newborn hearing screenings. Generally, at this point, when a child fails the screening, only a referral to a specialist is provided, without explanation of options should the child be deaf. Sometimes, service providers and families do not follow-up and children are not diagnosed as deaf until two or three years of age or later. Some children are wrongly diagnosed as having another conditions, such as cognitive impairments, developmental delays, autism, or extreme shyness, before their deafness is discovered. Nevertheless, some deaf children fail their newborn screening, and audiologists and ear specialist doctors subsequently diagnose them within the first few months of life. Then, the children are evaluated for hearing device suitability. If they are deemed eligible, they are fitted quickly with devices (i.e. hearing aids and/or cochlear implants), begin attending regular audiology and speech service appointments, and are sometimes referred to an early intervention program (Houston & Stredler-Brown, 2012). However, Danhauer et al. (2006) discovered through a localized questionnaire study in Santa Barbara many medical professionals feel they do not have enough resources and information to share with families for directing them to early intervention programs and services.

Their data supports the need for increased community outreach to educate medical professionals about local services for deaf children and their families (Danhauer et al., 2006).

Early intervention and school-based education

Part C of the *Individuals with Disabilities Education Act* (IDEA) requires states to provide early intervention services to children, ages 0-3, and their families. Some, but not all, early interventionists explain to families their deaf education options. Instead, many service providers support continued speech and audiological services, and if a child needs sign language, provide families only a basic, survival introduction to the complex language and do not present deaf-friendly practices. At age three, deaf children transfer to the public school system for special education services under Part B of IDEA. Some schools for the deaf provide early childhood family education programming for families of preschool children and sign language classes, but lack organized family education services beyond preschool. Furthermore, public schools rarely provide such services. Instead, families must be motivated to search for information and assistance on their own, more recently through Internet searches (Stredler-Brown, 2012; Szymanski, Lutz, Shahan, & Gala, 2013).

Technology-based family education

Research shows many families are either not served or are underserved by qualified, knowledgeable service providers working with deaf children (Houston & Stredler-Brown, 2012; Ingber & Dromi, 2010; Jackson, 2011; Joint Committee on Infant Health, 2013; Szymanski, Lutz, Shahan, & Gala, 2013). However, increased use of online communities has opened new options of *teleintervention* and *telepractice* for families and their service providers. Now, they can search and access information quickly using the Internet. Families and service providers are able to use two-way synchronous meetings through *Skype*, video messaging, or videophones to

connect with more experienced families and service providers who have worked within the field of deaf education for a number of years. Families and educators are able to meet and/or review the work of field experts from all over the country. In some cases, service providers observe families working with their children, model a new strategy, coach the family through applying it, and follow-up on the family's continued strategy usage (Houston & Stredler-Brown, 2012).

So far, this new technology-based practice looks promising. The benefits include increased quality and frequency of services, improved timely delivery of services, more setting opportunities for services, increased flexibility to satisfy people's schedules and availability, lower overall costs, and improved children and family outcomes. Nevertheless, drawbacks and considerations before implementing a tele-practice include selecting trained and qualified service providers, addressing the needs of technophobic families and providers, and accessing adequate Internet connection speed and technology troubleshooting. Rural and lower-income families are especially challenged to gain access to quality Internet service. Furthermore, the presently reviewed scholarly literature focuses on *tele-practice* and *teleintervention* practices with a speech-based approach, though a sign-based approach is plausible, just under-documented at this time (Behl, Houston, & Stredler-Brown, 2012; Houston & Stredler-Brown, 2012; Nicholson et al., 2014).

Supportive Programming for Family Engagement and Skill Development

Multiple reasons demand excellent family education programming for hearing families of deaf children. First of all, these families have a different set of emotional and psychological needs than most families face. Families need a variety of supports and resources to guide and assist them along the way. Most importantly, the educational and emotional welfare of the deaf

children are at stake. The early years of life have a great impact on students' future successes and struggles in school and in life.

Family emotional and psychological needs

These hearing families have special emotional and psychological needs, unlike those experienced by most families. Upon discovering their children's deafness, families go through an emotional process, similar to the grieving process. Bradham, Houston, Guignard, and Hoffman (2011) remind service providers of the Kubler-Ross grief model, which outlines the stages as denial and isolation, anger, bargaining, depression, and acceptance. Ingber, Al-Yagon, and Dromi (2010) studied how mothers' emotional states of anxiety, anger, curiosity, and motivation, as well as self-efficacy beliefs and knowledge, may influence their involvement. Mothers with decreased pessimism or increased perception of informal support were more involved. Mothers with higher levels of anger were less involved. Mothers with more anxiety were more pessimistic and less involved. However, these results originate from an Israeli study and need replication in the United States (Ingber, Al-Yagon, & Dromi, 2010). Needless to say, service providers must be mindful of these emotional and psychological stages to provide appropriate resources to meet families' needs (Marschark & Hauser, 2012; Szymanski, Lutz, Shahan, & Gala, 2013).

Jackson, Wegner, and Turnbull (2010), when studying family quality of life following early identification of deafness, considered the resiliency model of family stress, adjustment, and adaptability to explain the relationship between stressors, the family's well-being, and family resources. They used a 40-item family quality of life scaled questionnaire, piloted on over 1,000 people, to define family's perception on their quality of life. The items pertained to satisfaction with family life, impact of deafness on family life, child outcomes, and family supports. Results

showed families are generally satisfied with family life, interpret their children's deafness as a major factor lowering their emotional well-being, and pursue more support to address their lower emotional well-being. Given the sample consisted of all speech-using children, child outcomes are based on how well the families perceived their children's speech development. A similar follow-up study with sign-using children and their families' perceptions should be conducted. However, the sample, while over 200 participants, was non-representative and lacked cultural and linguistic diversity. So, the authors called for more controlled follow-up research as well (Jackson, Wegner, & Turnbull, 2010).

Family supports and resources

Studies have looked at the supports and resources families want. Researchers learned families need more informational resources, social-emotional support from other families with deaf children, educational advocacy for families, more connections with deaf adult mentors and role models, additional funding for services and supports, reduced time demands, and increased educational programming specialized in deafness and visual-oriented practices (Jackson, 2011; Jackson, Wegner, & Turnbull, 2010; Nicholson et al., 2014; Szymanski, Lutz, Shahan, & Gala, 2013). A study conducted by Bradham, Houston, Guignard, and Hoffman (2011) found the following three strategies deemed necessary for improving family support: (a) develop and implement family support programs, (b) engage paid staff members who are parents of deaf children, and (c) utilize appropriate materials from national, state, and local agencies. Thus, programs serving families with deaf children must evaluate the usefulness and quality of the resources and supports they provide.

Critical age for child development

Research documents the importance of skill development during the early years of life for future academic and life-long success. The foundation for language, cognitive, and social-emotional development occurs within the first few years of life. Therefore, these years are critical for providing deaf children and their families quality services, resources, and support. Education does not only take place in the school, but also, within the home and community, and most importantly, through social interactions. Deaf children can easily learn sign language, since it is a visual means of communication, to interact socially with family, friends, adults, and peers. They also can use sign language for academic purposes to develop reading, writing, math, science, and social studies skills (Marschark & Hauser, 2012).

Students who learn a visual language early not only have better language and communication skills, but also world knowledge, memory, and problem solving skills. However, many deaf children have delayed exposure to a visual, accessible language and lack of sufficient opportunities to develop their language and communication skills. As a result, they have below average academic achievement in school, compared to their hearing peers (Geeslin, 2007; Marschark & Hauser, 2012; Szymanski, Lutz, Shahan, & Gala, 2013). Nevertheless, research has shown bilingual students, compared to their monolingual peers, have greater communicative sensitivity, metalinguistic awareness, and divergent and creative thinking based on their fluency, flexibility, originality, elaboration, and greater number of associations (Baker, 2006).

Service provider professional development

Service providers working with this low-incidence, deaf children with hearing families, population need access to other professionals in their field. In the past, they traveled to

workshops or conferences, but now tele-intervention learning communities provide new opportunities. For example, the National Center for Hearing Assessment and Management at Utah State University started a tele-intervention learning community in 2010. The program aims to provide shared knowledge grounded on evidence-based practices, and requires participants to attend monthly online 90-minute sessions. Researchers evaluate the program's effectiveness using pre- and post-assessments and qualitative and quantitative measures. Results show participants gain a significant amount of knowledge. Participants propose more flexible scheduling of meetings and utilization of social media, such as *Facebook*, for sharing information more frequently. While this program focuses on listening and speech-based communication approaches, it could conceivably be replicated with sign-based methodologies (Behl, Houston, & Stredler-Brown 2012).

Overall family education programming must consider not only the circumstances of the hearing families and their children, but also the variety of service providers and "expert opinions" they encounter along their journey. Both sides of this influential and informational exchange are vital to improving family education programming. The more experience and resources a service provider possesses, greater potential for quality family education programming exists (Behl, Houston, & Stredler-Brown 2012; Jackson, 2011).

Family Education Models

Family education programming in deaf education has experienced multiple changes over the years. Some of these transformations are due to increases in knowledge, while others pertain to changes in society. Researchers have studied family education programming through both the eyes of the families themselves and their service providers. In recent years, special factors within the family unit have gained attention as well.

Intervention trends

In the past, family education programming focused on child-centered services and now concentrates on family-centered and community-based practices (Jackson, 2011; Joint Committee on Infant Health, 2013; Szymanski, Lutz, Shahan, & Gala, 2013). Ingber and Dromi (2010) reviewed family-centered practices in early intervention programs by considering the 12 factors of: (a) case management, (b) flow of services, (c) individualized family plans, (d) individualized education plans, (e) decision making, (f) participation in team meeting, (g) participation in defining needs, (h) participation in identifying priorities, (i) participation in assessment, (j) participation in assessment decisions, (k) participation in the philosophy, and (l) the philosophy itself. Interestingly enough, while the surveyed mothers felt professionals gave them the chance for making suggestions about services and problems to work on, they did not feel professionals encourage them enough to make decisions. Instead, professionals made decisions for them (Ingber & Dromi, 2010). Families need to feel more empowered for their jobs and fulfilling their decision-making responsibility. Therefore, professionals should complete ongoing monitoring of their families' satisfaction with the services, by surveying their perceptions of the program's strengths and weaknesses (Danklefsen, 2008; Jackson, Wegner, & Turnbull, 2010; Nicholson et al., 2014; Szymanski, Lutz, Shahan, & Gala, 2013).

In 2013, the Joint Committee on Infant Hearing issued a 56-page statement on the principles and guidelines for early intervention programs after confirmation a child is deaf or hard of hearing. Within this supplement to the original 2007 Joint Committee on Infant Health's position statement, the committee outlines 12 goals, the rationale for each goal, and detailed recommendations for meeting each goal. These goals include (a) timely and coordinated entry into EI programs, (b) qualified service coordinators, (c) qualified service providers in

development and child/family well-being, (d) access to specialists for children with additional disabilities, (e) considerations for culturally diverse backgrounds, (f) progress monitoring based on standardized, norm-referenced assessments in all developmental areas, (g) services for children with all types of hearing loss, including unilateral, slight, progressive, fluctuating, and auditory neuropathy, (h) families as active participants in the development and implementation of EDHI systems at all levels, (i) access to other trained families with children who are deaf or hard of hearing, (j) active adults who are deaf or hard of hearing in the development and implementation of programs at all levels, (k) access to support, mentorship, and guidance from deaf and hard of hearing individuals for all children and families, and (l) best practices implemented. The next step will be establishing accountability measures in programs to verify their progress toward or mastery of these goals (Joint Committee on Infant Hearing, 2013).

Information and influences

Given the multiple resource avenues families can access, Decker, Vallotton, and Johnson (2012) sought to determine how families make communication decisions based on their internal and external sources of information and influence. The researchers asked 35 families about their values, priorities, and beliefs for their children and then divided them into two groups based on their communication decision of speech-based versus sign-based approach. While no significant differences were found between the two groups based on their sources of influence or knowledge of communication development, noted differences based on their sources of information and parent values appeared. Families using a sign-based approach reported fewer sources of information. All families reported more information gained from medical professionals and Internet resources, than from educational professionals. The researchers explained these results in view of the social constructivism theory. In other words, families selected medical and

Internet resources as more informative and influential, given more frequent encounters with them over educators (Decker, Vallotton, & Johnson, 2012). Hence, educators should provide more opportunities to families for increasing their influential and informational support.

Special factors

Researchers ask for further research to account for variations within the family unit, from working families, blended families, culturally diverse families, to families living in rural areas (Lo, 2009; Myers et al., 2010; Roulstone, Wren, Bakopoulou, & Lindsay, 2012). The needs of culturally diverse families are growing in attention. Studies note the impact culture and language can have on adult learning. For example, Myers et al. (2010) examined differences between White and Black deaf students and their families using a small sample of 47 individuals. They found Black children scored lower on reading and ASL tests, possibly due to the fact more of their families used spoken language, instead of sign language, in the home. Overall, the Black students were exposed to ASL on average at a later age of nine, versus age three for the White children. Moreover, White families (86%) supported ASL more often than Black families (29%) did. Lo (2009) found Chinese families interpret their children's conditions as punishment for sins and struggle to find unbiased, qualified Chinese-speaking interpreters with adequate specialized training. Rightfully so, the researchers did ask for larger, more controlled and diverse studies to verify these findings (Lo, 2009; Myers et al., 2010). Furthermore, researchers call for more studies and explorations to explain the impact of children having other special needs in addition to deafness (Joint Committee on Infant Health, 2013; Szymanski, Lutz, Shahan, & Gala, 2013).

Implications for Further Research

This research is based upon a theoretical framework set in Bronfenbrenner's multi-system theory of development, disability theory's social model, and the Kubler-Ross grief model. The developing conceptual framework integrates the researcher's personal interests, topical research, and the theoretical framework. In order to learn more about family deaf bilingual education programming, this research used this conceptual framework to determine effectiveness measures and contributing factors as well.

Theoretical framework

Family education programming within deaf bilingual programs could fit into multiple theoretical models. Thus far, the literature review reveals application of the resiliency model (Jackson, Wegner, & Turnbull, 2010), Kubler-Ross stages of grief theory (Bradham, Houston, Guignard, & Hoffman, 2011), learning and human development theory (Geeslin, 2007), and the social constructivism theory (Decker, Vallotton, & Johnson, 2012). Additionally, disability theory, critical theory, critical race theory, or a transformative / postmodern framework ultimately could apply within this situation as well (Creswell, 2013). Nevertheless, Szymanski, Lutz, Shahan, and Gala's (2013) proposed use of Bronfenbrenner's multi-system theory of development is worthy of consideration. The Bronfenbrenner perspective guides family educators to restructure their programming objectives and actions to acknowledge and handle the multiple barriers deaf children and their hearing families live with everyday (Szymanski, Lutz, Shahan, & Gala, 2013).

Conceptual framework

Constructive family education planning results when hearing families adjust their everyday practices to empower their deaf children to overcome communication obstacles.

Instead of treating their deaf children as helpless or different than they would their other children, by fostering learned helplessness and/or having low expectations for them, healthy productive families give their deaf children and the rest of the family members the skills to permit the deaf children to communicate and learn as everyone else. They regularly use sign language, while encouraging others to do the same. They modify auditory aspects of life to make them visual or tactile accessible. They incorporate their deaf children as equal valued and contributing members within the family unit. Fundamentally, the deaf bilingual educational model transforms these hearing families into bilingual families, whose use of American Sign Language and written English support their deaf children's language acquisition progression (Marschark & Hauser, 2012; Nover, 1995).

Conclusion

This study explored how technology-based family education programming addresses the needs of hearing families of deaf children using an ASL/English bilingual educational methodology. Service providers at schools for the deaf were surveyed based on multiple factors outlined in Figure 2, seen below. This figure frames the possible independent variable, intermediate variable, and dependent variable relationship to redefine the research problem and present the conceptual framework, as well as show the anticipated variable relationship.

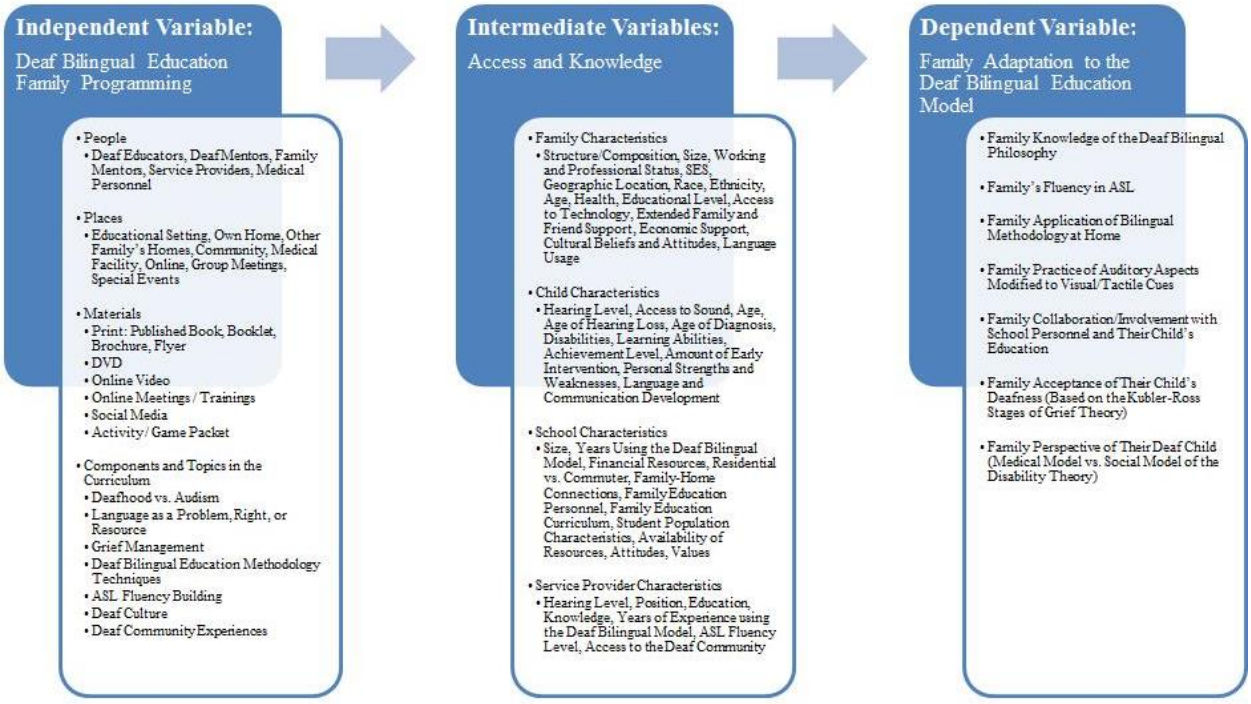

Figure 2. Conceptual framework's application to the methodology.

This study evaluated how family ASL/English bilingual education programs use technology to…

- provide influential and informational opportunities to families,
- equip families with methods and skills to overcome multiple layers of personal or societal barriers,
- address family needs at various emotional stages towards acceptance,
- account for variations within the family unit, from working families, blended families, culturally diverse families, to families living in rural areas, or have children with special needs in addition to deafness, and
- evaluate the usefulness and quality of the resources and supports they provide.

The intended beneficiaries of this study were not only the service providers, hearing families, and deaf children, but also the schools for the deaf themselves, the larger Deaf community,

service provider training programs at universities and colleges, and the public school systems where many deaf children are in inclusive or self-contained classrooms.

CHAPTER 3

METHODOLOGY

This phenomenological study used a researcher-developed survey design to collect quantitative and qualitative data from current ASL/English bilingual education service providers working at schools for the deaf in the United States to answer the question, *how are family ASL/English bilingual education programs using technology to provide opportunities to families, address the families' needs, account for variations within the family unit, and evaluate the usefulness and quality of the resources/supports they provide?* These practitioners must have been working with hearing families of deaf children and using a deaf bilingual educational philosophy. The descriptive data collected from these family education providers highlights how they use technology in numerous ways to provide family programming to address the physical, psychological, and emotional needs of hearing families of deaf children. Follow-up interviews and school resource/artifact collection were conducted, through critical sampling, to verify and expand upon the survey's findings.

Family education programs should consider and address the unique needs of hearing families of deaf children. Their needs include working through the stages of grief (denial and isolation, anger, bargaining, depression, and acceptance) toward acceptance of their children's learning differences, instead of using an audist perspective meant to focus on their children's impairments and the need to "fix" their deafness. Furthermore, families need support for working through the multiple barriers they face with their children, including child individual barriers, school barriers, philosophy barriers, community barriers, and society barriers (Bradham, Houston, Guignard, & Hoffman, 2011; Bronfenbrenner, 1992; Ingber, Al-Yagon, & Dromi, 2010; Northouse, 2013; Szymanski, Lutz, Shahan, & Gala, 2013).

This study gathered data to answer the following questions pertaining to how various forms of technology are used in family ASL/English bilingual education programs to…

1. provide influential and informational opportunities to families to equip them with methods and skills to overcome personal or societal barriers?
2. address family needs at various emotional stages towards acceptance?
3. account for variations within the family unit, from working families, blended families, culturally diverse families, to families living in rural areas, or have children with special needs in addition to deafness?
4. evaluate the usefulness and quality of the resources and supports they provide?

The rationale for choosing this study method was the suitability for gathering perspectives, perceptions, and common practice methods of using technology with hearing families of deaf children using an ASL/English bilingual methodology. The goals of the study were 1) to understand the current practices and how well they work, 2) to suggest how current trends can be improved for more effective future family service delivery, and 3) to educate a wider range of disciplines on how to initiate or maintain their family programming for hearing families of deaf children using an ASL/English bilingual methodology.

This rest of this chapter includes information about the (a) study's setting, (b) participants, (c) data collection process, (d) data analysis process, (e) participant rights, (f) potential limitations of the study, and (g) pilot study.

Setting

The setting of this study was 29 of the 80 identified schools for the deaf in the United States using an ASL/English bilingual philosophy. These schools provided the greatest chance of collecting rich qualitative data, given their clustered grouping of deaf children with hearing

families and their school's educational philosophy. Some schools for the deaf have professionals whose primary roles and job titles are family education providers, while other schools divide this role among their administrators, therapists, counselors, and classroom educators. Many schools for the deaf are the forerunners addressing the need for educating hearing families on the benefits and use of deaf bilingualism. Furthermore, service providers at these schools were the best candidates for providing answers to this study's research questions.

While some larger public schools have programs for deaf students, their deaf student populations tend to be smaller and lack the diversity present at schools for the deaf. Furthermore, public schools serving just a few deaf students oftentimes do not have well-developed family education programming for their hearing families or refer them to schools for the deaf. Additionally, not every state has a school for the deaf, while some states have more than one school for the deaf. The schools for the deaf included in this study were state-run, private, or charter. Schools for the deaf primarily using only an oral, auditory/verbal, or total communication philosophy were not included in the sample, since they did not readily utilize the ASL/English bilingual philosophy focus of this study. In the case of a few schools for the deaf which provide programs in two different philosophies (i.e. auditory-oral based and ASL-based), only service providers working within the ASL-based programs were surveyed. If the provider worked within both programs, they were instructed to provide answers based upon their involvement with the ASL-based programming. These detailed criteria bound the study.

Since there are not many schools for the deaf, this study implemented measures to ensure the confidentiality of the participants and their settings. Given this study reported the collected findings from these schools, the responses of any one individual school were protected and not easy to ascertain. The list of schools included in the study are only known to the researcher.

When a response from an individual school was reported or discussed to provide an example of a finding and/or to share a valuable quote from a respondent, the identifying school information was omitted. The investigator provided the schools with identification codes for managing the data during analysis (i.e. School A, School B, School C).

Selecting settings and gaining access to them is critical for any study. The schools for the deaf were selected based on an Internet search, school website review, and email/social media/organizational invitation. Access to the settings and their participants were arranged via email invitations, with follow-up videophone calls and emails to non-respondent schools and participants. The researcher did not use her own school for the deaf for this study's data collection, but utilized her school for the deaf as part of the pilot setting for testing and modifying the collection procedures, instruments, and protocols. The researcher does not have a relationship with the study's other participating schools for the deaf.

Participants from 22 schools for the deaf completed surveys. Seven of the schools had participants complete one or two extra surveys. In these seven cases, the survey results were combined from the school so their responses were not counted more than the other schools. Table 1, seen below, shows additional details about the 22 schools' regions, student population size, and number of family service providers. Figures 3 and 4, seen below, illustrate how the sample consisted of schools roughly diverse and equally representative in terms of geographic region in the United States and student population size.

Table 1

Setting Demographics

School	Region	# of Students	# of Family Service Providers
School A	East	50-100	5
School B	West	200+	7
School C	Central	200+	1
School D	Central	100-200	5
School E	East	200+	20
School F	East	50-100	1
School G	West	50-100	0
School H	West	100-200	15
School I	Central	<50	0
School J	East	50-100	4
School K	Central	100-200	5
School L	West	100-200	0
School M	Central	50-100	3
School N	East	50-100	3
School O	Central	100-200	1
School P	Central	<50	0
School Q	East	50-100	1
School R	East	100-200	2
School S	East	<50	3
School T	West	200+	0
School U	Central	200+	12
School V	West	100-200	2

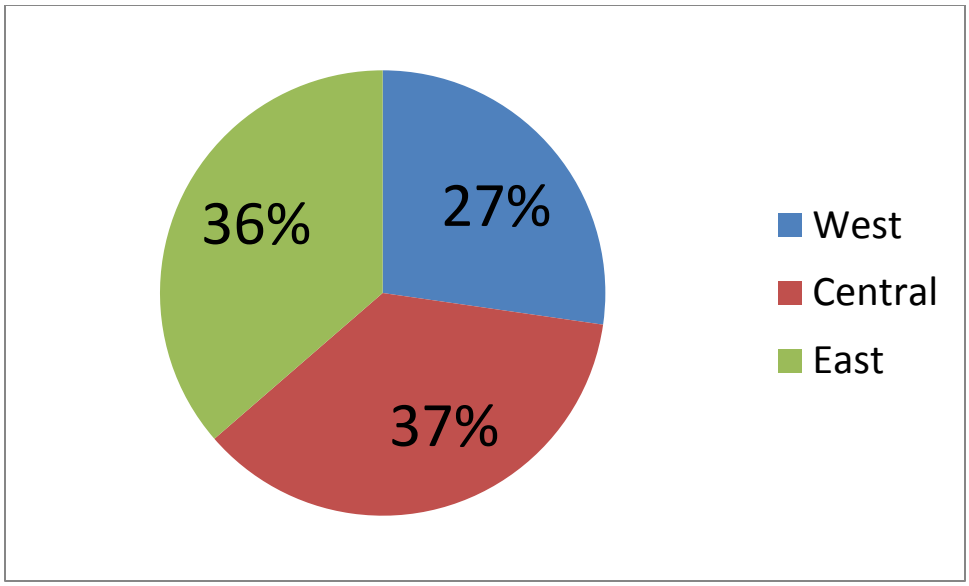

Figure 3. Setting demographics by geographic region in the United States. Western Region = 6, Central Region = 8, Eastern Region = 8.

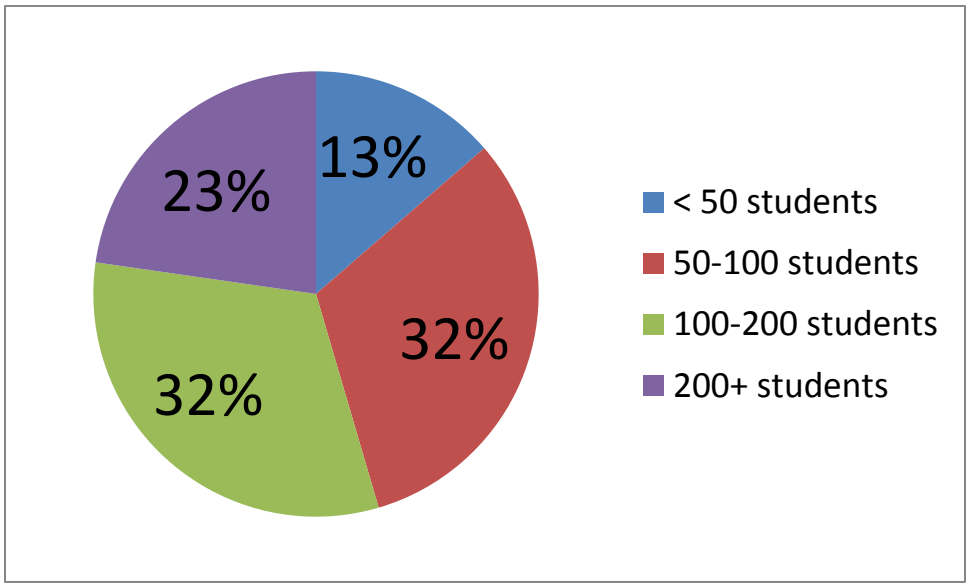

Figure 4. Setting demographics by student population size. Less than 50 students = 3 schools, 50-100 students = 7 schools, 100-200 students = 7 schools, and 200+ students = 5 schools.

As could be predicted, the number of family service providers within a participant school tended to increase as the number of students (school size) grew, as demonstrated in Table 2, seen below. The researcher validated the family service provider responses of the schools reporting

the four highest numbers. Three of the schools reported they greatly value family outreach. Two of these three schools emphasized family education was a top priority due to their diverse family population (race, language, culture, and students with severe needs). The fourth school (a state school for the deaf) reported they have six regional schools, instead of a single school. Each regional school has family consultants to serve the families of their region.

Table 2

Average Number of Family Service Providers, Given the School Size

School Size	**Average Number of Family Service Providers**
Less than 50 students	1.00
50-100 students	2.40
100-200	4.29
200+	8.00
All Schools	4.09

All of the participants responded their school program philosophy is bilingual (ASL/English). The respondents were asked to indicate what other type of programming their school offers. The results in order of prevalence were: 36% total communication (eight schools), 18% listening and spoken language (four schools), 18% auditory-verbal or auditory-oral (four schools), and 0% cued speech. Some schools offer three or four types of programming. Overall, these results were expected and appear representative of the school for the deaf population which include sign language in their programs.

Participants

The selection of the 32 participants was based upon purposeful maximal variation sampling to provide multiple perspectives on the topics being studied (Creswell, 2013). For schools for the deaf with family education providers, they were the participants surveyed. For

schools without a person formally in that primary role, the school administrators directed the researcher to the best representative(s) within their school who could provide the best information on the surveyed topics. These participants had to be in a position to conduct family education on an ongoing basis, even if it was not their primary job responsibility.

Participants were recruited primarily through emails obtained on school websites. Ten *Facebook* channels related to deaf education and ASL/English bilingualism also allowed posting the study invitation to participate. Using *SurveyMonkey*, the researcher emailed 806 potential participants at 80 schools for the deaf across the United States. Each school received at least five emails and no more than 25 emails. More contacts were made at larger schools for the deaf than smaller schools. Fifty percent of the emails were opened (N=399), while 47% were unopened (N=380), and 3% (N=27) bounced. Twenty-five percent of potential participants who opened the email reviewed the survey (N=98). Then, of those who opened the email, 42% of them (N=41) partially completed the survey (only the demographic section) and 33% (N=32) completed the entire survey. The remaining 25% (N=25) did not complete any parts of the survey.

The low response rate is likely due to multiple emails reaching possible participants who did not met the criteria of currently working with hearing families of deaf children. Furthermore, follow-up email and phone inquiries revealed some participants did not complete the survey because they reported they do not use any form of technology when working with hearing families of deaf children. They primarily use face-to-face interactions and printed materials.

The participants varied in age, gender, race, hearing status, native/first language, work setting grade / developmental level, and primary job title, as indicated in Tables 3 and 4, seen below. A majority of the participants were female and Caucasian/white. Roughly 60% of the

sample was hearing and reported English as their first/native language. Two respondents reported being hearing with ASL or ASL/English as their first language. Of the four hard of hearing respondents, three reported English as their first language and one reported ASL as their first language. Half of the deaf respondents reported ASL as their first language, while the other half indicated they were native bilinguals. For developmental / grade level work setting, a large portion of the sample worked with families of students at multiple grade levels. The sample consisted of professionals working at different levels within the school from classroom teacher, to department director, to top-level administrator. One-quarter of the sample self-identified as family service providers. One participant acted as an educational technology specialist, whose primary duty was to train and support professionals using technology to communicate with other professionals and families.

Table 3

Participants' Demographics

Age	**Gender**	**Race/ Ethnicity**	**Hearing Status**	**Native Language (First Language)**	**Primary Developmental / Grade Level Work Setting**
19% 20-29 years old, 6 people 25% 30-39 years old, 8 people 34% 40-49 years old, 11 people 16% 50-59 years old, 5 people 6% 60+ years old, 2 people	81% Females, 26 people 19% Male, 6 people	94% Caucasian / White, 30 people 6% Hispanic, 2 people 0% African American / Black 0% Biracial 0% Other	56% Hearing, 18 people 31% Deaf, 10 people 13% Hard of Hearing, 4 people	59% English, 19 people 22% ASL, 7 people 16% ASL/ English Bilingual, 5 people 3% Other (Spanish), 1 person	12% Infants & Toddlers, 4 people 27% Preschool/ Pre-K, 9 people 9% Elementary School, 3 people 3% Middle School, 1 person 12% High School, 4 people 37% All Levels, 12 people

Table 4

Participants' Primary Job Title

Title	**Sample Percentage**
Department Director/ Department Principal: Early childhood director/principal, elementary director/principal, middle school director/principal, high school director/principal, special needs coordinator, deaf support services director.	28%
Family Service Provider: Outreach consultant, social worker, deaf mentor, parent advisor, early intervention consultant, parent-infant teacher.	25%
Classroom Teacher: Preschool teacher, early childhood teacher, elementary teacher, middle school teacher, high school teacher, family consumer science teacher, residential life trainer, ASL teacher.	22%
Top-level School Administrator: Director of instruction, dean of students, K-8 Supervisor, school director.	22%
Other: Educational technology specialist.	3%

Within schools, various professionals take on the primary role of providing and/or facilitating opportunities for hearing families to develop within the ASL/English bilingual approach. Some schools employ outreach or family specialists, while other programs utilize school social workers or counselors. One particular school hired three people to act as "family educator / student wellness counselor" at the three school levels (elementary, middle, and high school) to bridge the communication and cultural gaps between the deaf students and their hearing families.

Follow-up interviews and artifact collection were conducted with participants from seven of the sample's schools for the deaf. These participants included five females, two males, six Caucasian/white, one Hispanic, four hearing people, two deaf people, and one hard of hearing person. The participants were of somewhat different ages (two in their twenties, one in their thirties, and four in their forties). They worked with families from a variety of age groups (two early childhood, two elementary school, one middle school, and two K-12th grade). The

participants represented schools for the deaf from the different U.S. geographic regions and school sizes (two western, three central, two eastern; two from small schools, two from medium schools, and three from large schools). The interviews were conducted via videophone in ASL with the three deaf and hard of hearing participants and via relay service in English with the four hearing participants. Both the researcher and hearing participants used English to communicate, and a relay service was utilized to translate the participants' spoken English responses into ASL to allow the researcher full access to the information.

The interview participants guided the researcher to varying avenues of technology artifacts found online from school websites, online trainings, and *YouTube* or *Vimeo* school channels to *Facebook* and *Instagram* accounts. The researcher also found similar artifacts pertaining to family education provided by eleven other schools for the deaf, of which four were schools for the deaf represented in the survey data and seven did not complete any surveys.

Data

Data was collected primarily by online surveys, with follow-up video interviews and school resource/artifact collecting guided by critical sampling, to verify, challenge, and expand the survey data collection. These methods provided the quickest and easiest means of collecting information from multiple schools for the deaf, across the United States, within a four-month time period. The researcher was the only person collecting this data to ensure the anonymity of the settings and participants, as well as to provide uniform collection procedures (Creswell, 2013).

The survey, interview, and resource/artifact collection data were meant to observe patterns among the schools, gather their collective story, and unite participants from multiple isolated schools based on their common experiences. Collecting data via online survey without

researcher support or with researcher facilitation should have improved the quality and authenticity of the data reported. Respondents may have been more inclined to provide accurate responses on a survey. Yet, participants also may have provided incorrect / invalid information about their school when completing the survey themselves online, given their personal opinion of how well they feel their school works with families. Overall, the subjectivity of the participants was a factor.

Upon request, the participants were given access to their own individual data, interview transcripts, and the study's results, reported in a manner protecting the confidentiality of the other participants, but none of them requested this information. They also had access to an initial draft of the group's results via email. Participant review processes were meant to support reliability and validity in the research process. None of the participants provided corrective feedback.

Table 5, seen below, outlines the study's timeline for collecting data.

Table 5

Data Collection Timeline

December 2015	Pilot study at researcher's school for the deaf to revise the protocols
January 2016 – February 2016	Email invitations to participate in the survey; Collect participant and setting contacts
February 2016 – May 2016	Surveys completed and reviewed
June 2016	Purposeful sampling for follow-up interviews and data collection
June 2016 – July 2016	Member check; Draft, revise, and submit findings

Study invitation

Participants were invited to complete the survey via email or *Facebook* pages. The invitation then directed them to a *SurveyMonkey* informed consent form, followed by an online survey. See Appendices A and B for a copy of the study invitation and informed consent form.

Survey

All participants completed an online, researcher-developed survey on their own, using the *SurveyMonkey* program. See Appendix C for a copy of the survey.

Interview

Follow-up / initial videophone semi-structured interviews were conducted to collect and expand the survey data. After reviewing the completed surveys, critical sampling guided follow-up interviews conducted to verify and/or expand divergent exploration of the research questions. A few participants from schools for the deaf reporting the least and most amount of the targeted family ASL/English bilingual education programming were asked to complete follow-up video interviews. Providing participants this interview opportunity allowed them more chances to share and clarify their practices and views, so their voices were heard, given the survey constraints could limit their expression. Furthermore, the interviews provided the researcher further exploration of the answers to the research questions. The interviews also allowed checking for misrepresentation of the survey responses, after noticing patterns in how the participants completed the survey. Additionally, the interviews opened the discussion for how practitioners view their use of technology with families.

The researcher took handwritten notes of the answers during the interview sessions, video-recorded the sessions, and created transcripts of the interviews for analysis. These documents will be destroyed within a year after the completion of the study and subsequent

doctoral degree obtainment. See Appendix D for the interview protocol. The interviewer/researcher aimed to treat the participants in a supportive, respective manner and responded to their reactions appropriately without influencing their information sharing.

School resources/artifacts

After reviewing the completed surveys, critical sampling guided follow-up data collection of school resources/artifacts representing how service providers use technology to provide ASL/English bilingual education training to their hearing families of deaf students. See Appendix E for the school resources / artifacts documentation form.

Analysis

Qualitative and quantitative methodology were utilized to review, compile, and report the responses and findings of this study. Schools were coded with a letter (i.e. School A, School B, etc.), and participants were coded with a number (i.e. Participant 1, Participant 2, etc.) to protect their anonymity and maintain organization of the data. Given the survey data is nominal or ordinal, non-parametric statistics were used. Descriptive statistics (i.e., frequencies and percentages) were collected for each demographic and survey item and reported in tables, with worthwhile results reported and discussed further within the text of Chapters 4 and 5.

Follow-up interviews and data collection of school resources/artifacts allowed for co-construction of meaning with the participants. Information gained from this follow-up process were reported qualitatively with descriptions.

The following steps were used to analyze the data.

(1) Organize the survey data and review it to develop a “whole picture” perspective.

(2) Review thoughts, impressions, coded items, etc. by recording notes in a research journal.

(3) Analyze the survey items using frequency and percentage measures.

(4) Report the non-parametric statistics in tables.

(5) Identify and record impressions using thematic summaries. Review impressions with peer reviewers.

(6) Study impressions and clarify survey responses by completing follow-up interviews for validity checks.

(7) Re-read data and determine items where researcher interpretations can be validated or challenged.

(8) Write a draft summary of the results.

(9) Review interpretations with participants and peer reviewers.

(10) Write a revised summary and include excerpts from the data which support interpretations (Creswell, 2013).

Participant Rights

The rights of the participants were crucial. All participants reviewed the study invitation and consent form before agreeing to voluntarily participate in the study. Only the researcher knows the schools and participants' true identities, and coding was implemented to protect their anonymity and organize the data for review, analysis, and reporting. The researcher retained individually identifiable information and protected the data during collection, storage, analysis, and reporting. Since aggregate data using surveys and interviews was gathered, analyzed, and reported, minimal risk exists for the participants and their settings. The data was kept on only one personal home computer, password-protected and accessed only by the researcher, with a back-up hard-drive system. The identifiable data was removed after the study's completion and will not be accessible for future study uses.

While the study did not intend to impose any risks or hardship on the participants, unintended outcomes of participation were possible. Participants may have felt burdened by the time commitment made to complete the survey and follow-up procedures, thus losing time for other commitments or responsibilities. Some survey items may have intrinsically encouraged or discouraged the participants based on how they feel their school for the deaf performs on said items.

Potential Limitations of the Study

This study had potential limitations, given its short time frame, small sample size, and non-representative sample. Data was collected within a few months. If a school or participant did not respond within the time frame, their input was not considered. While some schools were willing to participate in the study, other schools declined given a variety of reasons, thus further limiting the collection of responses from schools for the deaf using an ASL/English bilingual methodology, which is already a small sample within itself. Furthermore, while initially aiming to collect data from most schools for the deaf satisfying the study requirements, not all of them could or would respond. The pilot study was voluntarily conducted at the researcher's school for the deaf to test and modify the procedures and protocols, but their results were not included in the follow-up analysis and discussion. This practice protects the anonymity of the researcher's school and stakeholders.

More importantly, the researcher has personal bias, given her lifelong experience and support of the ASL/English bilingual methodology for working with hearing families of deaf children, which may have limited or alter the findings. While protocol-based efforts were implemented to remain impartial when interviewing participants and collecting data, the possibility existed for the researcher to unintentionally guide the participants' responses.

Additionally, the researcher stood to gain personally and professionally by conducting this study to improve how she and her school use technology to serve their students' families. Furthermore, how the researcher worded and designed the survey items, as well as translated the interviews, had the potential to influence the participants' responses. Lastly, many of the participants' answers could not be verified to ensure the reliability and validity of the data. The researcher described and discussed the information as it was reported.

Pilot Study

A pilot study was conducted with 10 participants to test and modify protocols (see Appendixes A-E) before use with participants at other schools for the deaf. Five of the ten pilot study participants worked at the researcher's school for the deaf (counselor, two teachers, and two administrators), while the other five were friends/acquaintances of the researcher who worked at other schools for the deaf in the Midwestern, western, and southern regions of the United States as itinerant teachers, classroom teachers, and an early intervention provider. The pilot study participants' input led to minimal changes to the survey design, interview protocol, and invitation and consent forms. The survey was modified to ask about their experience "within the last three years," given some participants felt their responses may be different if limited to just the current school year. The *SurveyMonkey* survey design layout was changed to show all the technology options within the screen space without requiring scrolling across the screen. A statement was added to the email invitation and survey's *SurveyMonkey* opening page to inform the participants they would be presented with a three-page consent form to review before proceeding to mark their consent and answer demographic and survey questions. The pilot study data was not included, analyzed, or reported in this dissertation or any discussions.

Summary

This study collected data from 32 participants and 29 schools for the deaf, using online surveys, interviews, and artifact / school resource collection. Demographic information shows some diversity among the sample in terms of age, job title, work setting, school size, and school geographic location. Efforts were made to improve the study, using a pilot study, prior to data collection and to protect the participants' rights throughout the study. Survey collection formed quantitative data, while all of the data resources allowed for qualitative reflection. This section also addressed possible limitations of this study.

CHAPTER 4

RESULTS

Technology advances the potential for instruction and learning, and schools continue to seek new tools to inform and educate families. Working with hearing families of deaf children, ASL/English bilingual schools for the deaf are utilizing technology in multiple ways and for several purposes to meet this unique set of family needs. This chapter outlines qualitative and quantitative data collected via an online survey, interviews, and web searches, from 29 different schools for the deaf in the United States and 32 school personnel working primarily with hearing families of deaf children/teenagers. First, the chapter presents the analysis model utilized for compiling, organizing, and reporting the data. Next, the data is discussed first as it divides into different types of technology utilized by the schools and then distributes to meet the major purposes/functions technology serves. Afterwards, the data is re-examined through the lens of the study's four research questions. Lastly, a follow-up summary reveals areas where technology is less commonly or not used and possibly needs concentrated development.

Analysis Model

Qualitative and quantitative methodology were utilized to review, compile, and report the responses and findings of this study, using data transferred into *Microsoft Excel*. Descriptive, non-parametric statistics (i.e., frequencies and percentages) were collected for each demographic and survey item and then reported in tables and charts, created in *Excel* documents. Follow-up interviews and school resources/artifacts allowed for co-construction of meaning with the participants to develop thematic summaries of the current practices and validity checks of the survey findings.

Presentation of Results

Thirty-two surveys were completed over a ten-week time period from late February to May 2016. A majority of the responses were collected in March 2016 (66% - 21 surveys), with 12% (four surveys) collected in February, 16% (five surveys) in April, and 6% (two surveys) in May 2016. These survey responses came from people representing 22 different schools for the deaf. Follow-up interviews were conducted with six of the participants and one additional person in June 2016. Artifact collection also occurred through guidance from the participants and web searches. Materials were collected from some of the surveyed 22 schools, as well as seven other schools for the deaf.

For the rest of this section, the data is present in four different ways based on (a) types of technology, (b) purposes for using technology, (c) detailed comparisons and descriptions of how technology is utilized, and (d) where technology is not being used in family education programming for hearing families of deaf children.

Overall technology usage

The complete survey results are presented first and then will be discussed divided into the four major purposes for using technology based on this study's research questions. The survey inquired about the types of technology used by the participants' schools for 27 different issues. The overall results showed the most widely-used forms of technology for providing services to hearing families of deaf children were email, websites, text messaging, and electronic books/booklets/flyers/brochures/etc. When the survey data was divided into the four primary purposes based on the research questions, these four forms of technology continued to be frontrunners. Videophone calls, social media, and online videos are somewhat utilized. Video messaging, DVD's, CD's, podcasts, and online trainings and meetings are less often employed in

family programming. Further detailed information on all the surveyed forms of technology in terms of total frequencies, percentage of the responses, and percentage of the participants is available in Table 6, seen below.

This progression of usage may be due in part to what is available to school personnel and their training. For example, one school administrator shared "I use *Facebook* everyday for myself to connect with my friends and family, but our school policy states school body members cannot use social media to be friends or follow parents. It's unprofessional" (Interview Participant 4, video interview, June 7, 2016). Additionally, one teacher stated "I would like to do video meetings, online trainings, or make sign language videos for parents, but I don't know how. We don't have video equipment in the classroom" (Interview Participant 2, video interview, June 3, 2016). In some cases, the technology options are unavailable, while in other cases, they may be under-utilized due to lack of training.

Data analysis then considered why technology is being used within family education programs. Overall technology usage is reported, divided by the 27 survey questions, in below Table 7 and is reported in order of prevalence. These results will be discussed in greater detail in the next four sections, along with the qualitative data collected. The data was collectively regrouped into the primary purposes proposed by the study's research questions in Table 8, seen below. Survey responses were greatest in the area of technology as a tool to provide influential and information opportunities for overcoming barriers, followed by technology as a tool accounting for variations within the family unit. Less often, technology is being used as a tool to focus on the hearing families' emotional process of accepting and addressing their deaf children's needs. Technology is not frequently being used in family education programs as a means of evaluating the materials and resources within the program.

Lastly, data analysis focused on follow-up interviews, artifact collection, and discussions pertaining to answering the study's four research questions. The next four sections will cover these questions with a discussion of the results from the surveys, interviews, artifact collection, and discussions. Noteworthy observations/comments from the qualitative data collection are summarized throughout the discussion of the results.

Table 6

Total Technology Usage From Survey Responses, Across All 27 Questions

Form of Technology	**Total Frequency**	**Average Frequency per Participant**	**% of the Responses**	**% of the Participants**
Emails	363	16.50	17.33	100.00
Websites	255	11.59	11.61	84.38
None	249	11.32	11.89	90.63
Text Messaging	217	9.86	12.17	87.50
Electronic books, booklets, flyers, brochures, etc.	202	9.18	9.64	53.13
Videophone Calls (1 family at a time, *Skype*, *FaceTime*)	193	8.77	9.21	90.63
Facebook	185	8.41	8.83	71.88
Online Videos (including *YouTube*)	127	5.77	6.06	68.75
Video Messages through phone	105	4.77	5.01	62.50
Instagram	63	2.86	3.01	21.88
DVD's	58	2.64	2.77	50.00
CD's	33	1.50	1.58	25.00
Online Meetings (multiple families at once)	27	1.23	1.29	25.00
Online Trainings	17	0.77	0.81	21.88
Podcasts	1	0.05	0.05	3.13

Table 7

Survey Responses' Itemized Purposes of Technology Usage

Purpose	**Frequency of Technology**
Provide influential and informational opportunities to families to equip them with methods and skills to overcome personal or societal barriers (Research Question #1).	***987***
Influential & Informational Opportunities	571
Contact	164
Informational	141
Influential	117
ASL skills	92
English skills	43
Other language skills	14
Overcome Barriers	416
In the School	127
Within the ASL/English bilingual philosophy	84
Individual to the child	77
In the hearing community	66
In the Deaf community	62
Account for variations within the family unit (Research Question #3).	***710***
Working families	118
Rural families	118
Children with special learning needs	102
Children with special health or medical needs	99
Children with special mobility needs	94
Culturally diverse families	91
Blended families / Step- or extended-families	88
Address family needs at various emotional stages towards acceptance (Research Question #2).	***372***
Acceptance	82
Denial and Isolation	80
Depression	73
Anger	71
Evaluate the usefulness and quality of the resources and supports they provide (Research Question #4).	***129***
Usefulness of material resources	37
Usefulness of personnel support	33
Quality of material resources	31
Quality of personnel support	28

Table 8

Survey Responses' Major Purposes for Technology Usage

Technology Purpose	**Uses of Technology Average Frequency Per Survey Question**
Provide influential & informational opportunities.	101.43
Overcome barriers.	95.17
Account for variations within the family unit.	83.20
Address family needs at various emotional stages towards acceptance.	74.40
Evaluate the usefulness and quality of the resources and supports they provide.	32.25

Technology to provide influential and informational opportunities

Research Question #1 asked "how are family education programs for hearing families with deaf children using technology to *provide influential and informational opportunities to families to equip them with methods and skills to overcome personal or societal barriers*?" The surveyed responses showed email and websites were the most popular forms of technology used. Further detailed information on all the surveyed forms of technology in terms of total frequencies, average frequency per participant, percentage of the responses, and percentage of the participants is available in Table 9, seen below.

Given the multiple ways technology can act as an influential and/or informational tool, survey results show it is most often used to contact families and tell them about upcoming or available opportunities in their community or online. Artifact collection revealed most schools for the deaf have a school website sharing announcements of upcoming events and classes at the school and in the community families can attend. Additionally, a growing number of schools are utilizing social media to inform and remind families of these special opportunities. Many school websites include a resource page referring families to online videos produced or utilized by the school to educate families on working with deaf children in a bilingual approach and learning

sign language. For example, one school has posted a video on *Vimeo,* educating others on the appropriate way to get a deaf person's or deaf group's attention in a variety of situations. Some schools have classroom pages where teachers post or link videos teaching the sign language vocabulary being taught in the classroom. A few schools have created *Vimeo* or *YouTube* channels dedicated to sharing school-made ASL videos on vocabulary, storytelling, answering questions, and encouraging communication within the family unit. Because school staffs realize families play an important role in each child's education, many programs have offered support and opportunities for family involvement through the *Shared Reading Project* based on bilingual practices, family literacy workshops, ASL workshops and classes, Deaf culture awareness activities, family learning weekends, parent support groups, sibling support groups, and presentations by Deaf adults. One early intervention coordinator specified,

> e-mail is the most powerful resource I have for reaching my families. I use it every day to send them personal messages or share links to cool videos they should watch. With some of my difficult parents who are stuck on what the doctor tells them… do not sign, your child will never learn to talk… I like to send them research articles or websites that explain the doctors are lying to them and sign language has many benefits and is good for helping teach their child to talk. (Interview Participant 7, video interview, June 14, 2016)

All states have federally-mandated early intervention programs to serve families of children with special needs from ages 0-3. These programs work with hearing families of deaf children. Some states have extended programs to serve these families with deaf children through the ages of five or eight years old. Within this study's interview and survey open-ended questioning, participants expressed a common vision that families of children/teenagers of all

ages should have access to extended intervention services. In some cases, the family members are not emotionally, mentally, or physically ready to accept and process what is provided to them when their deaf children are young. Given a second or third chance, when their children are older, some families may be able to change and progress at this later time. Even so, all families ought to be given the ongoing opportunity to grow as home educators, advocates, and integral parts of their deaf children's education. Too often, families will say they did not know about the all the services the school can provide them or the massive amount of resources in their communities and online. In the case of one school for the deaf, all of the students' families and the community have access to monthly, online webinars, ASL storytelling, and ASL interactive mentoring. The school regularly broadcasts parent meetings, luncheon seminars, school meetings, professional development workshops, athletic events, and performances to allow families on-going access to the multi-faceted make-up of the school and their deaf children's lives. The school's goal is to expand parent support, professional development services, and enhance student learning opportunities.

While ASL/English bilingual programs strive to treat the two languages equally, the survey results showed technology was used doubly for teaching families ASL skills over English skills. However, this result is warranted given most hearing families are already proficient English users and need additional instruction in ASL. Survey and interview participants shared the multiple ways technology is used to teach ASL: distance-learning ASL classes, on-campus ASL classes, through the school's website/*YouTube* channel, workshops throughout the state, online group or individualized classes offered by the school or commercial resources, and video recordings of on-campus ASL classes to be shared online or via DVD. During discussion with follow-up participants, many of them reported concern in this area and felt more emphasis

needed to be put on using technology to teach families ASL and how to translate back and forth between ASL and English. In order to teach ASL, they considered English was being taught as well and further English instruction was not warranted, except for English as a second language users. One middle school director shared

> I wish we could add to each IEP a goal for parents to improve their ASL skills, to make them take sign language classes. We offer online sign language classes to parents, one hour per week, at different times…. mornings, afternoons, and nights… but only a few go. We actually have more parents in those classes whose kids go to public school, not our school [for the deaf]. Too many of our parents just drop their kids here and expect us to take care of all their needs. More public school parents care and will work with their kids and learn to sign. (Interview Participant 4, video interview, June 7, 2016)

A few survey and interview participants mentioned referring families in need of English instruction to resources in their community, not at the school. Spanish, German, and Arabic translators and interpreters have been used at some of the study's schools for the deaf to accommodate written and spoken information. A few online materials were found translated into spoken or written Spanish, for schools with a larger population of Spanish users. One survey respondent admitted she uses *Google Translate* for written materials and knew it was not reliable or accurate. Nevertheless, schools for the deaf do feel the need to provide more personnel and material resources and supports in the families' native and most accessible languages.

Families encounter a number of barriers when implementing an ASL/English bilingual approach, from within their home or in the school to within the hearing or Deaf communities. Schools for the deaf felt they were using technology most often to support families overcoming

barriers in the school. Overall, they felt more attention needs to be brought to educating and equipping families to understand the difference between ASL and English, as well as the Deaf and hearing worlds. The ASL/English bilingual philosophy itself is based on supporting proficiency in ASL and English equally and mutual respect and understanding in both the Deaf and hearing communities (Geeslin, 2007; Marschark & Hauser, 2012).

Table 9

Technology Usage Survey Responses, Regarding Influential and Informational Opportunities, Across 11 Questions

Form of Technology	**Total Frequency**	**Average Frequency Per Participant**	**% of the Responses**	**% of the Participants**
Emails	188	5.88	16.64	53.41
Websites	156	4.88	13.81	44.32
Facebook	115	3.59	10.18	32.67
None	107	3.34	9.47	30.40
Text Messaging	97	3.03	8.58	27.56
Electronic books, booklets, flyers, brochures, etc.	94	2.94	8.32	26.70
Videophone Calls (1 family at a time, *Skype*, *FaceTime*)	92	2.88	8.14	26.14
Online Videos (including *YouTube*)	71	2.22	6.28	20.17
Video Messages through phone	60	1.88	5.31	17.05
DVD's	40	1.25	3.54	11.36
Instagram	28	0.88	2.48	7.95
CD's	21	0.66	1.86	5.97
Online Meetings (multiple families at once)	16	0.50	1.42	4.55
Online Trainings	8	0.25	0.71	2.27
Podcasts	1	0.03	0.09	0.28

Technology to address emotional stages

Research Question #2 asks "how are family education programs for hearing families with deaf children using technology to *address family needs at various emotional stages towards acceptance?*" The surveyed responses showed email and websites were the most popular forms of technology used. Further detailed information on all the surveyed forms of technology in terms of total frequencies, average frequency per participant, percentage of the responses, and percentage of the participants is available in Table 10, seen below.

Given the multiple ways technology can act as a counseling and coping tool as families go through the stages of grief toward accepting their child's deafness and visually-oriented perspective, survey results show it is more often used with families in the acceptance or denial stage, instead of the depression, anger, or bargaining stages. "The greatest issue families face is *accepting* they must learn ASL to bond their relationship between deaf child and hearing family members. When they sign, they show they are accepting and loving their child as he/she is" (Interview Participant 3, video interview, June 3, 2016). The survey and interview participants commented many of them feel early interventionists should be handling families going through the emotional process. While they realize it is not right, many participants admitted once the deaf children were in school, and especially in middle or high school, the school professionals did not address confronting families in the different emotional stages. Instead, they left it to families to go find the resources they needed or remain trapped in their current state of denial, depression, anger, or bargaining. Some school professionals indicated they did not feel trained in dealing with these situations. They might refer families to the school's social work, psychology, or counseling service providers, while others stated their school did not provide those types of services to the families, but just the students.

However, schools are using technology and non-technology-based approaches to guide family members on their emotional journey. Two schools for the deaf used lengthy online video series to educate families on each of the stages and how to handle themselves or others in the family within each of the stages (Keith, 2011, *Working with Families*; Keith, 2011, *Parent Survival Skills*; MediaDesk, 2015). A few schools for the deaf reported using parent or sibling support groups to assist families. Oftentimes, the PTO/PTSO (Parent-Teacher-Staff Organization) indirectly addressed this need through their meetings or panel discussions including Deaf teenagers/adults and hearing family members who have gone through the process before and reached the acceptance stage. As one school administrator stated, "families grow so much, knowing they are not the only ones facing challenges with their deaf children" (Interview Participant 1, video interview, June 2, 2016). One early interventionist felt her main responsibility was to "guide parents to other parents, so they can help one another out, be there when one is struggling and needs someone to listen and let them vent, someone who understands their little/special world" (Interview Participant 3, video interview, June 3, 2016). Likewise, one deaf mentor participant stressed the importance of connecting hearing families with deaf adults, who can act as role models and guides for the family, but more importantly give them insight into the unique world in which their deaf children live.

Multiple schools for the deaf are using social media, school websites, and school recruitment videos to promote families within the acceptance stage. These resources are available any time of the day. Furthermore, as one teacher commented "sometimes, I feel like parents won't listen to me, but will listen to another parent. I love it when I see a good parent talking to a struggling parent. They exchange emails, become *Facebook* friends, and make plans

to do things together" (Interview Participant 2, video interview, June 3, 2016). Additionally, an elementary school administrator shared,

> Many parents are busy throughout the day and do not have time to really stop and think about what drives their decisions. I know some parents end or start their day on social media. If they friend other parents, they get to see what others are doing and see posts shared about events, articles, and information. Some families get stuck depressed or complacent and are not involved or comfortable in their child's life, but if they see something positive or active posted online again and again, sometimes it sinks in and gets them moving again. (Interview Participant 6, video interview, June 12, 2016)

Families who are in a state of acceptance can help other families get unstuck and choose the steps to get moving, progressing toward a state of acceptance of their deaf children where they fully involve them in the family.

Table 10

Technology Usage Survey Responses, Addressing Emotional Stages, Across 5 Questions

Form of Technology	**Total Frequency**	**Average Frequency Per Participant**	**% of the Responses**	**% of the Participants**
Emails	68	2.13	16.00	42.50
Websites	63	1.97	14.82	39.38
None	53	1.66	12.47	33.13
Electronic books, booklets, flyers, brochures, etc.	41	1.28	9.65	25.63
Online Videos (including *YouTube*)	39	1.22	9.18	24.38
Text Messaging	38	1.19	8.94	23.75
Facebook	34	1.06	8.00	21.25
Videophone Calls (1 family at a time, *Skype*, *FaceTime*)	33	1.03	7.76	20.63
DVD's	23	0.72	5.41	14.38
Video Messages through phone	10	0.31	2.35	6.25
Online Trainings	7	0.22	1.65	4.38
Instagram	6	0.19	1.41	3.75
CD's	5	0.16	1.18	3.13
Online Meetings (multiple families at once)	5	0.16	1.18	3.13
Podcasts	0	0.00	0.00	0.00

Technology to reach a variety of families

Research Question #3 asks "how are family education programs for hearing families with deaf children using technology to *account for variations within the family unit, from working families, blended families, culturally diverse families, to families living in rural areas, or have children with special needs in addition to deafness?*" In the words of one interview participant, "Technology is great! We can reach the parents in so many ways, not just in-person or by calling them on the phone anymore. Technology brings together our parents who live all over the state

and connect them with other families all over the world" (Interview Participant 1, video interview, June 2, 2016). The surveyed responses showed email and text messaging were the most popular forms of technology used. Further detailed information on all the surveyed forms of technology in terms of total frequencies, average frequency per participant, percentage of the responses, and percentage of the participants is available in Table 11, seen below. Given the multiple ways technology can reach a wider variety, diverse group of people, survey results show it is most often used in this case to connect with working families and families living in rural areas.

Technology is a growing means of distance learning, which is especially valuable to families living far away from schools for the deaf and/or families that are too busy to meet with school professionals face-to-face during school hours. A number of schools are asking hearing families to apply, obtain, and use videophones within their homes to allow deaf students equal opportunity to communicate with their deaf peers and to provide additional visual means of school personnel and families to collaborate on a daily basis and during IEP or disciplinary meetings. Videophones allow more visual information to be conveyed than a standard audio-based phone. For example, videophones permit school staff and families to show one another ASL signs, concepts, and materials.

Schools are using technology to deliver services focused on the special needs some deaf children have due to cognitive or learning disabilities, health or medical needs, and mobility issues.

> The medical field and research have changed how much we know about deaf students and the many genetic conditions or illnesses they may have that caused their deafness. Now, parents can *Google* to find out more about what their child has and what they can

> do. However, too much of it tells them to not sign, which is heart-breaking and the wrong information for them to get. I forward good ASL articles and resources to my staff to share with parents to get them on the right path. (Interview Participant 1, video interview, June 2, 2016)

The field of augmentative and assistive communication allows students alternative means of interacting with others. Modified versions of some materials are available for use with children with cognitive, learning, or vision disabilities. Some school professionals use email or website references to provide families with recommendations to meet children's special cognitive, health, or mobility needs. Emails and text messaging have greatly improved day-to-day communication among the many adults within children's lives, thus allowing for more consistent, well-rounded interventions.

Family service programs use technology to reach culturally diverse families. Some schools utilize online language translation programs to convert materials into the families' native language. Social media, online blogs, and group emails are being used to connect families of different cultural backgrounds to others sharing their native language, race, heritage, and/or experience within the same school or at other schools for the deaf.

Technology can bring together family members separated by circumstance or place to collectively concentrate on what their deaf children need. In the past, materials and resources may be mailed/sent home or discussed in person with one of the child's caregivers. This caregiver could then share it with the other caregivers and family members (i.e. spouse, ex-spouse, grandparent, caregiver, etc.), but that did not always happen. Now, technology is improving how families of children living between two or more homes can be served.

Information can be distributed on mass emails, websites, or online apps/channels, accessible to multiple parties at once. For example, deaf children's grandparents or cousins could be learning the same sign language vocabulary as the children and keep better informed about what is going on at the deaf children's schools. These applications of technology open up greater possibilities for including deaf children in more, in-depth meaningful conversations and making them equal members in the family unit. Technology allows deaf children to share their experiences, beliefs, and feelings. Oftentimes, schools will provide voice-over interpretation, captioning, or post written translation transcripts to interpret materials originally produced in ASL. This practice allows family members to see what their children, their classmates, school personnel, and the larger Deaf community members are sharing and possibly motivate them to learn ASL to improve their communication skills with their deaf children and the Deaf community. Additionally, these types of technological services pull hearing families into their deaf children's community. The Albuquerque Sign Language Academy emphasizes this point on its promotional Internet video "children, family, community, possibility" (Finkelstein, 2012).

Table 11

Technology Usage Survey Responses, Addressing Family Unit Variations, Across 7 Questions

Form of Technology	**Total Frequency**	**Average Frequency Per Participant**	**% of the Responses**	**% of the Participants**
Emails	162	5.06	21.51	72.32
Text Messaging	119	3.72	15.80	53.13
Videophone Calls (1 family at a time, *Skype*, *FaceTime*)	85	2.66	11.29	37.95
Websites	84	2.63	11.16	37.50
Electronic books, booklets, flyers, brochures, etc.	68	2.13	9.03	30.36
Facebook	65	2.03	8.63	29.02
Video Messages through phone	47	1.47	6.24	20.98
None	43	1.34	5.71	19.20
Online Videos (including *YouTube*)	34	1.06	4.52	15.18
Instagram	25	0.78	3.32	11.16
DVD's	9	0.28	1.20	4.02
CD's	7	0.22	0.93	3.13
Online Meetings (multiple families at once)	5	0.16	0.66	2.23
Online Trainings	0	0.00	0.00	0.00
Podcasts	0	0.00	0.00	0.00

Technology to evaluate program effectiveness

Research Question #4 asks "how are family education programs for hearing families with deaf children using technology to *evaluate the usefulness and quality of the resources and supports they provide?"* The surveyed responses showed email was the most popular form of technology used, but a greater majority of the participants reported they used no form of technology to evaluate their programs. "We simply don't have time to develop evaluations for parents and they probably wouldn't do them. The government and school administration already

require us to do so much else" (Interview Participant 2, video interview, June 7, 2016). Further detailed information on all the surveyed forms of technology in terms of total frequencies, average frequency per participant, percentage of the responses, and percentage of the participants is available in Table 12, seen below.

Technology can function as an evaluation tool in multiple ways for assessing people or materials and allowing feedback. These people or materials can be appraised based upon their usefulness or quality of service. Survey results reveal a few schools consider technology as an evaluation tool. A greater majority of the interview participants and artifact search revealed schools do not consider families oftentimes when evaluating their programs. Instead, they more often depend on the input and performance of students and school staff to evaluate their programs. "I can tell how we are doing by watching the students. I can see which families are doing what we tell them and which ones are not… I also see how my staff perform at work and do annual evaluations on them," commented one school administrator (Interview Participant 5, video interview, June 10, 2016).

Nevertheless, the artifact collection process did divulge how a few schools use technology as an evaluation tool with families. One school for the deaf, which happens to be charter-operated and have significant family involvement, employs an anonymous posting site where family members can post about concerns, problems, and recommendations for other families and school personnel to provide responses, feedback, and follow-up. Another school for the deaf has annually sent home school performance surveys to families and has added the alternative for families to complete the survey online where they have the option of having the survey items read-aloud or signed to them as well. So, there are existing examples of the possibilities for using technology as an evaluation tool with families.

Table 12

Technology Usage Survey Responses, Regarding Program Evaluation, Across 4 Questions

Form of Technology	**Total Frequency**	**Average Frequency Per Participant**	**% of the Responses**	**% of the Participants**
None	71	2.22	35.50	55.47
Emails	49	1.53	24.50	38.28
Electronic books, booklets, flyers, brochures, etc.	18	0.56	9.00	14.06
Websites	17	0.53	8.50	13.28
Videophone Calls (1 family at a time, *Skype*, *FaceTime*)	14	0.44	7.00	10.94
Text Messaging	9	0.28	4.50	7.03
Facebook	6	0.19	3.00	4.69
Instagram	4	0.13	2.00	3.13
CD's	4	0.13	2.00	3.13
Online Trainings	3	0.09	1.50	2.34
Online Videos (including *YouTube*)	2	0.06	1.00	1.56
Video Messages through phone	2	0.06	1.00	1.56
Online Meetings (multiple families at once)	1	0.03	0.50	0.78
DVD's	0	0.00	0.00	0.00
Podcasts	0	0.00	0.00	0.00

No use of technology

Data collection exposed where technology is not being used. Table 13, seen below, charts where no forms of technology were reported within the four major purposes for using technology. Over half of the participants indicated they do not use technology to evaluate their family education programming. Instead, schools for the deaf base their program assessments on student performance and staff opinion. One-third of the participants believe they do not use

technology to address the hearing families' needs at various emotional stages or to provide opportunities to families overcoming the multiple barriers they face when raising and educating their deaf children. This information highlights where future efforts can focus on improving family educational programming using technology.

Table 13

Survey Responses of "None" Within Each Technology Purpose Area

Technology Purpose	**Average Frequency Per Question**	**% of the Participants**
Evaluate the usefulness and quality of the resources and supports they provide.	17.75	55.47
Address family needs at various emotional stages towards acceptance.	10.60	33.13
Provide influential & informational opportunities and overcome barriers	9.73	30.41
Account for variations within the family unit.	6.14	19.19

Further exploration

At the end of the survey and interview were three additional open-ended questions meant to seek elaboration on this topic in terms of other family programming goals and types of technology used, which were not included in the survey choices, as well as discussion on common forms of non-technology resources used to work with hearing families of deaf children. These questions were intended to encourage discussion for future practices and research.

Other family programming goals. Family education programs have used technology to fulfill other goals for their families. Most importantly for this selective group of hearing families with deaf children, technology is used for "learning sign language, learning about Deaf

community and Deaf culture, and understanding why ASL is important" (Survey Participant 16, open-ended question response, March 14, 2016). Participants also listed providing one-on-one / individualized attention and basic instruction meant to teach the families and their children academic concepts (how something is taught in the classroom). Furthermore, like most schools, deaf education programs are using technology to send emergency messages via text, email, voice messages, video messages, and electronic display boards. Interestingly, one school participant admitted "the use of technology within the school focuses more on *publicizing* the school at the neighborhood, city and state levels and is not used to assist, support or educate the families on a consistent basis" (Survey Participant 12, open-ended question response, March 10, 2016). A number of websites, *Vimeo* channels, and *YouTube* channels show promotional videos, advertising the schools' existence, history, philosophy, building structures, and multiple services.

Technology is not only used to reach out to the families when they are at home, but also when they are on the school's campus. Two schools for the deaf explained how they have parent workshop days. One of the schools focused a full day on how to obtain and use various forms of augmentative/assistive technology, showed a movie that was interpreted on-screen for children, and ended the day by taking the group to attend a movie theater offering different types of captioning. The other school used the parent day to not only demonstrate important pieces of technology to be used with deaf children (captioning, videophones, assistive listening devices, visual alert systems, etc.), but also to explain the different programs and therapies they offer and significant aspects of Deaf culture and community.

Other types of technology. Through the survey and interview collection process, other forms of technology were uncovered which were not included on the survey. Two schools for the deaf give each student, K-12th grade, a tablet or iPad to use throughout the day at school and

regularly take home to share their work, act as a videophone, and teach their families more about ASL/English bilingual instruction, ASL-English translation skills, and the Deaf community and culture. Another participant explained how they use digital whiteboards and projectors during their family trainings or meetings. Besides *Skype*, *FaceTime*, and videophones, some schools have utilized *Google Hangouts* with families.

A number of participants expressed the need to increase their school's use of their websites and creating online videos / webinars as beneficial routes to educating families on and in the ASL/English bilingual philosophy. While the Internet has a growing number of sign language videos and webinars, the quality of some are unacceptable and some videos exhibit an English-based form of sign and not true ASL. Additionally, school personnel want more videos available on a wider range of topics and for multiple audiences, young infants through adults.

Some schools allow their employees to use their personal mobile phone to communicate with families, while other school provide their staff mobile devices to use. In some cases, school policy prohibits school workers from using their personal devices for work purposes. Even so, mobile devices allow family service providers several means of communicating with families via text, email, video messaging, video conferencing, and apps. *Glide* has become a popular video messaging app used among deaf individuals and is being used to bridge the communication gap between school personnel and families. An increasing number of apps are being produced for teaching families and children sign language, but more are definitely warranted, especially apps with storybooks presented in ASL and with elements of Deaf culture integrated.

Non-technology usage. Some families and schools have limited access to technology, so the study also included a question on the survey and interview protocol regarding what traditional / non-technology means are used to meet the needs of hearing families of deaf

children. Of course, face-to-face interactions/meetings/workshops/trainings, letters/notes, phone calls, and mail were often reported. Daily/weekend communication booklets, take-home copies, home visits, flashcards, and ASL/English labels for around the house are especially popular when working with early childhood and elementary students. Printed classroom, department, or school-wide newsletters can be mailed or sent home in the students' backpacks. Some schools loan or provide books/booklets to families on various deaf education – related topics. Families are encouraged to seek technology resources at the library and within their family and friend network. Some states include throughout their state regional classes, workshops, trainings, meetings, and lectures within their family education paradigm. One school reported focus on empowering students to go home and educate their families.

Nevertheless, one participant felt "technology is secondary. Communication comes first and having the Deaf community accept hearing parents and hearing parents accept the Deaf community" (Survey Participant 2, open-ended question response, February 25, 2016). Some family education providers maintain and encourage families to attend sign classes, support groups, and functions in the Deaf community. These functions could be or might not be taking place at the school. Many Deaf communities have social clubs, churches, organizations, and sporting teams. In some cases, knowledgeable and experienced parents or deaf mentors are assigned to new families to accompany them through their transition.

Summary

Schools for the deaf are using multiple forms of technology to connect, educate, and support their hearing families of deaf children (see Figure 5 below). Email, websites, text messaging, and electronic versions of books/booklets/flyers/brochures are widely used as communication tools, informational and influential tools, and means of reaching a wider variety

of families. Social media, *YouTube, Vimeo,* and videophones grant families and educators additional avenues for collaboration. Currently, video messaging, DVD's, CD's, podcasts, and online trainings and meetings are less often applied in family programming. Lastly, other forms of technology and reasons for using technology are being explored, while traditional / non-technology methods continue to effectively address the needs of hearing families of deaf children.

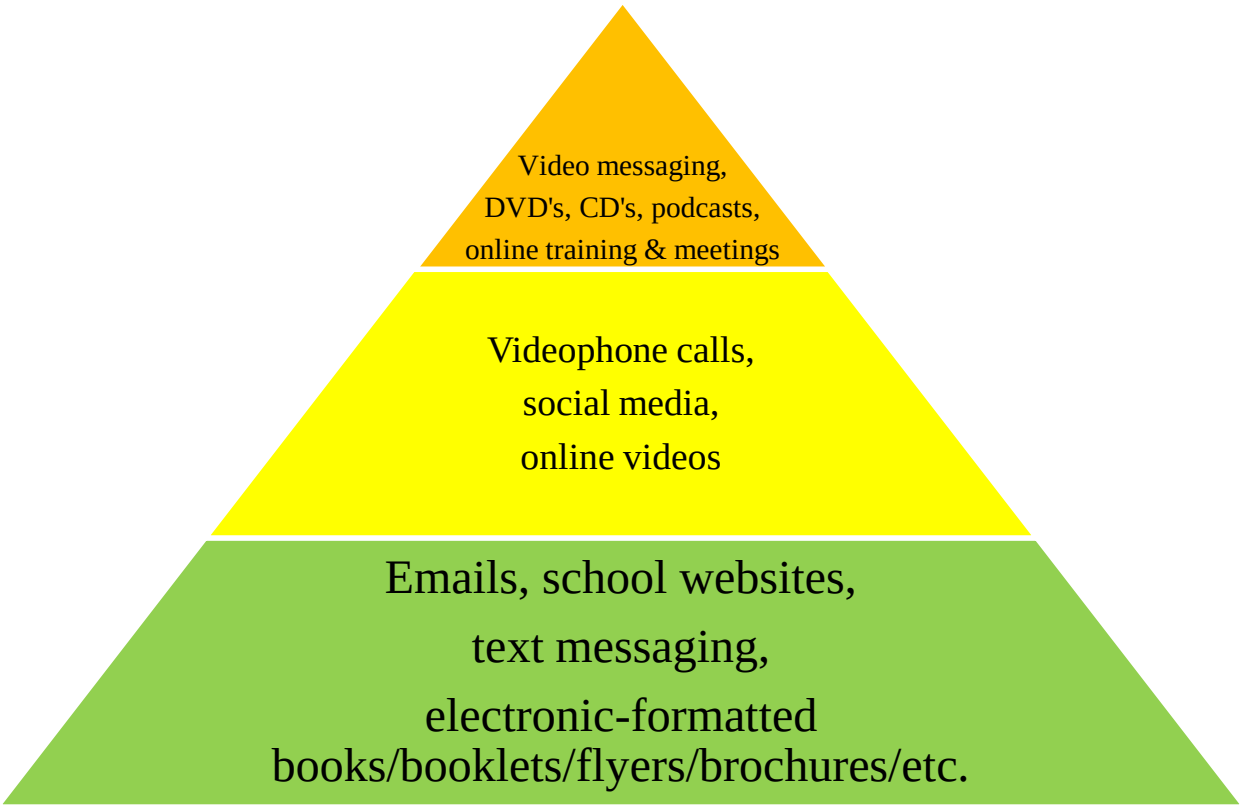

Figure 5. Technology usage, from least often used, somewhat used, to often used.

CHAPTER 5

CONCLUSIONS

This chapter reviews this study's findings and limitations, the result's implications for multiple stakeholders, and recommendations for action and further study. This study concentrated on collecting data from a small and specialized population, family service providers at ASL/English bilingual schools in the United States as they work with hearing families of deaf children. Given technology is transforming how people learn, this study also focused on its application into the family education programming for hearing families of deaf children scenario. These quantitative and qualitative findings support and guide the ongoing advancement of how family service providers and all school/medical/therapy – based professionals use technology to meet the numerous demands placed upon them from hearing families with deaf children with special and assorted needs.

This research focused more specifically on how and what types of technology permit collaboration between hearing families of deaf children and personnel at ASL/English bilingual schools for the deaf. Technology can (a) provide *influential and informational opportunities* to families to equip them with methods and skills to overcome *personal or societal barriers*, (b) address family needs at various *emotional stages* towards acceptance, (c) account for *variations within the family unit*, from working families, blended families, culturally diverse families, to families living in rural areas, or have children with special needs in addition to deafness, and (d) *evaluate* the usefulness and quality of the resources and supports they provide. Survey, interview, and online artifact searches revealed the most widely-used forms of technology employed by schools are email, websites, text messaging, and electronic-formatted books/booklets/flyers/brochures/etc.

Results also showed technology is most often used as a means of contacting families, followed by providing opportunities and tending to family unit variations. Less often, technology addresses the family members' needs as they deal with their children's differences and progress on their emotional journey towards acceptance. Lastly, the findings point to the opportunity for growth in how schools and programs can utilize technology as an evaluation tool for assessing their collaboration with families. Figure 6, seen below, illustrates how reported technology usage in this study is allocated to different purposes within family education programming for hearing families of deaf children served at ASL/English bilingual schools for the deaf.

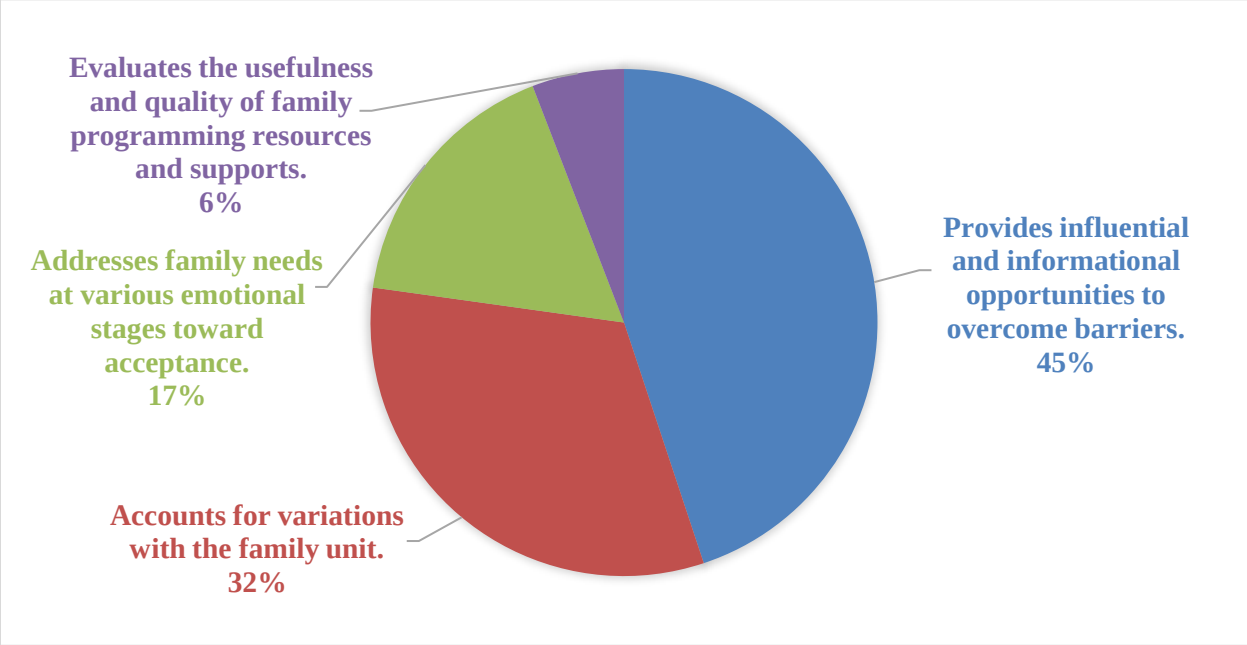

Figure 6. Technology usage by purpose.

Interpretation of Findings

This section presents the limitations of this research before reviewing the results of how technology can be used as an informational and influential tool, counseling and coping tool, diversity tool, and evaluation tool.

Limitations

This study included a number of limitations. First of all, the study was conducted within a short, four-month period of time and had a small sample size. Participants were recruited online and completed their interviews and surveys online, instead of face-to-face with the researcher. The researcher collected artifacts online, instead of directly from visiting the schools' campuses. While data was collected from schools of varying sizes and geographic locations, the study did not incorporate input from a diverse set of participants. The sample did include participants of various ages who work with families of students at different age/grade levels. However, the sample was made-up of predominantly Caucasian/white females. While this outcome could possibly be representative of the greater population of family service providers at schools for the deaf, more gender and racial diversity within the response sample would offer more perspectives and could be a valuable contribution to understanding diverse families' educational and cultural experience (Villegas & Irvine, 2010; Waddell & Ukpokodu, 2012).

Furthermore, many participants only utilized what their schools provided and the types of technology they are trained to use. Some schools provide more forms of technology than others. Participants likely use technology most comfortable to them. For example, even though a particular form of technology may be available at the school, participants may not feel qualified to use it. Alternatively, they may find a particular form of technology more difficult to use than other forms of technology and therefore avoid using it (Gentry, Denton, & Kurz, 2008; Sorensen, Shepherd, & Range, 2013). Additionally, depending on the participants' fluency in ASL and English, they may feel more comfortable and inclined to use certain types of technology. For instance, using email might appeal more to native English users, while videophone calls appeal

more to native ASL users. Also, service providers may have a preference for signed/spoken versus printed forms of technological communication. Lastly, family service providers may realize their families' technological and communication preferences and utilize what best fits with their clients.

Moreover, this study was limited by the job positions the participants have. Some schools are larger than others, with a more diverse set of professionals and more positions. Certain schools have specifically-designated family support professionals, while others depend upon classroom teachers or administrators to provide family services. In some cases, family education is not being provided. A few recruited participants responded by email to state they would not complete the survey or interview process and could not think of anyone else in their school who does provide family education. Nevertheless, this study did generate beginning discussion on the topic of technology usage in family education programs with people willing to report on their own common practices or those of their department's personnel.

Informational and influential tool

Schools most commonly use technology as a communication tool. Technology provides *influential and informational opportunities* to families to equip them with methods and skills to overcome *personal or societal barriers*. Many schools for the deaf use email, websites, *Facebook*, text messaging, electronic-formatted printed materials, videophones, online videos, and video messaging to achieve this goal. However, approximately one-third of school personnel reported they use no forms of technology to provide families opportunities for learning and to overcome barriers in their journey in raising and educating their deaf children. Instead, they depend upon face-to-face interactions or regular phone calls. Regrettably through,

educators are unable to reach a number of families using any means, due to multiple factors including unwillingness to accept services.

Counseling and coping tool

Technology can address *family needs* at various *emotional stages* towards acceptance as it works as a counseling and coping tool. Many schools for the deaf use emails, websites, electronic-formatted printed materials, online videos, text messaging, *Facebook,* videophone calls, and DVD's to attain this objective with hearing families of deaf children. School personnel are less likely to use video messaging, online meetings, or online trainings to counsel families. Approximately one-third of school personnel use no technology for this need. Instead, families are left to locate their own counseling and coping resources outside of the school.

Diversity tool

Technology can reach a variety of family units. Many schools for the deaf use emails, text messaging, videophone calls, websites, electronic-formatted printed material, *Facebook*, video messaging, and online videos to reach working families, blended families, culturally diverse families, rural families, and families with special needs children. However, approximately one-fifth of school personnel use no technology for contacting families with diverse needs.

A welcomed benefit of technology to the field of bilingual deaf education is its potential for access to American Sign Language within a video format, thus allowing communication and instruction through ASL. In the past, families trying to learn sign language to communicate with deaf children had to depend upon paper-based depictions of signs and/or attend live classes. Now, they have more technology options for working around their various needs. From family members working multiple schedules, sharing children between households, to families living far

away from the school or in rural areas, technology provides them access to ASL/English bilingual instruction. Additionally, no two students are alike. Each child/teenager comes with his/her own unique set of learning characteristics. Technology gives families additional resources for attending to their children's individual needs.

Evaluation tool

Technology can be used as an evaluation tool to assess the usefulness and quality of the resources and supports within a program. Some schools for the deaf use emails. Less commonly, electronic-formatted printed materials, websites, videophone calls, and text messaging are utilized to examine a family education program, if in fact such a separate program is designated in the school. More concerning is the finding over half of school personnel use no technology for monitoring their programming. Social media, online meetings, and video messaging are viable means of qualitatively evaluating a program, but are grossly under-utilized.

Implications

First and foremost, this study resonates with cultural changes currently occurring in the United States. Deaf celebrity Nyle DiMarco's accomplishments are helping to bridge the Deaf and hearing worlds. He acts as a spokesperson for *Language Equality and Acquisition for Deaf Kids* (LEAD-K), advocating for bilingual education. The non-profit *Nyle DiMarco Foundation* was established to provide more access to resources for deaf children and their families. The silent minority of the Deaf community is being heard. For so long, people have heard about the benefits of ASL/English bilingualism, but they were not really listening. The entertainment industry has had a profound impact on the larger, hearing society's attitudes (Calkins, 2016; Drolsbaugh, 2016).

More literature is available on school programs utilizing a spoken language or total communication approach. These methodologies, while more conceivable and widely-used by hearing families, have limited results for some deaf children, especially those who do not have access to spoken language speech and sounds. Instead, this category of deaf students or students with multiple needs benefit from a visual-based language which ASL can provide. While this study concentrated on how schools can introduce, recruit, and maintain family involvement within an ASL/English bilingual program, more research is definitely warranted in this area.

This study's results uncover how technology usage can be changed and improved within family programming. Technology could stand to be used more often as a counseling/coping tool and evaluation tool for assessing and measuring progress within the family programs. This section also examines how these findings can impact multiple stakeholders… deaf children, families, service providers, schools for the deaf, and deaf education training programs. This study's influence on researchers will be discussed in a later section, Recommendations for Further Study.

Deaf children

In general, hearing children outperform their hard of hearing and deaf peers in school achievement and language development. A large factor causing this phenomenon is hard of hearing and deaf children's limited access to language. Deaf children who attend ASL/English bilingual programs have visual access to language through ASL, but many of them go home to hearing families who do not communicate with them. Deaf children with hearing families who sign are more highly educated and exhibit better social skills. Given at least 35% of deaf students have special needs, coordinating with their families can improve the educational opportunities for the involved children and advance their language development, academic

achievement, and overall well-being (Geeslin, 2007; Keith, 2011, *Working with Families*; Marschark & Hauser, 2012). Summoning effective deep and equitable change to family programming to increase the effective collaboration between hearing families and deaf bilingual education experts stands to transform the lives of many deaf children. Technology should play a major role in this transformation (Shields, 2010).

Current research and pedagogical practices are transfiguring the world's perspective on how best to educate deaf and hard of hearing children. ASL and deaf culture have multiple benefits for all children, given its visual components (Belisomo, 2015; Marschark & Hauser, 2012). Technology allows deaf children more access to ASL and visual means of learning academic and worldly concepts. Therefore, encouraging family education programs to utilize technology is beneficial to the deaf children for developing their multiple tenets of transformative leadership from a young age. Principles, such as reconstructing new knowledge of social/cultural frameworks, rejecting deficit thinking, and demonstrating moral courage and activism, are integral to the ASL/English bilingual movement, and today's children are the future's leaders. Technology is and will continue to be a major influence in their self-development and their journey to overcome the multiple barriers they will face as deaf children in a hearing world (Shields, 2010; Szymanski, Lutz, Shahan, & Gala, 2013).

Families

Families are the constant in deaf children's lives and are in the best position to identify the well-being, barriers, and needs of their children and the overall family. Therefore, supporting the families is a valuable way to help the children (Hardin, Blanchard, Kemmery, Appenzeller, & Parker, 2014). Hearing families of deaf children need to deeply transform their way of life and belief systems in order to accommodate their deaf children's needs and focus on equity and

justice for all members of the family. Families act as leaders for their children and need family education programming which not only mentally and physically prepares them for their role, but also emotionally equips them for effectiveness (Reagan, 2011; Shields, 2010). Families are quite busy, and this small subset of families need more access to other families facing the same situation, highly-qualified service providers, and most valuably deaf role models. Technology allows them more means of connecting with families and deaf people within their children's school, their community, and across the United States, as well as service providers (Broekelmann, 2012; Jackson, 2011; Wells & Sheehey, 2012). So, family education programs need to empower families with the technological and transformative leadership and learning tools to meet their families' multiple, diverse needs.

Some hearing families are not emotionally ready to absorb the information provided to them, meant to assist them in nurturing their deaf children. They may deny their children have special needs. They might be busy seeking "fixes" from medical professionals and valuing their advice more than the guidance of ASL/English bilingual educators. Until family members reach a state of accepting their deaf children's differences, they have impeded learning potential (Hardin et al., 2014; Reagan, 2011).

Families come with a set of wishes, hopes, and dreams for their general future and their children's future. With the discovery their children are deaf, families are faced with the challenge to realize those wishes, hopes, and dreams in a different way or to allow their deaf children to change those expectations into unique, and equally valuable, wishes, hopes, and dreams. In some cases, this process of change is "like a death". The child they intended to have (a hearing child) has died, and now they have a new child to accept (a deaf, visually-oriented child). This overall feeling of a "death of a child" is always there and does not go away, but does

become better as families develop skills to cope. As the deaf children grow, the families can learn new ways to accept their different child. However, far too often, families get caught in the stages of denial and bargaining, negotiating with medical and educational professionals and sometimes their understanding of a god. Family education programming can use technology to assist families in overcoming the obstacles they face within themselves, their homes, and community (Hardin et al., 2014; Keith, 2011, *Working with Families*; Keith, 2011, *Parent Survival Skills*; Szymanski, Lutz, Shahan, & Gala, 2013).

According to Asberg, Vogel, and Bowers (2008), hearing parents of deaf children who perceive higher levels of social support report lower levels of stress. Like all families, hearing families of deaf children must deal with the common issues of finances, childcare, health, and balancing work/home life, friends, and fun. However, these families are prone to greater degrees of stress in these areas… extra financial burdens, specialized childcare, additional doctor and/or therapy visits, and added fears about the unknown and future. Their time is spread thin with extra appointments and commitments for their deaf children, and sometimes this leads to the damaging practice of not finding time for themselves and others in the family. Families have to learn to make time for themselves, their extended family, and friends. Furthermore, they experience a lack of normality with their family and friends. They encounter damage to and/or loss of their supports, their friends and family. They lose some friends and family, because these supports did not know what to do or say or feared they would hurt their feelings (Hardin et al., 2014; Keith, 2011, *Working with Families*; Keith, 2011, *Parent Survival Skills*).

Not only do the parents of the deaf children have to deal with their emotions, but also the siblings, extended family, and friends must do the same. They, too, will deal with some of the same issues and go through the same emotional stages. In some cases, they manifest “survivor’s

guilt" and experience a change to their supportive group. Some friends are lost and new friends are made. Family programming with the objective of widening their impact and audience to include more family members than just the parents can use technology in multiple ways to achieve their goal (Keith, 2011, *Working with Families*; Keith, 2011, *Parent Survival Skills*)

Getting hearing families invested in their deaf children's education and lives is critical. Having them realize the best thing to do is to provide their deaf children every access to language and sound, and see where their children blossom is powerful. While hearing families may struggle to learn a whole new language and culture and be accepted into a new community, the benefits and rewards to deaf children and their whole family are well worth it to have a full, meaningful relationship with their children. Deaf children and their hearing families and friends can be a part of each other's lives and not feel like strangers or visitors (Hardin et al., 2014).

Technology is helping to bridge the communication gap between families and their children. It allows families flexible settings and time for learning more about the ASL/English bilingual approach and utilizing it in their homes and communities. Technology gives families access to information, instruction, other families, and experts in the field of deaf education. Families can participate in coaching, support groups, trainings, and therapy lessons (Broekelmann, 2012; Jackson, 2011).

Service providers

School personnel, be it teachers, administrators, social service providers, or therapists, need to transform their own personal beliefs and practices for increasing family access to the knowledge and understanding of ASL/English bilingualism. Doing so requires these transformative leaders and professionals to demonstrate the tenets of emphasizing the public and private good, demonstrating moral courage and activism, and rejecting deficit thinking and

blame. They can inspire deep and equitable change within themselves, their profession, and organization (Shields, 2010). Technology provides them more options for working effectively with other service providers across the nation, to develop collaborative groups and mentor-mentee relationships (DeMoss, Clem, & Wilson, 2012). Additionally, technology gives providers multiple opportunities to collaborate with programs for the deaf (Richardson, Fox, & Lehman, 2012) and reach more families (Behl, Houston, & Stredler-Brown, 2012). More importantly, the mighty tool of technology gives service providers the ability to surpass their own limitations and philosophical barriers within their profession, the Deaf community, and the hearing society. For example, the current online and legislative LEAD-K movement provides service providers an avenue to grow as transformative leaders.

Schools for the deaf

Schools for the deaf need to transform their practices for providing more family education to their hearing families of deaf children. Initiatives to accomplish this would be more designated family educators and use of technology with families and collaborating with other schools for the deaf to share resources. All schools for the deaf could benefit from having employees, besides classroom teachers, whose primary job responsibility is to work as family education providers. Focus needs to be on building upon families' strengths and pushing for students' right to a fundamentally appropriate education and a language-rich environment at home and school. Technology allows schools to unite with other schools to pool their specialized ASL/English bilingual resources (Nover, Andrews, Baker, Everhart, & Bradford, 2002). "Educators who are involved in new advances and evidence-based practices can help to improve learning for everyone involved in deaf and hard-of-hearing education" (Easterbrooks, 2008, p. 44). Schools for the deaf, as transformative leaders within the deaf education field, have

a duty to emphasize and model what is best for deaf children and their disenfranchised hearing families, top-quality family education programming rooted in the ASL/English bilingual philosophy (Shields, 2010).

Deaf education training programs

Training programs for people going into the deaf education field (classroom teachers, administrators, early interventionists, ASL/English bilingual specialists, etc.) must transform their curriculum and enrollment practices. Family service providers need advance training in ASL, ASL/English bilingual instruction, and technology usage. College and university programs should focus on increasing the diversity of service providers they are training. Programs need to recruit, train, and graduate more people who are male, African Americans/black, Hispanic, Asian, biracial/mixed, Deaf, hard of hearing, and/or native ASL or bilingual users. Diverse teachers act as role models for all students and improve academic outcomes and school experiences for students similar in diversity to them (Humphries & Allen, 2008; Lenihan, 2010; Villegas & Irvine, 2010; Waddell & Ukpokodu, 2012). Technology gives deaf education training programs additional means of instructing their adult students and reaching a more diverse set of adult and young students. Training programs could use technology more often to collaborate with schools for the deaf and their hearing families and deaf children to improve their post-secondary instructional models and professional skill development with a special focus on ASL/English bilingualism (Johnson, 2016; Patterson, Webb, & Krudwig, 2009).

Recommendations for Action

Programs serving hearing families of deaf children need to…

a. Increase their usage of technology as a counseling and coping tool to improve the hearing families' relationships with their deaf children.

b. Increase their usage of technology as an evaluation tool to assess and modify their programs to more effectively meet their families' needs.
c. Improve their training models for preparing service providers to effectively use more forms of technology with the hearing families they serve.
d. Improve their relationships with deaf education service provider training programs to better prepare professionals for working with hearing families of deaf children.
e. Share their resources with other programs via a central online location to enhance the quality of service delivery.

These five recommendations will be reviewed further in this section.

Improving technology as a counseling and coping tool

Families need programs meant to make them feel comfortable and connected with their deaf children and to invest in their children's education. By learning American Sign Language and deaf culture, these hearing families can help their deaf children to feel not left out and fully participate in deep conversations with their children. With sign language, families can have meaningful communication with their children, beyond the basic daily tasks. They can learn their children's needs and feelings and get to know their children. They can express their love. They can discuss difficult and abstract concepts, life questions, educational things, but more importantly, expand their children's relationships and social skills. Therefore, their children can develop into mentally and emotionally healthy children, teenagers, and adults. Communicating with their deaf children will have a positive impact on both the children's and family's self-esteem and overall relationship. Hearing families will be able to converse with their children's deaf friends. In the future, if their deaf children have deaf spouses or children, their hearing

family will continue to be a part of their lives (Keith, 2011, *Working with Families*; Keith, 2011, *Parent Survival Skills;* Marschark & Hauser, 2012).

Programs need to change families' outlook on life and lens for perceiving their deaf children. Instead of viewing deaf children as disabled, hearing families need to realize their children are a part of a linguistic minority and ASL is a language-as-resource, not a language-as-problem (Reagan, 2011). Their children's deafness and visual-oriented ability can be considered assets, not limitations. It provides children with a different perspective and opens a new, comforting way of thinking for their whole family.

Improving technology as an evaluation tool

While ASL/English bilingual programs for the deaf have used technology as an educational, communication, and collaborative tool, they need to consider increasing its usage as an evaluation tool. In doing so, they are given enhanced capability to modify their programs to better reach and fit the specialized needs of hearing families with deaf children. All the hard work educators put into using technology to work with families could be improved if they knew how families felt and performed with said technology. Feedback from the families can guide educators to making the necessary changes to the technology to improve its usefulness and quality (Jackson, 2011; Patterson, Webb, & Krudwig, 2009; Sawyer, 2015).

Improving technology training models

Family education programs need to continue training their staff for fully utilizing the technological resources available to them and their client families. The study's survey process included only one educational technology specialist, who works with school personnel to navigate the technology waters for educating their students and collaborating with families. Since educational technology specialists work with many service providers and have

technological expertise, they are a hidden resource within many schools/programs which could be appointed for not only training and encouraging staff and families to use technology more often, but also share bilingual resources across the program (Sorensen, Shepherd, & Range, 2013).

Improving relationships with service provider training programs

Family education programs have experience with and access to the hearing families of deaf children that service training programs need to prepare future practitioners for counseling families and attending to all of the family members (siblings, extended family, and friends). Service providers need to overcome their fear of making the families mad or upset. They also need confidence and knowledge to convince families to make the effort to learn their deaf children's language and world and be a part of their children's lives and education. The deaf children and their hearing families also benefit from the college/university resources. There are several benefits for both the academic institutions and the schools for the deaf (Humphries & Allen, 2008; Johnson, 2016; Patterson, Webb, & Krudwig, 2009). "Those children who often need the most assistance are not able to receive individualized, evidenced-based interventions that are tailored to support their educational needs. Effective university-school collaboration can be one way to address these deficits" (Johnson, 2016, p. 42).

Improving collaboration between programs/schools for the deaf

Schools for the deaf need to increase their collaboration for sharing family education resources (Nover et al., 2002). One participant stated "I would like to see more information shared via websites across all the schools for the deaf" (Survey Participant 14, open-ended question response, March 17, 2016). One central website could act as an online library, linking its school and family audiences to high-quality, valuable ASL materials, ASL/English bilingual

resources, and "best ways to support their children's academic and social needs at a Deaf school" (Survey Participant 22, open-ended question response, March 25, 2016). This central library would need to include materials accessible through ASL, written English, *and* spoken English, thus modeling the ASL/English bilingual philosophy's equal communication access principle. Right now, some materials are available only in one or two of these three formats. Additionally, many people work inside their schools and tend to forget about the outside world's resources. Instead of working as isolated individuals and small programs throughout the United States, collectively schools for the deaf have the potential to bring about real change when they pool their resources and combine their strengths.

Recommendations for Further Study

This section proposes several ways future studies can deeply examine different aspects of this study, improve upon this study, and evaluate new types of ASL/English bilingual programs. While this list is not complete, it does indeed illuminate multiple questions in need of answers or reconsideration. Humankind is always evolving and improving itself with each new opportunity and tool.

First of all, different aspects of this study are open to more in-depth analysis. This research did not explore the participants' backgrounds in ASL/English bilingual education to determine whether they are qualified to educate students and their families in this approach. This study also did not investigate the participants' backgrounds in technology to ascertain their comfort with different types of technology and frequency of technology usage in general, outside of using it for working with families. Lastly, this study did not consider if age, gender, race, hearing status, or native language impacted the participants' practices.

Secondly, this study can be improved by replication in different settings. A larger and more diverse sample could provide additional information. Research could be replicated and limited to only people with strong backgrounds in technology and ASL/English bilingualism. Other types of technology could be added to the data collection process. Participants mentioned using tablets and *Google Hangouts*. School-issued mobile phones, monitored by the school and separate from staff personal devices, are another technological option to consider. A few schools provide residential and administrative staff with mobile devices, but this practice was not mentioned with teachers or family service providers. Plus, new forms of technology are developed and becoming commercially-available every year. These resources need to be assessed for their usability in family education programming as well.

Lastly, new types of ASL/English bilingual programs need to be investigated. Currently, most programs limit their enrollment to just deaf and severely hard of hearing students. However, hearing and mildly/moderately hard of hearing students also are good candidates for ASL/English programs and given their tendency to be English-dominant users, they would be a welcomed balance to deaf children who are ASL-dominant users. Together, these children can learn from each other's dominant languages to improve their second language. Stronger programs for simultaneous bilingualism are possible by mixing hearing, hard hearing, and deaf students. For example, the Albuquerque Sign Language Academy consists of deaf, hard of hearing, and hearing children. The hearing children have deaf siblings or parents (Media Desk NM, 2015). A few other schools/programs for the deaf across the nation incorporate hearing students. As ASL grows in acceptance and usage as a language, these types of schools are justified and should be researched.

Conclusion

While one can walk through schools and see the increasing use of technology within the classroom in the form of desktop computers, laptops, tablets, and large interactive whiteboards, technology is also playing an ever-expanding role in how schools engage the outside world, informing families and community members (Wells & Sheehey, 2012). With the advent of the Internet, school websites appeared. Influential school websites incorporate school directories, classroom pages, blogs, videos, resources, and recommendations for other websites to access or purchase materials. Some schools have established school- or department-wide *Facebook, Instagram,* or *Twitter* accounts. These forms of social media allow schools to be in instant communication with families on a wide range of topics, from important announcements / reminders to valuable resources. Other schools have developed *YouTube* or *Vimeo* channels to share with families. Online trainings and meetings, as well videophone conversations, provide educators and families face-to-face interaction without requiring extensive traveling and modified schedules. Overall, technology is changing how schools/programs communicate and collaborate with families.

In an ever-changing world of technology, education professionals are exploring and enhancing new uses of technology for not only educating their students and staff, but also the students' families. Deaf students constitute a very small portion of the student population. Within the United States, researchers are finding a deaf bilingual educational methodology, utilizing American Sign Language and English, provides multiple benefits and opportunities for profoundly deaf students, as well as hard of hearing and hearing students. However, most deaf students' families are hearing and require support from ASL/English bilingual education experts to implement a bilingual approach in their homes and communities.

Technology allows us to learn many more things in different ways. More often, it is being used to take children and adolescent students to the next level of academic achievement. It stands to reason the same benefits apply to adult students, and in this case, society's hearing families with deaf children. With the arrival of their deaf children into their families, they have become students themselves again in need of re-learning how to accomplish the same things they intended to do in life, but just in a different way, a way that welcomes their deaf children, the Deaf community, American Sign Language, and visual access to sound.

This phenomenological study used a researcher-developed survey, interview, and artifact collection design to gather quantitative and qualitative data from current deaf bilingual education service providers working at 29 schools for the deaf in the United States with hearing families of deaf children to answer the question, *how are family deaf bilingual education programs using technology to provide opportunities to hearing families, address the families' needs, account for variations within the family unit, and evaluate the usefulness and quality of the resources/supports they provide?* The descriptive data collected from this study's 32 family education providers features how they use technology in multiple ways to provide family programming to address the families' cognitive, psychological, and emotional needs. These families' needs include working through the stages of grief and multiple barriers they encounter in their homes, children's schools, and the larger community. Overall, this research enlightens and prepares programs for the deaf and deaf education service provider training programs for guiding continuous improvement toward effective family education programming delivery.

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Appendix A

Study Invitation

January 2016

Hello Fellow Deaf Educator,

I am a doctoral student, conducting a survey as part of my research. If you are working with hearing families of deaf children in an ASL/English bilingual program, please consider completing this survey. It will take 15-20 minutes of your time. You will be prompted first by three pages of a required university research consent form and then directed to completing the survey. Your responses will be kept anonymous. Thank you for your valuable contribution to the field of deaf education. Please forward this request to others in your school who can report on how technology is used to serve families.

Technology-Based Family Education in ASL/English Bilingual Schools for the Deaf

(A University of New England Dissertation Study)

Click to enter the survey: https://www.surveymonkey.com/r/QCF93W3

Sincerely,

Myriah Dixon

Appendix B

Informed Consent Form

First, you will see three pages of a university consent form. After reviewing these pages and pressing "Next", you will have one page of demographic information and then one page of survey questions to complete. Please complete all of the survey items through #47. Your responses will be kept anonymous. I appreciate your participation in completing this survey. It should take 15-20 minutes to complete. Thank you.

Project Title: Technology-Based Family Education in ASL/English Bilingual Schools for the Deaf

Principal Investigator: Myriah Dixon, Doctoral Student,
University of New England's Transformative Leadership Program
mdixon4@une.edu 256-474-0140

Faculty Advisor: Dr. Michelle Collay, University of New England Transformative Leadership Program
mcollay@une.edu 207-602-2010

Introduction:

This dissertation study is collecting information on current practices in ASL/English bilingual Schools for the Deaf for using technology to work with hearing families of deaf students. Please read this form. The purpose of this form is to provide you with information about the research study, and if you choose to participate, document your decision. Your participation is voluntary. You may choose to voluntarily participate in this dissertation study or decline/withdraw from the study at any time. You are encouraged to ask any questions that you may have about this study now, during, or after the project is complete. You can take as much time as you need to decide whether or not you want to participate by June 10, 2016.

Why is this study being done?

The purpose of this research study is to collect a wide range of information on how service providers at ASL/English bilingual Schools for the Deaf use technology to serve the hearing families of their deaf students, early childhood through high school. The collected results are intended to inform and guide current and future practitioners working with hearing families of deaf children, thus allowing for continued positive transformation of how schools collaborate with students' families.

Who will be in this study?

At least twenty participants from across the United States will complete the research study's survey. At least five of them will complete a follow-up interview and data collection process. The participants must be actively working at least weekly with hearing families of deaf students as part of their job at an ASL/English bilingual School for the Deaf. Their job position may include, but is not limited to, outreach specialist, family interventionist or support specialist,

classroom teacher, administrator, therapist, and admissions coordinator.

What will I be asked to do?

You will be asked to access Survey Monkey to complete an online survey, which will take approximately 20-30 minutes of your time. The researcher Myriah Dixon will compile and analyze the survey data to determine trends among the answers and follow-up interview and data collection processes. She may then contact you via email or phone to request more information from you through a follow-up recorded videophone, online, or in-person interview and data collection process. These follow-up activities will take approximately one hour of your time and are meant to verify, clarify, and discuss the overall survey results. This study will run February – June 2016 with final results presented in July 2016.

What are the possible risks of taking part in this study?

There are no foreseeable risks associated with participation in this study. This study will not present any known risks throughout the process, other than inconveniencing you for your time to complete the survey (approximately 20-30 minutes) and possibly a follow-up interview and data collection process (approximately 1 hour).

What are the possible benefits of taking part in this study?

The expected benefit of your participation is to directly allow you to reflect on how you use multiple approaches to address the various needs of your deaf students' hearing families. Indirectly, your responses will be combined with the responses of other service providers across the United States to benefit current and future service providers learning how they can use technology to serve the multiple needs of their hearing families with deaf children.

What will it cost me?

Participants will not incur any monetary costs. This study only requires your time (20-80 minutes).

How will my privacy be protected?

Your personal identifying information will not be shared with anyone else or discussed/reported/published with the findings. Only the researcher will know your identifying information for possible follow-up. The study's results will be reported as a collection of all the survey and interview responses. Should a specific response or piece of non-demographic information be shared, your identity will be protected, coded, and you will be referred to as "Participant 1, 2, or etc." and your School will be referred to as "School A, B, C, or etc."

Research records will be kept on the researcher's password-protected laptop and back-up hard-drive. Please note the Institutional Review Board of the University of New England may review the research records, but only after identifying information has been re-coded by the researcher, so your identity will not be shared. Given part of the study includes an online survey, the transferred data is kept secure, since only the researcher has the username and password for accessing the survey information and responses.

Once the study is completed, the researcher will present the findings to her dissertation committee and research group (approximately 8 people). The completed dissertation will be accessible online. Individually identifiable data will be destroyed after the study is complete. A copy of your signed consent form will be maintained by the principal investigator for at least 3

years after the project is complete before it will be destroyed. The consent form will be stored in a secure location that only the researcher will have access to and will not be affiliated with any data obtained during the project. There is no intention to use the data for future research purposes after the completion of this dissertation research project. Participants may request a copy of the completed dissertation report.

If audio or videotape recordings are made, only the researcher will have access to them. They will be used for collecting information to compile with other results. The recordings will be erased/destroyed within three months of the completion of the dissertation project.

What are my rights as a research participant?

Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University of New England or researcher Myriah Dixon. You are free to withdraw from this research study at any time or choose not to participate, for any reason. If you choose to withdraw from the research or not participate in the study, there will be no penalty to you and you will not lose any benefits you were otherwise entitled to receive. You may skip or refuse to answer any questions for any reason. At any time during the study, you may request access to your own individual data, and in June 2016, you may request access to the study's results reported in a manner that protects the confidentiality of all participants. The Institutional Review Board (IRB) for the Protection of Human Subjects at the University of New England has reviewed the use of human subjects in this research. The IRB is responsible for protecting the rights and welfare of people involved in research.

What other options do I have?

You can choose not to participate in this research study.

Whom may I contact with questions?

The researcher conducting this study is Myriah Dixon of the University of New England. For questions or more information concerning this research, you may contact her at (256) 474-0140 or mdixon4@une.edu, or her faculty advisor Michelle Collay at (207) 602-2010 or mcollay@une.edu.

If you have any questions or concerns about your rights as a research subject, you may call Olgun Guvench, M.D. Ph.D., Chair of the UNE Institutional Review Board at (207) 221-4171 or irb@une.edu.

Will I receive a copy of this consent form?

You may print/keep a copy of this consent form.

Please sign/see below, agreeing to this consent form with full knowledge of the purpose and procedures of the study, its survey, and possible follow-up interview and data collection. ***(You will be asked to agree to this statement before proceeding into the survey.)***

I, (participant's name) _____, agree to participate in this study, titled Technology-Based Family Education in ASL/English Bilingual Schools for the Deaf. I understand the above description of the research and the risks and benefits associated with my participation as a research subject. I understand by proceeding with this survey and possibly

interview and data collection process, I agree to take part in this research and do so voluntarily. I also agree to allow the researcher to audio- or video- record any possible follow-up interview conversations.

Participant's Electronic Signature: _____

Printed Name: _____

Date: _____

Researcher's Statement:

The participant named above had sufficient time to consider the information, had an opportunity to ask questions, and voluntarily agreed to be in this study.

Researcher's Signature: *Myriah Dixon* (image available upon request)
Printed Name: Myriah Dixon
Date: 1/31/16

Thank you for participating in this survey! :-)

Please read below, agreeing to this consent form with full knowledge of the purpose and procedures of the study, its survey, and possible follow-up interview and data collection, as explained in *Consent for Participation in Research, Parts 1, 2, and 3*.

I agree to participate in this study, titled Technology-Based Family Education in ASL/English Bilingual Schools for the Deaf. I understand the above description of the research and the risks and benefits associated with my participation as a research subject. I understand by proceeding with this survey and possibly interview and data collection process, I agree to take part in this research and do so voluntarily.

- ☐ **CONFIRM.** I agree to all of these terms.
- ☐ **DENY.** I do not wish to participate in this survey and do not agree to the terms.

If I am chosen by the researcher for a follow-up interview, I agree to allow the researcher to audio- or video- record the interview conversations.

- ☐ **CONFIRM.** I agree to be audio- or video-recorded.
- ☐ **DENY.** I will complete the survey, but I do not wish to be interviewed.

Appendix C

Online Survey

Technology-Based Family Education in ASL/English Bilingual Schools for the Deaf

Your Name: _____ (will be kept anonymous) School: _____ (will be kept anonymous)

Phone Number: _____ Email: _____

Job Title: _____ School Enrollment (Approx. # of students in the whole school): _____

# of Family Service Providers in Your School: _____ Gender (check one): ___ Female ___ Male

Age (check one): ___ 20-29 years old, __ 30-39 years old, __ 40-49 years old, __ 50-59 years old, __ 60+ years old

Race (check one): ___ Caucasian/White, __ African American/Black, __ Hispanic, __ Biracial, __ Other

Hearing Status (check one): ___ Deaf, __ Hard of Hearing, __ Hearing

Native Language (check one): ___ Bilingual (ASL/English), __ ASL, __ English, __ Other (comment: _____)

Developmental/Grade Level of Students Whose Hearing Families You Work Primarily With (check all that apply):
_____ Infants/Toddlers, _____ Preschoolers/Pre-Kindergarten, _____ Kindergarten/1st grade, _____ 2nd-5th grade, _____ 6th-8th grade, _____ 9th-12th grade

School Programming (check all you are involved in): ___ Bilingual (ASL/English), __ Oral, __ Auditory/Verbal, __ Listening and Spoken Language, ___ Total Communication, ___ Cued Speech, ___ Other (comment: _____)

*** NOTE: If you act as a provider in a program that uses an ASL/English bilingual methodology and another methodology (i.e. oral, auditory/verbal, listening and spoken language, total communication, cued speech, etc.) provided your ***answers based on your involvement in the family ASL/English bilingual programming***.

Mark (X) how **your School for the Deaf's ASL/English bilingual program uses technology to reach hearing families of deaf children…**

Skills	**Email**	**Text message**	**DVD**	**Websites**	***YouTube* videos**	**Online videos**	**CD's**	**Social Media (*Facebook*)**	**Social Media (*Instagram*)**	**Podcasts**	**Video messages via phone**	**Scanned books or booklet**	**Scanned brochures or flyers**	**Videophone calls (for just one family, videophone, *Skype*, or *FaceTime*)**	**Online meetings (for multiple families at once)**	**Online trainings**	**Other (Please comment the type of technology.)**
EXAMPLE: *To contact families*	X	X					X	X			X		X	X			*iPad app*
To provide *influential* opportunities																	
To provide *informational* opportunities																	
To equip families with *ASL skills*																	
To equip families with *English skills*																	
To equip families with *language skills, other than ASL and English*																	

(i.e. Spanish, etc.)																	
To assist families in overcoming *individual child barriers* (barriers not experienced by most deaf children)																	
To assist families in overcoming *school barriers* (accessing and communicating with the school)																	
To assist families in overcoming *ASL/English bilingual philosophy* barriers (understanding, communicating, and explaining the philosophy to others)																	
To assist families in overcoming *barriers they feel/experience in the Deaf community*																	
To assist families in overcoming *barriers they feel/experience in the hearing community/ society* as a result of their child being deaf																	
To address family needs when in a state of *denial and isolation* about their child being deaf																	
To address family needs when in a state of *anger* about their child being deaf																	
To address family needs when in a state of *bargaining* about their child being deaf (trying to fix them)																	
To address family needs when in a state of *depression* about their child being deaf																	
To address family needs when in a																	

state of *acceptance* about their child being deaf																	
To contact families in *rural areas*.																	
To contact *blended / step- or extended families*.																	
To contact *working families*.																	
To contact *culturally diverse* families.																	
To contact families of deaf children with *special health or medical needs*.																	
To contact families of deaf children with *special learning needs*.																	
To contact families of deaf children with *special mobility needs*.																	
To evaluate the usefulness of the *material resources* provided by the school.																	
To evaluate the usefulness of the *personnel support* provided by the school.																	
To evaluate the quality of the *material resources* provided by the school.																	
To evaluate the quality of the *personnel support* provided by the school.																	

Open-ended questions:

- Within the past three years, how else have you used technology to meet the needs of the hearing families of deaf children in your ASL/English bilingual program? What are some other ways in which technology was used to meet the families' needs? What were the "needs" being met / addressed?

- What other types of technology would you like to see being used to meet the needs of hearing families with deaf children?

- I understand some families do not have access to technology, given their geographic location and/or lower economic status. How are you meeting the needs of hearing families with deaf children in your program, without using technology? Which forms / types of non-technology are you currently using?

Appendix D

Interview Protocol

Introduction: I am a doctoral student at the University of New England. I am studying how family programming for hearing families of deaf children uses technology to address the multiple needs of families using an ASL/English bilingual methodology. Your input will be valuable for improving family education practices throughout the United States. I will ask you a series of questions and then allow time for more comments and questions from you at the end.

Demographic information (To warm up the conversation, verify survey's responses through summary and inquire to answer incomplete survey responses)**:**

What is your name? _____ (will be kept anonymous)

School? _____ (will be kept anonymous)

Phone Number? _____ Email? _____

Job Title? _____

Approximately how many students attend your school? _____

How many family service providers are in your school? _____

What is your gender? ___ Female ___ Male

Which age range are you in? ___ 20-29 years old, __ 30-39 years old, __ 40-49 years old, __ 50-59 years old, __ 60+ years old

What is your race/ethnicity? ___ Caucasian/White, __ African American/Black, __ Hispanic, __ Biracial, __ Other

Are you… ___ Deaf, __ Hard of Hearing, or __ Hearing?

What is your native language, first language? ___ Bilingual (ASL/English), __ ASL, __ English, __ Other (comment: _____)

Which grade/developmental level of students' families do you primarily work? (check all that apply):

_____ Infants/Toddlers, _____ Preschoolers/Pre-Kindergarten, _____ Kindergarten/1st grade, _____ 2nd-5th grade, _____ 6th-8th grade, _____ 9th-12th grade

What type of deaf education program is your school? ___ Bilingual (ASL/English), __ Oral, __ Auditory/Verbal, __ Listening and Spoken Language, ___ Total Communication, ___ Cued Speech, ___ Other (comment: _____)

If you act as a provider in a program that uses an ASL/English bilingual methodology and another methodology (i.e. oral, auditory/verbal, listening and spoken language, total communication, cued speech, etc.) provided your ***answers based on your involvement in the family ASL/English bilingual programming***.

1. Tell me about your experience educating/working with hearing families of deaf children.
2. How does your program use technology to *inform* hearing families, supporting family understanding of the ASL/English bilingual methodology?
3. How does your program use technology to *influence* hearing families, supporting family use of the ASL/English bilingual methodology at home?
4. How does your program use technology to equip hearing families with methods and skills to overcome *personal barriers* regarding their child's deafness?
5. How does your program use technology to equip hearing families with methods and skills to overcome *societal barriers* regarding their child's deafness?
6. How does your program use technology to address family needs at *various emotional stages* towards acceptance…?
    a. When families are in denial of their child's special needs, not providing ASL/English access at home?
    b. When families are angry about their child's special needs?
    c. When families are bargaining, trying to fix their child's deafness?
    d. When families are depressed about their child's special needs?
    e. When families are accepting of their child's needs and providing ASL/English access in the home?
7. How does your program use technology to account for the needs of *working families*?

8. How does your program use technology to account for variations within the family unit, such as *blended families* and *extended families*?
9. How does your program use technology to account for the needs of *culturally diverse families*?
10. How does your program use technology to reach families in *rural areas*?
11. How does your program use technology to work with families of deaf children with *special needs* (i.e. learning, mobility, behavioral/emotional, health/medical)?
12. How does your program use technology to evaluate the *usefulness* of the material resources you provide?
13. How does your program use technology to evaluate the *usefulness* of the personnel supports you provide?
14. How does your program use technology to evaluate the *quality* of the material resources you provide?
15. How does your program use technology to evaluate the *quality* of the personnel supports you provide?
16. Within the past three years, how else have you used technology to meet the needs of the hearing families of deaf children in your ASL/English bilingual program? What are some other ways in which technology was used to meet the families' needs? What were the "needs" being met / addressed?
17. What other types of technology would you like to see being used to meet the needs of hearing families with deaf children?
18. I understand some families do not have access to technology, given their geographic location and/or lower economic status. How are you meeting the needs of hearing

families with deaf children in your program, without using technology? Which forms / types of non-technology are you currently using?

19. What other comments do you wish to add? What else is important to consider and address when using technology with hearing families of deaf children?
20. What questions do you have for me?

Thank you for your time and for sharing with me about your program. This information contributes to the understanding of current practices and how we can improve them for the future. Feel free to contact me at any time with any questions or comments. You are welcome to review the dissertation before and after its completed submission.

Appendix E

School Resource / Artifact Documentation

1. Show me examples of how your program uses technology to educate/work with hearing families of deaf children.
2. Show me examples of how your program uses technology to ***inform*** hearing families, supporting family understanding of the ASL/English bilingual methodology?
3. Show me examples of how your program uses technology to ***influence*** hearing families, supporting family use of the ASL/English bilingual methodology at home?
4. Show me examples of how your program uses technology to equip hearing families with methods and skills to overcome ***personal barriers*** regarding their child's deafness?
5. Show me examples of how your program uses technology to equip hearing families with methods and skills to overcome ***societal barriers*** regarding their child's deafness?
6. Show me examples of how your program uses technology to address family needs at ***various emotional stages*** towards acceptance….
    a. When families are in denial of their child's special needs, not providing ASL/English access at home?
    b. When families are angry about their child's special needs?
    c. When families are bargaining, trying to fix their child's deafness?
    d. When families are depressed about their child's special needs?
    e. When families are accepting of their child's needs and providing ASL/English access in the home?

7. Show me examples of how your program uses technology to account for the needs of *working families*?
8. Show me examples of how your program uses technology to account for variations within the family unit, such as *blended families* and *extended families*?
9. Show me examples of how your program uses technology to account for the needs of *culturally diverse families*?
10. Show me examples of how your program uses technology to reach families in *rural areas*?
11. Show me examples of how your program uses technology to work with families of deaf children with *special needs* (i.e. learning, mobility, behavioral/emotional, health/medical)?
12. Show me examples of how your program uses technology to evaluate the *usefulness* of the material resources you provide?
13. Show me examples of how your program uses technology to evaluate the *usefulness* of the personnel supports you provide?
14. Show me examples of how your program uses technology to evaluate the *quality* of the material resources you provide?
15. Show me examples of how your program uses technology to evaluate the *quality* of the personnel supports you provide?

Thank you for your time and for sharing resources with me from your program. This information contributes to the understanding of current practices and how we can improve them for the future. Feel free to contact me at any time with any questions or comments. You are welcome to review the dissertation before and after its completed submission.