1-1-2011

The Relationship Between Computer-mediated Communication and the Employment of Deaf People

James A. Schiller
Walden University

Walden University

COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES

This is to certify that the doctoral dissertation by

James Schiller

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Morton Teicher, Committee Chairperson, Human Services Faculty
Dr. Elaine Spaulding, Committee Member, Human Services Faculty
Dr. Scott Hershberger, University Reviewer, Human Services Faculty

Chief Academic Officer

David Clinefelter, Ph.D.

Walden University
2011

Abstract

The Relationship Between Computer-Mediated Communication and the Employment of Deaf People

by

James Arthur Schiller

MSW, Adelphi University, 1995
BA, University of Southern California, 1988

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
Health and Human Services

Walden University
November, 2011

Abstract

Job satisfaction results from a workplace meeting individual needs for income, belonging, and professional growth. Accordingly, core factors contributing to satisfaction vary across individuals and groups. Deaf people have traditionally located satisfying employment among enclaves of other deaf people working within the predominantly manufacturing oriented economy of the 20th Century. With the current shift toward more spatially distributed service industries in the 21 st century, there is little research on factors that contribute to job satisfaction among deaf people engaged in this new workforce. Operating from a theoretical perspective of worker/environment fit proposed by Alderfer, the exploratory correlation study investigated relations linking the degree of hearing impairment, use of computer mediated communication (CMC), choice of employment sector, and level of job with job satisfaction. A web survey was used to gather 343 questionnaires from deaf workers; questionnaires included items related to degree of hearing impairment, demographics, use of specific CMC technologies in the workplace, and job satisfaction. The relationships linking individual differences, types of CMC to elements of job satisfaction were analyzed using stepwise multiple regressions. Results were used to document that email and video relay services specific to customers and supervisors were significant predictors of job satisfaction. The implications for social change include informing specific guidelines related to the education, and program needs to prepare deaf people to be competitive in securing satisfying employment in the 21st century.

The Relationship Between Computer-mediated Communication and the Employment of Deaf People

by

James A. Schiller

MSW, Adelphi University, 1995
BA, University of Southern California, 1988

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
Human Services

Walden University
December 2011

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Dedication

I dedicate this dissertation to my wife Donna and my two children, Michael and Maya. There is no question that as much time and effort that I put into my doctoral studies, Donna put in three times as much. Donna's own job involves consulting with teachers and parents on the education needs of deafblind children. On top of that, she is raising a child with multiple disabilities, and a daughter with so many interests I lost track. While I might have been there to assist her on occasion, Donna showed me what it means to both love and sacrifice. I am eternally grateful to her for giving me a chance to fulfill my life ambition. To my daughter Maya, I can only say thank you for all those times you chose to sacrifice time with me and push me back into my office to "get it done." To Michael, my son who is deaf, thank you for being the inspiration for my career as a social worker and specifically for this dissertation. I love and cherish you all!

Acknowledgments

I would like to thank my father Peter Nicholas Schiller for his encouragement and instilling in me a work ethic and determination that carried me through this research. To my brothers, sisters, nieces and nephews, thank you for being so understanding as I missed family gatherings to work on my research. To my friends, I can only say thank you for also putting up with my absenteeism during those events most meaningful to you and your families. I look forward to reuniting with all of you. I would like to thank my sister Elizabeth Friedman, PhD, for her continued encouragement and reminder that "you'll get there." I also express my undying gratitude to my sister Wendy Schiller, PhD, for her encouragement, guidance, and general belief in my ability to accomplish this monumental goal. To my cousins, Janie and Mike Golightly, who are deaf, thank you for your encouragement and enlightening me about the deaf community and culture.

A number of faculty members have encouraged me and pushed me beyond my limits in research methodology and critical thinking. To a former colleague at Gallaudet University, Dr. Teresa Moore, I extend gratitude for first encouraging me to enter Walden's PhD program. To Dr. Terry H. Coye, a special thanks for taking the time to discuss his seminal research with Dr. Crammatte and for consulting on the survey used this study. Similarly, to Dr. Schroedel, my gratitude for guidance and encouragement in following up on his work with Terry Coye and Alan Crammatte. I certainly would not have successfully completed my studies if it were not for Dr. Mortin Wagenfeld, who

challenged me in every aspect of critical thinking and genuinely modeled excitement in the process.

To my dissertation committee I express the sincerest gratitude and appreciation for the many hours providing me with feedback and guidance on this research. Dr. Teicher, the chair of my dissertation committee, modeled for me the kind of professor I aspire to be. His attention to detail, and the manner in which he held me accountable, are attributes I will hold invaluable. As I embark on my career in higher education, I will aspire to keep the standards of excellence you set for me. To Dr. Cawthon, who made sure I maintained a path of ethical, reliable, and valid examination of the deaf community, my deepest gratitude. Last, but not least, to Dr. Elaine Spaulding a sincere debt of gratitude for the countless hours spent reviewing my work throughout the PhD program and this research project. Since I first entered the program, you have been a beacon of excellence and determination that carried me through to this moment.

Gratitude is also extended to Gallaudet University Alumni Relations, Deaf and Hard of Hearing in Government, and Office of Deaf and Hard of Hearing in Maryland for their support in disseminating the survey for this research.

Last, but not by any means least, I thank the deaf community for embracing my research and participating in the study. Your trust in my study and me cannot be understated. For if it were not for your willingness toward self-examination and advocacy, this research would not hold any promise as an agent of social change. I look

forward to returning the data to the community and assisting in any way I can in using the data for positive social change.

Table of Contents

List of Tables

List of Figures

Section 1: Introduction and Background of the Problem

Statement of the Problem

In 2000, 18 million of the approximately 33 million working-age people (approximately 55%) with disabilities in America were employed. Of that population, approximately 4,000 had a sensory impairment (U. S. Department of Labor, 2007). While the number of deaf and hard-of-hearing workers in the United States is unknown, deaf people are believed to have been underemployed for most of the 20th century (Bowe, McMahon, Chang, and Louvi., 2005; Pressman, 1999). Despite deaf people making gains in education (Schroedel & Geyer, 2000) and entrepreneurship (Pressmen, 1999), no evidence in the literature suggests that the trend of employment has been reversed for most deaf people.

The 21st-century labor market is moving away from manufacturing and toward meeting the needs of a service-based economy. According to the Bureau of Labor Statistics, total employment will increase to 166.2 million, or by 10%, by 2016, and the "long-time shift from goods-producing to service-providing employment will continue" (U.S. Department of Labor, 2008, p.3). A service-based economy requires literacy and rapidly changing computer skills, which challenges deaf workers when they compete for jobs in both general and deaf sectors (Lipset & Ray, 1996; Luft, 2000).

Much of the research cited in this study is antiquated because of a lack of current research on employment of deaf people. Schein and Delk (1974) performed the last census of the adult deaf population in recent history. Since 1973, research on the employment of deaf people has relied on national surveys such as the U.S. Census,

including the Survey of Income Program Participation, Community Survey, and National Health Interview Survey (Bowe, McMahon, Chang, & Louvi, 2005). However, those surveys do not distinguish between deaf and hard-of-hearing people and do not examine use of computer-mediated communication (CMC) in employment of deaf people. Other data about deaf people are gathered through secondary analyses of alumni surveys, which not only lack scientific rigor, but also do not examine the employment characteristics and use of CMC among deaf workers. Significant changes in the labor market, the education of deaf people since 1973, and CMC call for a current exploration of employment status of deaf people.

Deaf people work in two broad sectors, one that caters just to deaf people and one that caters to both deaf and hearing people. According to Crammatte (1987), the hearing sector serves both hearing and deaf people, and the deaf sector serves only deaf people. The proposed study substitutes the word *general* for *hearing and deaf* because it speaks more to the issue of serving both communities rather than one over the other. This study also uses the term *general sector* because it represents the progress deaf and hearing people have made to include deaf people in mainstream society since Congress started passing disability legislation in the mid-1960s. According to Schirmer (2001), "the use of capital D refers to culturally deaf people who share a particular set of beliefs, language, heritage, and practices and who refer to themselves as deaf" (p. 81). American Sign Language (ASL) is the primary language of culturally deaf people; many who are not "culturally" deaf use alternative forms of sign language that more closely resembles their

native hearing-culture language. Some deaf people use signed English (SEE), which follows the grammatical structure of written English and is considered quite different from ASL. This study uses the word *deaf* with a lowercase *d* to refer to the large population of people who have hearing loss and rely on visual communication. The study used the term *culturally deaf* when specifically discussing issues where deaf culture is of particular relevance.

Most deaf people choose to work in deaf-sector jobs that serve deaf people and where they have deaf coworkers (Crammatte, 1987; Rawlings, King, Skilton, & Rose, 1973; Schroedel & Geyer, 2000). The attraction to deaf-sector jobs stems from the belief among deaf people that the general sector involves communication-related stress, isolation, discrimination, and little occupational growth for the deaf employee (Foster, 1987; Geyer & Schroedel, 1998; Mowry & Anderson, 1993; Sitka, 1997). Similarly, deaf people believe that deaf-sector jobs offer high levels of job satisfaction because of the ease of communication, safety from discrimination, opportunity for self-efficacy, steady income, contact with the deaf community, and favorable relationships with coworkers (Crammatte, 1987; Geyer & Schroedel, 1988).

Hogg, Lomicky, and Weiner (2008) studied the use of Computer-mediated communication (CMC) by the deaf community during the Gallaudet University protest of 2006. This study uses the phrase *computer-mediated communication* (CMC) to expand on that study beyond the investigation into the function of CMC during the protest to the examination of how CMC is associated with employment outcomes of deaf people. CMC

includes “technology that allows for transmission of information from one entity to another through a digital device and over a network” (Hogg, Lomicky, & Weiner, 2008, p. 89). CMC includes smart phones, cell phones, Web cams, video cams, Internet, intranet, and management software. Methods of transmission include email, instant messaging, blogs, video blogs, and video phone conversations. All the methods allow for instantaneous and seamless communication among deaf people (Hogg, Lomisky, & Weiner, 2008). Some CMC allows deaf and hearing people to use the Qwerty display found on most smart phones to type back and forth. Remote interpreting allows for seamless communication between hearing and deaf people and allows each to use their native language while a third party interprets using a webcam, television screen, and Internet.

Deaf people either can benefit from or be adversely impacted by the changes brought on by the 21st-century market place. America is moving from a manufacturing-based economy to a service-based one. The American economy is dependent on information and communication technology, which requires literacy in a service-based economy. With traditional employment options for the deaf slowly disappearing, there is very little information on how CMC is associated with the work patterns of deaf people in America. There are many other factors to consider when examining the employment of deaf people that this study does not cover, including deaf people’s mistrust of hearing people, their desire to avoid discrimination, and their desire to work in environments accustomed to deaf culture. Socioeconomic factors such as a high national unemployment

rate and family circumstance might also influence patterns of employment among deaf people. Yet, this study contributes to Deaf studies by examining characteristics of deaf people's employment in the 21st century.

Purpose of the Study

The purpose of this study was to examine the association between CMC and employment of deaf people. This study also tested Alderfer's (1972) motivation theory, which measures job satisfaction (independent variable) according to the degree that a worker experiences existence, relatedness, and growth in the workplace. Intervening variables will be CMC use in the workplace, employment characteristics, and personal characteristics.

Employment conditions that existed in 1990 when Congress passed the Americans with Disabilities Act (ADA) have changed from a manufacturing- and labor-based job market for deaf people to a service-based job market reliant on literacy, information, and CMC. Title I of the ADA places the burden on the employer to prove that one's disability prevents the fulfillment of the "essential function of the job" and that any modification to the job would place an "undue burden" on the employer (Fleischer & Zames, 2001, p.95). Study findings highlight current issues of accessibility and impact of hearing loss in a service-based job market dependent on CMC. Findings of this study also help to evaluate efficacy of resources provided under the Rehabilitation Act (1973), Americans with Disabilities Act (1990), and the New Freedom Initiative (2001) by examining how effective they are in view of the current changes in the labor market and

employment characteristics of deaf people. The study will also inform secondary education, postsecondary education, and rehabilitation services as they prepare deaf people for the 21st-century service-based labor market.

Nature of the Study

This study will perform a quantitative investigation into the association of CMC with the employment and personal characteristics of deaf people. The study will also use Alderfer's (1972) theory to frame and expand the understanding of employment decisions of deaf people under current social, economic, and technological conditions. A descriptive survey is an appropriate approach for this study because, as Neuman (2006) suggested, "it captures self-reported beliefs and behaviors, measures more than one variable, and tests more than one hypothesis at a time" (p.273). Surveys are also useful in getting data on populations, examining associations between population characteristics (Trochim, 2005), and investigating job satisfaction (Cook, Hepworth, Wall, & Warr, 1981).

The Deaf Employment and Technology Survey (DETS), given in Appendix A, was created for this study from variables used in Alderfer's theory of motivation, types of CMC (Hogg, Lomicky, & Weiner, 2008), demographic characteristics, and employment characteristics (Crammatte, 1987). The study made changes to the design of the questionnaire based on feedback by pilot and pretest participants. The study used the revised Web survey to collect descriptive data from a self-selected sample of deaf workers. The study used nonparametric statistics, including Chi-square, to examine the

relationships between demographic characteristics, CMC use, and characteristics of employment.

Research Questions

1. How does CMC associate with deaf people's choice between deaf- and general-sector employment?
2. How do deaf people use CMC in both general- and deaf-sector employment?
3. What are the relationships between CMC, employment sector, personal characteristics, and employment characteristics for deaf workers?
4. What are the relationships between CMC and job satisfaction?

Assumptions

This study assumes that:

1. Deaf employees and employers are likely to have access to the Internet, email, mobile communication devices, or video communication at the time of this study (Bowe, 2002).
2. Deaf people highly value CMC in the workforce (Bain, Basson, Faiman, & Kanevsky, 2005).
3. Deaf job seekers would not seek employment opportunities that do not allow use of CMC (Bowe, 2002).
4. Deaf people rely heavily on CMC to help integrate with society (Bowe, 2005).
5. Members of the deaf community will be motivated to participate in research that advances their efforts toward social equality (Bowe, 2002; Crammatte, 1987).

6. Deaf people share the same desire for existence, relatedness, and growth in the workplace as hearing people (Alderfer, 1972; Crammatte, 1968/1987).

Limitations

Study participants are self-selected and data are self-reported. Alderfer's (1972) theory on motivation may not fully explain deaf people's choices of employment since it is derived from a *content* perspective of job satisfaction. Several other possible variables not explored in this study stem from a *process* perspective of job satisfaction, including deaf people's mistrust of hearing people; their desire to avoid discrimination in the form of Audism, and their desire to work in environments accustomed to deaf culture and norms. Socioeconomic variables may also associate with employment of deaf people and include family circumstances and unemployment rate, neither of which is addressed by the proposed study. Limits exist in the use of a Web survey and quantitative analysis to gather data. Although helpful, questionnaires are the least informative method of research in assessing people's attitudes, orientations, circumstances, and experiences (Babbie, 2004). People who work, but do not have access to the Internet, were not included in the study. People who do not access the Internet during the survey were not included in the study. The study examined communication as one aspect of deafness and deaf culture for an association with job satisfaction and did not examine other characteristics of the deaf community. The study was cross-sectional and did not measure changes in job satisfaction over time, but instead examined job satisfaction at one point of time. The study only involved people who were working at the time of the survey.

The landscape of the deaf community is changing. Scholars disagree as to the nature of deaf culture and the survival of the deaf community (Fernandez & Myers, 2009). Some scholars have recently argued that for the deaf community to survive as a cultural minority community, deaf studies programs, leading deaf advocacy organizations, and the deaf community need to adopt a broader definition of what it means to be culturally deaf to include the effects of a multicultural identity (Fernandez & Meyers, 2009; Leigh, 2009). However, multiculturalism in the deaf community and its impact on employment of deaf people were not under investigation in the study.

Delimitations

The study did not seek causality between variables, but instead associations among descriptive data, use of CMC, job satisfaction, and employment characteristics. The deaf community is multicultural and to divide the population by those who are culturally deaf and those who are not is an oversimplification (Leigh, 2009). The study did not examine other issues that may influence how technology impacts the employment of deaf people. Those issues include the views of employers, competition with hearing applicants, nature of the jobs, and encouragement from deaf-centric social and family systems to enter certain fields or a particular sector of employment. The study took place during a period of relatively high national unemployment and did not collect data from deaf people who were not employed at the time of the survey. In examining job satisfaction, the study did not measure supervisor or coworker praise as an item impacting a job satisfaction index score.

Theoretical Perspective

The study classified job satisfaction into two theoretical categories: content theories and process theories (Gruneberg, 1979, p.9). Studies conducted from a *content* perspective examine how specific employment characteristics such as tasks, flow of information, salary, and workplace discourse impact job satisfaction. The *process* perspective examines how beliefs, expectations, and values associate with employment characteristics to impact job satisfaction (p. 9). Alderfer (1972) derived his theory on motivation in the workplace from Maslow's (1943) motivation theory and both use content theory in examining job satisfaction. Alderfer's theory and its constructs of *existence, relatedness, and growth* (ERG) in employment provide the theoretical framework for this study.

Alderfer (1972) applied Maslow's five basic needs (physiological, safety, love, esteem, and self-actualization) to employment by combining them into three categories: existence, relatedness, and growth (p. 25). According to Alderfer, the need for existence is basic and motivates a person to satisfy physiological needs such as food, shelter, and clothing. Through one's salary, a person is able to purchase these needed items. Salary and health care benefits help to address those needs. The need for relatedness speaks to relationships with coworkers that involve inclusion, respect, and acceptance. Growth needs, according to Alderfer, are satisfied by behaving in a manner that leads to self-esteem and self-actualization through using one's capabilities and developing new ones while being productive in the workplace (p.20). The assumption here is that workers

associate productivity to reward systems within the workplace, including salary and promotion. Alderfer also assumed that congruence between self-assessment of productivity and workplace reward systems leads to job satisfaction, whereas incongruence leads to low job satisfaction.

The premise of Alderfer's (1972) theory on motivation is that the need for existence, relatedness, and growth are present in all human beings and that the desires related to those needs have as much an impact on behavior in the workplace as anywhere else. Alderfer suggested that existence, relatedness, and growth can be satisfied through targeted interaction in the workplace. The result of not fulfilling needs for existence, relatedness, or growth will be workers with markedly diminished job satisfaction (p.14).

Working with hearing people might present several potentially negative psychosocial outcomes that affect a deaf person's ability to satisfy existence, relatedness, and growth needs in the general workplace (Higgins, 1987, p.154). Problems caused by a lack of communication for a deaf person include social and family isolation, depression, and behavior difficulties (Lucas, Schiller, & Benson, 2004). Social support is necessary for mental health, which suggests that deaf people might consider social support in a job when deciding whether to apply for it (Larisgoitia, 1996; Young, Ackerman, & Kyle, 2000). This study examined CMC for mitigating affects on those potentially negative outcomes for deaf workers in general sector employment.

Need for special accommodations, coworkers' lack of disability awareness, and lack of understanding of deaf culture cause stress for the deaf worker in the general sector

(Crammatte, 1987). Alderfer's (1972) theory applied to deaf people posits that deaf workers might seek employment in sectors that they believe will offer the greatest opportunity to satisfy all three motivation-related needs while causing the least amount of stress. This study investigated whether CMC creates such a workplace in the general sector and enables deaf people to satisfy all three needs as described by Alderfer.

This study examined how all three of Alderfer's (1972) constructs of existence, relatedness, and growth help to explain the role CMC plays in deaf workers' choice of employment sector and job satisfaction. This study investigated CMC for an association with a deaf person's choice of employment sector and job satisfaction. The study also examined the relationship among CMC, personal characteristics, employment characteristics, and job satisfaction.

Definition of Terms

American Sign Language: "ASL is a visual language with its own syntax and grammar that is used to convey individuals' ideas, information, and emotion . . . it includes signs made with the hands, facial expressions, body posture, and movements" (Padden & Humphries, 1988, p.2).

Conversational communications: "unplanned, informal interactions among coworkers associated with the development of personal relationships and integration within the social and political networks of the work environment" (Higgins & Nash, 1996, p.47).

*Culturally deaf (Deaf-World): "*an ethnic group comprised of deaf people who adhere to the practices and behaviors proscribed by deaf culture and whose primary method of communication is a visual-gestural language" (Lane, 2005, p.291).

Deaf: "the common outcome of diverse causes resulting in an inability to hear and understand speech through the ear alone" (Higgins & Nash, 1996, p.22).

Deaf community: "people with severe to profound hearing loss; rely on visual communication whether it be lip reading, visual and manual communication, voice, or written English; and who may or may not be members of the Deaf World" (Ladd, 2005, p.291).

*Deaf culture: "*common mores, values, worldviews, and beliefs mediated through a common language that binds individuals" (Lane, Hoffmeitser, & Bahan, 1996, p.124).

Deaf sector: "the part of the labor market that employs those respondents who either serve deaf people or work in situations where their deafness is applicable to their occupation"(Crammatte, 1987, p.189).

Hearing: a cultural term in which the deaf community identifies hearing individuals as "non-deaf people" (Ladd, 2003, p.17).

Hearing loss: "a loss of hearing measured in decibels (db): mild (26 to 40 db), moderate (41 to 55 db), moderate to severe (56 to 70 db), severe (71 to 90 db), and profound (greater than 90 db)" (Luft, 2000, p.52).

*Hearing sector: "*part of the labor market that employs respondents who work in corporations, government agencies, or self owned businesses that serve the general

public" (Crammatte, 1987, p.189). This study chose to use the term *general sector* because it is less divisive.

*Job satisfaction: "*a person's emotional reactions to a particular job (Gruneberg, 1979, p.3).

Significance of the Study

This study contributes to the emerging synthesis between disability studies and public policy (Hinton, 2003; Watson, 1993). According to Bavia (1993) "the ultimate goal of disability policy is to prevent social disadvantages associated with disabilities and impairments, and to promote opportunities and options for people with disabilities to live productively in their communities" (p.736). To this end, advocacy for people with disabilities developed over the past century into a sociopolitical machine that led Congress to pass the Americans with Disabilities Act in 1990 (Pfeiffer, 1993). Advances in technology are believed to influence education, work, and subsequently, social stratification in Americans (Lipset & Ray, 1996, p.614). Little research exists on CMC use by deaf and hard-of-hearing people (Austin & McGrath, 2006; Bain, Basson, Faisman, & Kanevsky, 2005; Bowe, McMahon, Chang, & Louvi, 2005; Hogg, Lomicky, & Weiner, 2008; Keating & Mirus, 2003). Even less is known about CMC use by deaf people in the workplace (Baldridge, 2001; Saladin, 2004; Tigh, 1994). Technology in post industrial society has the potential to positively impact some and negatively impact others in the workplace, thus furthering the divide between social classes brought on through the industrial society (Lipset & Ray, 1996).

In the context of a postindustrial society, this study might be useful to associations and organizations striving toward socioeconomic equality between people with and without disabilities. The Rehabilitation Services Administration relies on updated research to preserve the federal government's responsiveness to the employment needs of people with hearing loss and to implement comprehensive and coordinated programs of vocational rehabilitation, supported employment and independent living for individuals with disabilities (RSA, 2009). The Americans with Disabilities Act of 1990 secures the right of people with disabilities to have equal opportunity to work and participate in other aspects of society. The Vocational Rehabilitation Act of 1973 (Public Law.93-112) and President Bush's New Freedom Initiative (Executive Order 13217, 2001) put in place financial support and technical assistance for individuals with disabilities to establish themselves in the labor market. The 2009 economic crisis brought to the forefront the issue of transparency and accountability of government spending including policy and program evaluation. Little is known about how education, social, and employment services are preparing deaf people for the current job market and whether those services are successful. This study's results on how CMC associates with aspects of employment of deaf people, may be relevant to development of social programs preparing deaf people for the demands of the 21st-century job market by suggesting how to use existing resources more effectively.

This study also improves on the research methods currently used to examine the deaf population. Research relies on national data, including the U.S. Census, Survey of

Income Program Participation (McNeil, 2000), Community Survey, National Health Interview Survey (Bowe, McMahon, Chang, & Louvi, 2005), Vocational Rehabilitation Administration outcomes (Capella, 2003), and university alumni surveys (Karchmer, Lam, Mitchell, & Hotto, 2006) to examine employment of deaf people. Secondary analysis of data from the national census presents challenges in drawing conclusions about deaf and hard-of-hearing people. Data drawn from the national census do not distinguish deaf from hard-of-hearing people. Much of the data are likely to reflect program participation and program efficacy rather than provide information about specific issues affecting deaf people's participation in society. This study collected data directly from a sample drawn from the U. S. deaf population to examine what impact CMC (a social phenomenon) has on employment of deaf people.

This study examined CMC use in context with other possible influential factors in the employment of deaf people. Crammatte (1987) suggested that professional interpreters and telecommunications devices could lead to reducing employment barriers in the general sector. This study investigates barriers to communication by examining CMC use, and might explain the continued struggle of deaf people to participate in the general sector. Several personal characteristics were found to influence deaf people toward working in deaf-sector jobs, including frustration and embarrassment (Higgins & Nash, 1987); depression and isolation (Lucas, Schiller, & Benson, 2004); and self-efficacy (Meadow-Orlan, 2000). By examining the vocational choices that deaf adults are making in the information era, this study sheds light on whether CMC overcomes those

social, organizational, and personal characteristics that might also act as barriers to participation in the general sector. Crammatte concluded that telecommunication devices at that time would affect employment of deaf people by creating greater accessibility in the general sector. This study also examined use of technology that is more advanced in bridging communication between deaf and hearing people than the telecommunication devices of previous decades.

Employment-related characteristics also influence deaf people's decisions about work. Research has found that communication difficulties, attitudinal barriers, and lack of understanding of deaf culture in the general-sector workplace steer potential deaf employees to deaf-sector jobs (Geyer & Schroedel, 1998). This study examined whether difficulty communicating with hearing peers and supervisors, feelings of exclusion from flow of information, and perceptions of discrimination in the general sector continue in the general sector despite the presence of CMC. A sense of isolation may also lead deaf people to seek employment in the deaf community. Although, as Keating and Mirus (2003) suggested, "the Internet is increasing connections among deaf members" (p.695). The possibility exists that using the internet to socialize may entice deaf people to work in the general sector knowing that they will stay connected with the deaf community through CMC.

Summary

This study fills a gap in the understanding of deaf people in America. The purpose of the study was to examine the association between CMC and employment of deaf

people. The changing nature of employment in the United States and the reliance on technology in the world economy raises concern over future employment of deaf people. It is important for employers, federal programs designed to assist in employing deaf people, policy makers, and members of the deaf community to have insight into how technology might impact employment of deaf people.

The next two sections discusses other possible influences over employment of deaf people and explains how this research advances previous efforts to study employment among deaf people. Section 2 of this dissertation discusses the literature pointing to personal, employment, and social characteristics found to influence employment of deaf people. The review of the literature also considers current research on the use and impact of CMC by deaf people. Literature explaining Alderfer's (1972) theory on motivation in the workplace with its constructs of existence, relatedness, and growth provided the theoretical foundation from which to understand deaf people's choice of employment sector. This study continues the traditions of previous investigation into the deaf community by using 21st century technology in an information era. Section 3 of this dissertation discusses the research method and explains why this study used a Web survey to study the effect of CMC on employment of deaf people. Section 3 also discusses the statistical methods that this study used to answer the study's research question.

Section 2: Review of the Literature

Introduction

In the information era, little is known about how computer mediated communication (CMC) affects the deaf community (Hogg, Lomisky, & Weiner, 2008). No studies were found that discuss how CMC affects or even associates with deaf people's choice between working in the deaf or general sector, type of employment, and job satisfaction. However, some studies of deaf people's employment offered several perspectives on other potentially influential variables in the choice of employment of deaf people. The studies that collected descriptive data on employment of deaf people reveal trends and characteristics of employment relevant to the current study. The review includes a discussion of personal and employment characteristics because they may prove to be associated with CMC and employment outcomes. The social context in which deaf people find employment is also discussed because it may prove to be associated with CMC use and employment of deaf people. The final section of this review covers what little research exists on CMC use among deaf people.

Literature Search

This section encompasses a review of the literature on employment of deaf people. The researcher performed an extensive search using ERIC, EBSCO, Google Scholar, ProQuest, PsychINFO, Dissertation Abstracts International, Academic Search Premier, and the Washington DC Metro area library consortium ALADIN System. The researcher used the subject heading option and paired deaf, hearing loss, and hard-of-hearing, with each of the following terms: employment, workers, jobs, trends, vocational

rehabilitation, education, training, placement, rehabilitation services administration, communication, technology, video relay, instant messaging, email, computers, and job satisfaction.

Employment Trends

Deaf people found skilled and semiskilled jobs during most of the 20th century. Also, deaf people have made considerable gains toward participating in the labor market in a variety of both blue- and white-collar jobs. Martens (1937) conducted interview surveys with nearly 20,000 deaf and hard-of-hearing people across 27 states and found 33.5% working in manual labor and 20.1% working in manufacturing. In some instances, the number of deaf workers in a particular industry outnumbered those in the general population. Lunde and Bigman (1959) conducted a national survey of deaf people explicitly to examine their occupations. That study found that of a sample of 7,920 deaf and hard-of-hearing people, 70% were craftsman, foremen, or machine operatives and the number of deaf people employed in the manufacturing industry (52.7%) was twice the rate of their hearing counterparts (25.5%). Computed by the U. S. Bureau of Census in 1956, Schein and Delk (1974) conducted a census of deaf people in the United States and found high employment rates among deaf people, with 97.1% of males (*n*=2,707) and 89.8 % (*n*=2,552) of deaf females employed at the time of the study. Schein and Delk categorized employment according to Department of Labor occupational classifications and reported most (80%, N=5,257) of deaf employees worked in skilled or semiskilled positions, including 34.7% as nontransit operatives, 21.3% as craftsmen, and 15% in

clerical positions. Klein (1988) surveyed 69 deaf workers and found most respondents (96.2%) were employed in clerical, technical, or manual occupations.

In the latter half of the 20th century, a shift away from skilled and semiskilled labor and toward professional and administrative jobs took place in the deaf community. Those jobs were found mostly in social services and education for deaf people. Deaf workers began to migrate to deaf-sector employment in schools for the deaf or to jobs in the federal government. Schein and Delk (1973) found 2,702 (78.6%) deaf males and 2,552 (70.4%) deaf females were employed across the private sector while 15.8% of deaf males and 24 % of deaf females were working for the federal government. Rawlings et al. (1985) examined employment of deaf people with graduate degrees (*N*=871) and found 70% of graduates working in deaf education.

Crammatte (1987) surveyed deaf professionals and found 1,091 (63%) working in deaf education programs, 309 (17.7%) working in government, and 249 (14.4%) working in private businesses. Rawlings, King, Skilton, and Rose (1993) examined employment among undergraduates of Gallaudet College since 1923 and found 45% of undergraduates worked in state schools for the deaf and 29% worked for the federal government (*n*=2,343). The 2006 Gallaudet University Alumni Survey (*n*=1,114) found 68% of the graduates working in education (specific type unknown) and 10% working in government. The federal government remains the largest single employer of deaf and hard-of-hearing people in America. As of 2008, there were 1,249 deaf and hard-of-

hearing members in 54 federal departments of the federal government (Deaf and Hard-of-hearing in Government, 2008).

Employment Sector

Most research suggests that deaf people who rely on sign language prefer employment in jobs that employ other deaf people or serve customers who are deaf (Bat-Chava, Daegnin, & Martin, 2002; Dowler & Walls, 1993; Emerton, Foster, & Gravitz, 1992; Lucas, Schiller, & Benson, 2004; Luft, 2000; Michel, 1999; Saladin, 2004; Scherick, 1996; Welsh & Foster, 1991). Crammatte 1968 grouped these jobs together and call it the *deaf sector* and those just serving hearing people as the hearing sector. Rawlings et al. (1993), in analyzing alumni surveys from Gallaudet University (*n*=3,116), found approximately 1,500 (62%) of undergraduate students and 479 (55%) of graduate students employed in the deaf sector. Similarly, 78% (*n*=1,829) of undergraduates and 68% (*n*=600) of graduates were employed in other jobs in the general sector, but where other deaf people were working. The 2006 Gallaudet University Alumni Survey (*n*=1,114) found 63% of undergraduate alumni working in the deaf sector, with 45% of those respondents working in an education setting and 30% in government.

Occupational status does not alter the preference of deaf people to work in the deaf sector or among other deaf people. Crammatte (1968) interviewed deaf professionals and found participants were working in deaf-sector employment in 10 of 21 occupational categories. With the exception of artists, the remaining nine categories involved were in some form of human services including education. The remaining categories may have

had more to do with choice of occupation than with the sector of employment since few deaf lawyers, scientists, technicians, and professionals existed at the time Crammatte conducted the study. Progress toward social mainstreaming for people with disabilities has led not only to expansion of occupational choices for deaf people, but also migration into general sector employment. Pressman (1999) surveyed deaf entrepreneurs (*N*=86) and found only 8 (9%) catered to just deaf people while 78 (91%) catered to a combination of both deaf and hearing customers. Deaf people find employment in the fields in which they are prepared and this too affects their choice of employment. The 2006 Gallaudet University alumni survey, found 74% of graduate school alumni working in the deaf sector (74%). A recent alumni survey from the National Institute for the Deaf, a college offering degrees in science and technology, showed that of 112 graduates who found employment, 63% of them were working in business or industry, while 29% were working in education or non-profit social services, and 8% were working in government (NTID Annual Report, 2008).

Occupational Status

Cross-sectional studies take a snapshot of worker conditions in a moment of time and may not reflect job mobility. Similar to changes in job sector and occupation, job status among deaf people currently signals movement away from earlier socioeconomic stratification and social marginalization. Schroedel and Geyer (2000) surveyed deaf and hard-of-hearing graduates from one university over a 15-year period and found that between 1989 and 1999 the number of deaf and hard-of-hearing people holding

professional, managerial or technical jobs rose from 48.8% (*n*=186) to 55.9% (*n*=195). However, most deaf people find work with lower occupational status. Michael (1999) used data obtained from the Rehabilitation Services Administration to examine deaf people's employment in a service-based economy. Clerical, service, and sales jobs made up the pink-collar category while professional, technical, and managerial fell in the white collar category. All others were into the blue-collar category. That study found 14% (*n*=2,163) of the respondents holding white-collar jobs, 43.4% (*n*=6,320) holding pink-collar jobs, and 41.6% (6,085) working in blue-collar jobs. Deaf people have also ventured into self-employment, but this is a minority among the deaf population (Crammatte, 1987; Pressman, 1999). This researcher found no other study exceeding those numbers and concludes that further research is needed to determine if self-employment among deaf people is on the rise, decline, or remains relatively the same as those previous studies mentioned earlier.

The trend in employment of deaf people shows that as a community, deaf people are finding pink- and white-collar employment. Equally apparent is that as the labor market became service-based in the late 20th century, deaf people continued to secure employment. Together with CMC, other personal or employment characteristics may affect employment of deaf people. The remainder of this section includes an examination of the literature on specific characteristics that contributed to deaf people adapting and surviving in the labor market. Characteristics most examined for association with deaf

people's employment have been communication, education, workplace, and job satisfaction.

Characteristics Associated with Employment of Deaf People

Communication.

Communication in the workplace for deaf people depends on several factors including the age at which one looses the ability to hear, the extent of hearing loss, literacy, type of job, preference for type of communication, and sector of employment (Crammatte, 1987). For many deaf people, especially those tied to the deaf community, which encourages use of ASL, English is a second language and, as such, places deaf people at an academic disadvantage (Marshark & Spencer, 2003). Internet and cellular technology enable people to communicate in variety of formats. However, to date no studies have found technology able to heighten literacy rates among deaf people. Low literacy among the general deaf population leads to limited occupational choices in an industrial-based economy and the effect in the information era is unknown.

The rise of a deaf sector in employment has led to mixed results, associating poor literacy with low wages. Lunde and Bigman (1959) found 35.9% people born deaf (n=1,105) earning under $2,000 a year compared with 9.2% of people deafened at age 6 or later (n= 1,105). The same study found twice as many deaf people who lost their hearing after the age of 1 (40.1%) than those born deaf (20%) earned over $6,000 ($n$=647). Crammatte (1965) found that of the 52 participants who lost their hearing before the age of 6, more than two thirds (n=46) earned less than the sample median salary of

$4,040. Schein and Delk (1974) found people born deaf had the lowest median income ($5,663) and people who lost their hearing after age 6 had the highest median income ($6,871). That study also found 75.1% of people born deaf earned less than $7,000, compared with 58.7% of people deafened after age 6.

However, Lunde and Bigman (1959) also found fewer people who lost their hearing after age 6 (18%) earning more than $6,000 than those who lost hearing between ages 1 and 6 (40.2%). They argued that there is no proof that a relationship exists between age of onset, type of communication, and salary (p.34). Crammatte (1987) also claimed that the age of onset was not a reasonable predictor of employment because of the advances made in deaf education and hearing aids and he suggested examining type of communication, education, and degree of hearing loss instead. This study could not find any study that examined the relationship between age of hearing loss and income since 1987. However, since then, the focus of research shifted to the type of communication used in the workplace.

The association of communication type with earnings in the latter part of the 20th century is equivocal. Lunde and Bigman (1959) found 46.2% (*n*=642) of study participants made over $6,000 using speech for expressive communication. Crammatte (1965) found 71% of deaf professionals who earned over the median salary of $8,000 (*n*=38) preferred to use speech for expressive and receptive communication with business associates.

One exception is offered by Schein and Delk (1973), who identified 1,476 prevocational deaf adults (adults who lost their hearing before the age of 19), and found more workers earning over $15,000 using sign language (4.5%) than speech (3.3%) or written English (1.0%). However, more respondents who used writing to communicate earned a salary between $7,000 and $9,999 (27.6%) than those who relied on speech alone (21.0%). Schein and Delk's results might be a result of an increasing number of deaf-sector white-collar jobs in human service agencies and schools for the deaf during that period.

Deaf people who use multiple methods of communication in the general sector earn higher salaries than deaf workers who depend on only one method. Schein and Delk (1973) found 66.6% of the sample (*n*=1,476) communicated in the general sector by combining speech with sign language and gestures and earned between $5,000 and $10,000. The same study found that literacy, even in combination with other methods of communication, was not associated with higher income. Of deaf people earning between $5,000 and $10,000 (*n*=1,476), 49% combined speech with writing, 38.1% writing with gesture and speech, and 33% used sign language with writing. Klein (1988) surveyed 97 deaf and hard-of-hearing graduates from one high school for the deaf in Pennsylvania and found 11.8% of the respondents used speech and sign language simultaneously and 10.3% used sign language with their employers (*n*=68). Of the 68 respondents, 26 (37.7%) were employed in manual labor and 24 (34.8%) held technical or clerical positions. In the same study, Klein also asked participants to comment on strategies they

used with others during breakdown in communication. Thirty-nine (57%) asked the other person to repeat themselves while the deaf person read their lips and 24 (38.8%) resorted to writing notes back and forth.

In the latter part of the 20th century, speech was a communication strategy preferred by most deaf people regardless of which employment sector they were in, or what type of position they held. Crammatte (1987) studied how deaf professionals communicated with coworkers in both hearing and deaf sectors. Out of 372 deaf professionals in the hearing sector, 241(64%) used speech for expressive communication and 232(63%) used speechreading for receptive communication. Second to sign language, 34% used speech (*n*=420) and speechreading 28.9% (*n*=359) as methods of communication. Macleod- Gallinger and Foster (1996) surveyed deaf graduates from one university and compared those who held a supervisor position (*n*=43) and those who did not (*n*=160). A majority of supervisors (74.4%) and nonsupervisors (70.2%) were found using speech most often as a means of communication which is consistent with earlier findings from Crammatte (1987).

Deaf people's preference for communicating with hearing people is also associated with the purpose for communication. Larisgoitia (1996) examined the employment status of 175 deaf employees for characteristics that contributed to gaining and keeping employment. That study found that for supervision, 87 (50%) of the respondents used speech, 52 (30%) wrote, and only 30 (18%) used sign language for expressive communication with their supervisors. Larisgoitia found that given the

opportunity to use their native language with their supervisors, only 14 (8%) of the study participants preferred to rely on sign language through an interpreter for expressive communication, and 11 (6%) preferred to use an interpreter for receptive communication. Larisgoitia found similar results when he examined the communication between deaf and hearing coworkers. Seventy-five (53%) of the respondents who had hearing coworkers preferred to use verbal and aural methods of communication both expressively and receptively.

In addition to preference and purpose for communication, deaf people take into account environmental considerations when considering which method to use for communicating in the work place. For most sign language users, the general sector involves challenges while the deaf sector offers ease of communication. Resources designed to bridge communication between hearing and deaf workers either are misused or are inadequate in overcoming communication barriers that deaf workers experience in the general sector (Dowler & Walls, 1996). Crammatte (1987) found that group meetings, trainings, telephone calls, and informal networking were particularly problematic because the appropriate accommodations were not in place. Scherick (1996) surveyed employers of deaf people and found 77% reported barriers to communication most noticeable during workplace related social functions, 75% with staff meetings, and 68% with in-services (*n*=51).

Postsecondary education.

A longstanding aspect of employment has been that advanced degrees lead to upward job mobility. Most deaf people did not attend college in the first half of the 20th century. Over the past few decades, legislation and resource allocation has led to an increase in the number of deaf people entering college. Similarly, employment rates among deaf college graduates remained high in a labor market having advanced degrees are advantageous (Armstrong, 1983; Crammatte, 1987; Klein, 1988; Lune & Bigman, 1959). Schein and Delk (1974) found level of education to be the strongest predictor of occupational status (r = .46, p<.001) and other data suggest that education is associated with the rate of change in job status for deaf people measured by type of occupation. Welsh and Foster (1991) carried out a cross-sectional study of the effect education had on employment by comparing the labor force status of college graduates (N=1,149) with that of nongraduates (n=2,658). They also compared results with those of the Secondary School Follow-up Questionnaire, which is a survey sent to graduates of 27 secondary schools for the deaf from around the country. Little difference was noted in the employment rate of deaf people with and without college degrees 5 years after graduation. Of noncollege graduates 45% were working by the first year after graduation compared with 75% of college and students without a bachelor degree holders. Five years from graduation, employment rates in each category showed less difference. Approximately 98% of the respondents with undergraduate degrees, 95% with sub-bachelor degrees, and 91% of those with high school degrees held jobs 5 years after

graduation. Level of education also varies among self-employed deaf people. Pressman (1999) found 24 (27.9%) of entrepreneurs surveyed (*N*=86) had no degree while 18(20.9%) had a bachelor of arts degree, and 11(12.8%) had a bachelor of science degree. Only five (7.1%) respondents held a master's degree.

The National Training Institute for the Deaf (NTID) surveyed its 2008 graduates and reported that of 203 undergraduates, 118 entered the labor market, and of that number 112 found full-time employment. The same report found that the employment rate was greater than 94% among graduates from NTID entering the labor force between 2003 and 2007. In the 2006 Gallaudet University Alumni Study, 78% of alumni with graduate degrees (*n*=984) were holding full-time professional or technical occupations compared with 6% of respondents with undergraduate degrees (*n*=1,144).

Postsecondary education has been associated with job growth and mobility for deaf workers in the information era. MacLeod-Gallinger and Foster (1996) examined deaf supervisors to identify characteristics that have led them to become supervisors (*N*=121). In that study, a majority of supervisors believed that level of education led to job growth and their supervisory roles. Five percent of the supervisors had an associate's degree, 28.6% a bachelor's, 45% a master's, and 8.6 % a doctorate. The same study found 92% employed at the time of the study and over 80% were working in professional, technical, or managerial positions that required a college degree. In the Gallaudet University Alumni Survey (2006), 81% of respondents with graduate degrees were working in professional or administrative positions (*n*= 984). While much of the

research into deaf people's employment has looked for associations between level of hearing loss, education, and employment outcomes, the influence that societal conditions may have on employment of deaf people cannot be discounted.

Societal considerations.

The repression of sign language and discrimination in the private sector were responsible for socioeconomic stratification of deaf people in the mid-20th century (Buchanan, 1996). Social and economic changes, many of which influenced by technology, have created different employment circumstances in which deaf workers find themselves. However, two characteristics remain influential in the employment of deaf people, deaf culture and discrimination against people with hearing loss.

Culture.

The deaf community's identification as a cultural and minority group offers an alternative explanation as to why deaf people would prefer working in the deaf rather than general sector. *Deaf World* refers to a subset of the deaf community in which members have strong ties to deaf culture (Lane, 2005). Membership in the Deaf World consists of deaf and hard-of-hearing people who share characteristics, including language, norms, values, knowledge, kinship, art forms, history, social structure, and customs, used to describe groups with cultural ties (Lane, Hoffmeister, & Bahan, 1996).

Proficiency in ASL, which offers a common means of communication that allows for sharing information, rituals, values, and experiences, is the cornerstone of membership in the deaf community (Baker & Padden, 1978; Higgins, 1987; Lane,

Hoffmeister, & Bahan, 1996). Working with other deaf people insures the survival of deaf culture by offering the opportunity to share stories, teach each other ASL, pass along community information, and organize community activities. Given advances made in communication technology, the question remains whether those advances contribute to the survival of deaf culture without deaf people having to work in close proximity to one another.

Deaf culture fueled the creation of the deaf sector by specifically catering to the needs of deaf people. With the ability to form its own industries and franchises, the deaf community behaves like a closed social system and relies on the deaf community to fill jobs created for deaf people (Coye, 1987). Deaf people gravitate toward deaf-sector jobs that in some instances have higher salaries and matched their educational background more precisely than what deaf people match found in the general sector. Difficulty in communication was a major barrier to general sector employment for deaf people so they often sought work where other deaf people were working (Bursell, 1997; Larisgoitia, 1996).

Discrimination.

Despite efforts to pass comprehensive legislation protecting the rights of all American citizens, people with disabilities faced discrimination in employment in the 20th century (Young, Ackerman, & Kyle, 2001). In what is considered to be the model for civil rights legislation for people with disabilities, the Americans with Disabilities Act (1990) failed to rid the private employment sector of discrimination against individuals

with disabilities (U.S. Equal Employment Opportunity Commission, 2009). According to the Commission (2009), workers with disabilities filed 19,453 claims for discrimination in 2008, up from 18,000 claims filed in 1997. According to most people with disabilities looking for work, the most common external barrier to employment for people with disabilities has been the attitude of employers that people with disabilities could not perform adequately in the workplace, even with appropriate accommodations (Hinton, 2003).

The 21st century brought legislation preventing discrimination against people with disabilities in employment using cyberspace. The Telecommunications Act (1996) assured that telecommunications equipment and services are accessible to people with physical and intellectual disabilities (47 U.S.C § 225). Section 508 of the Rehabilitation Act (1973), which took effect in June 2001, requires that federal employees with disabilities "have access to and use of information and data that is comparable to the access to and use of the information and data by Federal employees who are not individuals with disabilities" (29 U.S.C § 794d (a)(1)(A)(i)). However, initial investigation shows that section 508 has had less than a significant effect in creating access to e-government by people with disabilities (Jaeger, 2004). Re-examination of the use of CMC among deaf workers will contribute to evaluating the current effectiveness of amendment 508 among federal and state deaf employees and deaf private-sector workers needing access to cyberspace in order to complete job tasks.

Imbedded in the consciousness of the deaf community, and particularly in the more culturally affiliated Deaf World, is a history of marginalization and discrimination that has lead to deaf people feeling resentment and mistrust toward hearing people (Bauman, 2004; Humphries, 1975; Lane, 1992; Padden & Humphries, 1988). Crammatte (1987) surveyed deaf professionals about the perception of rejection in an index of discrimination comprising six aspects of job satisfaction. Respondents rated their perception of rejection on a scale from 0 (never) to 4 (very often). Crammatte found the index scores higher in all six categories in the hearing sector than in the deaf sector in hiring 1.28 (1.11), promotion 1.35 (1.01), training .99 (077), evaluation 1.01 (.95), communication 1.45 (1.31), and salary 1.05 (1.04).

Discrimination might affect deaf workers differently than people with other disabilities. According to the National Organization on Disability (2004), 22% of working people with disabilities feel discriminated against. Bowe, McMahan, Chang, and Louvi (2005) compared claims of discrimination filed with the U.S. Equal Employment Opportunity Commission by deaf and hard-of-hearing workers (N=8,936) with claims filed by workers with physical or sensory disabilities between 1992 and 2003 (N=165, 674). People with hearing loss filed more complaints than did people with other disabilities in the areas of hiring 11.8% (5.0%), harassment 9.0% (7.4%), promotion 4.3%, (2.3%), training 1.3% (6.0%). Compared to people with other disabilities, the same study found employees with hearing loss filed more complaints against businesses of less than 100 workers (x^2=45.9, p<0.001), and filed more complaints in the service industry

than in other industries (x^2=207.9, p< 0.001). Bowe, McMahan, Chang, and Louvi concluded that deaf and hard-of-hearing people can continue to expect resistance from employers in hiring, providing reasonable accommodations, promotions, and training.

Some argue that society intentionally prepares deaf people for blue-collar work and that is a direct result of discrimination (Scheetz, 2001). Negative social attitudes create significant barriers to mainstream employment for people with disabilities (Fritz, 1987; Noonen, 2004; Wheeler- Scruggs, 2003; Woodcock, Rohan, & Campbell, 2007). Deaf-sector employment offers an inherent understanding and acceptance of deaf culture.

A study is needed to determine if CMC is associated with deaf people's sense of belonging in the general sector and whether deaf people might prefer to work in the general sector over the deaf sector. Alderfer's (1972) theory on job satisfaction suggests that a sense of belonging and relatedness exists in the deaf sector while the general sector maintains barriers against deaf workers feeling engaged with coworkers and supervisors. Deaf people prefer to work in the deaf sector, feeling the need for a sense of belonging that comes with working among people who share a culture or to avoid the victimization that results from discrimination. Knowing if CMC lessens discrimination by creating opportunities for communication, collaboration, and socialization between deaf and hearing coworker would help deaf people feel comfortable exploring careers in the general sector.

Job Satisfaction

Alderfer's (1972) theory on motivation in the workplace suggests that job satisfaction is no less important to deaf workers than with their hearing counterparts and that job satisfaction among deaf workers is similar to that of hearing workers. This researcher found no study that compared job satisfaction outcomes between the two. Deaf workers report high job satisfaction in both sectors despite feeling a sense of belonging in the deaf sector and experiencing discrimination in the general sector. Lunde and Bigman (1959) examined worker satisfaction for the workplace, level of earnings, and opportunities for promotion (n=7,920) and found that 84% reported that working conditions were good. That study also gave similar findings on the issue of salary, with 65.2% reporting a good salary and 24.1% reporting that the salary was fair in relation to their level of education. Opinions of promotion potential showed a stark contrast with salary and working conditions. Lunde and Bigman found that only 26% thought promotions were possible for them.

Job satisfaction of deaf professionals varies by sector of employment and scale of measurement. Crammatte (1987) measured job satisfaction by using an index score and found higher ratings in the deaf sector than hearing sector on promotion [.71(1.06)] and salary [.75(1.18)]. Crammatte also found index scores for the remaining four items slightly lower in the hearing sector than in the deaf sector. These items included nature of work [1.60(1.69)], supervisors [1.31(1.34)], coworkers [1.57 (1.65)] and subordinates [1.10 (1.11)]. A study conducted by the Rehabilitation and Research Training Center at

the University of Arkansas examined job satisfaction among workers with mild to moderate hearing loss (*N*=383). The study found that a majority of workers were satisfied with nine of 14 items that, when combined, comprise a rating of job satisfaction. Crammatte clustered 13 items into economic aspects, intrinsic characteristics, and extrinsic attributes. A 14th question asked about overall job satisfaction. Of the 82% that reported their employers treated them well, 48% reported discontent with the economic aspects of their jobs.

Level of education is also associated with aspects of job satisfaction of deaf workers. A Gallaudet University survey of graduates (1993) examined job satisfaction between undergraduates and graduate alumni. That study found that undergraduates (*n*=192) were less satisfied than the national norm in challenge [37% (50%)], location [43% (56%)], and advancement potential [18% (29%)]. Findings were similar among the graduate degree holders (*n*=63) when compared with the national norm on satisfaction of advancement potential [16% (29%)]. However, undergraduates expressed higher satisfaction (29%) with their salary than both graduates (24%) and the national norm (24%). Welsh and Foster (1991) conducted interviews with 25 graduates from a university program for the deaf in the United States. They found that deaf workers in the general sector reported poor communication and lack of socialization as causes for their low job satisfaction.

Soon after Congress passed the Americans with Disabilities Act in 1990, researchers in Deaf Studies focused much of their attention on the extent to which

accessibility affected deaf people's participation in society. Geyer and Schroedel (1998) examined job satisfaction among deaf and hard-of-hearing people between the ages of 24 and 65 (N=322) and found accessibility was not the most important issue associated with job satisfaction. The survey measured job satisfaction by asking one question: "Overall, how satisfied are you with the job you have now?" Respondents had a choice of responses consisting of (1) not satisfied, (2) satisfied, (3) very satisfied (p. 34). In the same study, Geyer and Schroedel measured job limitations by asking respondents, "Was any part of the job they could not do because of their hearing loss?" The study also asked whether telecommunication technology was available in the workplace. Lower status jobs (r = .19; p< .01), length of prior unemployment (r = -.13; p< .01), and limitations in the workplace (r =-.11; p< .01) were all found correlated with low job satisfaction. Lack of availability of telecommunication devices for the deaf (r- .13; p< .01) and income (r = .18; p< .01) were also found to negatively affect job satisfaction, although to a lesser extent.

Mentoring holds a specific purpose for deaf workers and highlights several interpersonal and self-esteem related issues that might also affect job satisfaction for deaf people. Foster and Macleod (2003) conducted a qualitative study to examine what deaf workers believe contributed to their obtaining supervisory or managerial positions. They interviewed 15 graduates who reported that when both hearing and deaf coworkers took the time to communicate with them, the result was often advantageous to the mentee. Foster and Macleod also concluded that in the absence of formal mentoring, working

with deaf peers provides deaf employees with a source of validation for their work while developing their confidence and self-efficacy

Awkward and inhibited interaction with hearing coworkers lead to frustration, embarrassment, and isolation for deaf people that amounts to low job satisfaction as well (Higgins, 1987, p. 154; Rehabilitation and Research Training Center, 2005). A lack of communication and isolation are leading causes of work-related stress for deaf people and leads to low job satisfaction. Welsh and Foster (1991) conducted semistructured interviews with 21 deaf and hard-of-hearing workers and found communication barriers, social isolation, and discrimination were particularly stressful. Participants in that study reported "anxiety over whether they had access to information to the same extent that hearing coworkers did; the degree to which they relied on hearing coworkers for communicating with others; and the degree to which they were left out of incidental office dialogue" (p. 44). Anxiety over access to full communication leads to feelings of isolation and depression that Alderfer's 1973 theory on Motivation in the Workplace suggests leads to low job satisfaction.

Examination of job satisfaction of deaf people took place during a different era in which the job market for deaf people consisted mostly of skilled and unskilled labor. Recently, the change from a manufacturing to a service-based industry, the Americans with Disabilities Act (1990), the President's New Freedom Initiative (2003), the creation of a deaf-employment sector, and CMC all might have influenced how deaf people rate their job satisfaction. Alderfer's theory offers a means by which to measure job

satisfaction under different socioeconomic circumstances than those that Schein and Delk (1973) and Crammatte (1987) encountered. Unlike previous studies, this study concerns the impact of technology on the existence, relatedness, and growth experiences of the deaf worker.

Computer-Mediated Communication

Computer-mediated communication allows deaf people to participate in society much more efficiently than when telecommunication devices for the deaf were used to bridge communication over phone lines. Computer-mediated communication makes online education accessible in both ASL and text (Bain, Basson, Faisman, & Kanevsky 2005; Preminger, 1997). Data from the Survey of Income and Program Participation showed that between 1993 and 1997 employment among adults ages 21-64 with severe hearing impairments dropped from 59% in 1993 to 48.5% in 1997. The survey authors concluded that the availability of email and IM made it possible for more deaf people to find employment (Bowe, et al., 2005).

Deaf people are beginning to receive mental-health services through video technology as an alternative to relying on an interpreter assigned to the community and to traveling great distances (Austen & McGrath, 2006). Deaf entrepreneurs and employees can communicate with deaf and hearing people alike using video relay services (Pressman, 1999). Fourth generation (known as 4G) technology will enable deaf people to use video phones much as hearing people use cell phones. According to Kodama

(2000), “there is little doubt that in the future video-based information networks will support all types of community revitalizations”(p. 330).

Computer-mediated communication leads to increased frequency and enhanced information sharing among deaf people and between deaf and hearing people. Hogg, Lomicky, and Weiner (2008) examined the role CMC played in how deaf and hard-of-hearing people communicated about Gallaudet University affairs during the 2006 protest. Ninety-eight percent of the respondents (*n*=662) used CMC to stay abreast of events as they unfolded; 80 (70%) used text messaging and 57 (45%) blogged. Qualitative analysis in the same study showed that respondents believed CMC enabled members of the deaf community to share information almost instantaneously; made deaf community information easily accessible; made it possible to organize protest activities; enabled members to participate in events remotely; and included deaf people from around the world. Power, Power, and Rehling (2007) examined the use of short messaging or texting, relay services, fax, and email among deaf people. That study used a Web survey advertised in websites to deaf people interested in Germany. The respondents comprised deaf people from Germany, Austria, Switzerland, Luxemburg, and the United States (*n*=102). That study found that 96% used text messaging through mobile devices; 72% used email, and 31% used chat rooms. Vincent, Deaudelin, and Hotton (2007) found computer-mediated technology useful for 15 deaf people who could only communicate through sign language. The study involved training participants to use a pocket PC designed to bridge sign language with spoken French. Assistive technology use among

deaf people significantly improved their social interaction with hearing people after one month of use (p=0.026) and found that significant improvement in functional participation in the community took place after two months (p=0.016).

The extent that deaf people rely on and benefit from CMC differs by type, setting, and purpose. Tighe (1994) examined the relationship between disability, employment, and computer use before video communication existed. That study found 84% used computers at work for word processing, 74% used it for data entry, and only 64% used electronic mail (n=143). Tighe also compared groups by disability type and found deaf respondents (60%) used computers at work significantly less often than other participants (x^2=25.67, p<.0001). Bowe (2002) surveyed deaf and hard-of-hearing adults (N=884) and examined the use of email and instant messaging (IM) at work. A majority of respondents relied on IM for communication from home (75%), and only 35% reported using IM at work. The same study gave similar results for email, with 97% using email from home and 74% using it at work.

A number of issues challenge deaf people's use of CMC in the general sector. Hearing people use many devices that allow simultaneous video and voice communication, often at the expense of video quality. Currently, technology does not enable deaf people to maintain high video quality to capture the gestures, finger spelling, and facial expressions of sign language. While video relay services distribute videophones free of charge to deaf people, those devices are quite expensive to general-sector employers of deaf people. The Deaf and Hard-of-hearing in Government

association distributed an online survey to its members (*n*=1,249) and received 332 (26.6%) responses. Of those responses, 234 (66%) of deaf and hard-of-hearing employees did not have videophones at their jobs. The survey found that of those who did not have videophones in the workplace, 104 (38.8%) said they were "denied one due to security and workplace network issues" (p.6). In that sample, 39 (14.6%) said they were unable to receive a videophone because their job tasks did not require it and 27 (9.7%) were denied due to funding concerns. Eighty-four (31.3%) respondents indicated that they did not receive a videophone for "other" reasons. Clearly, there are procedural challenges and lack of information blocking use of videophones. The authors concluded that "making a videophone requisition a reasonable accommodation in government has been largely unsuccessful" (Deaf and Hard-of-Hearing in Government, 2008, p. 1).

Deaf people's perception that CMC is an accommodation for a disability also explains their inconsistent use of CMC in the general sector. Baldridge (2001) investigated what deaf people consider before requesting workplace accommodations (*n*=474). Baldridge categorized accommodations into assistance from others, professional services, and equipment. In the study, 30% of those interviewed requested equipment and 52.4% of those requested equipment at least once in the past year. Of those who chose to withhold requests (*n*=237), Baldridge found that 35% felt the request would not be effective at rectifying the barrier (.32, $p<.001$,); 15% felt the request was not appropriate based on workplace norms (-.045, $p<.01$).

In addition to workplace policy and resource allocation, personal characteristics of deaf workers also affect the rate at which deaf workers use CMC. Austen and McGrath (2006) examined confidence among deaf professionals (n= 30) and hearing mental health professionals (n= 104) in using videoconferencing. A 1 to 10 Likert scale was used to measure levels of confidence in both professional and personal use of videoconferencing. No significant difference between the proportion of deaf and general services staff was found ($x^2(4, n=133) = 0.158, p= .691$). Similarly, deaf and hearing professionals showed no significant difference in level of confidence in using videoconferencing for professional reasons [t (121) =-0.455, p=. 650]. Saladin (2004) examined deaf worker's adoption of CMC in deaf-sector employment. Saladin examined the influence of personal characteristics on the likelihood of workers adopting video relay services at a school for the deaf. Saladin interviewed 75 (72.8%) deaf and 28 (27.2%) hard-of-hearing workers. Using a structure matrix outlining correlations between discriminate variables and standardized canonical discriminate functions, Saladin found participants who felt competent at their job (.816, p>.50), had high self-esteem (.755, p>.50), and who are characteristically adaptable to new situations (.636, p>.50) were all more likely to use CMC to perform their tasks. Those results are difficult to generalize to all types of CMC because that study only examined the use of video relay services, using a convenience sample from one location.

Summary

The review of literature on employment of deaf people shows high rates of employment and a trend away from underemployment that continued through most of the latter part of the 20th century. Deaf studies scholars have looked to both personal and societal characteristics to help explain employment trends of deaf people. Education, age of onset, literacy, and method of communication are associated with type of employment setting and choice of occupation. Societal variables including type of employment available to deaf people, federal civil rights legislation, avoidance of discrimination, and technology have an association with employment trends of deaf people.

This section provided a review of Alderfer's (1972) theory on motivation, which suggests that, despite using CMC in the general sector, deaf people may choose to work in the deaf sector over the general sector to maintain a sense of belonging and self-esteem. Alderfer theorized that motivation in employment stems from fulfillment of needs for existence, relatedness, and growth, which is the theoretical backdrop to this study exploring the effect of CMC on employment of deaf people. Alderfer's (1972) theory suggests that deaf people will seek employment in the sector that will satisfy basic needs attached to income, relatedness, and occupational growth. Deaf people might choose to enter general-sector employment over deaf-sector jobs if they believe that by doing so, they will fulfill their need for existence through adequate salary; feel a sense of relatedness with coworkers and supervisors; and experience job growth through increased responsibility, training, and promotions.

The 21st century, while enhancing the lives of deaf people in many respects, might also affect employment for deaf people in the coming years. Literacy requirements in the 21st-century service-based job market might pose new challenges to deaf people. Yet, video communication technology might be compensating for shortfalls in literacy and may offer a sufficient bridge in communication with hearing coworkers and customers in the general sector. Computer-mediated communication acts as a conduit for information and increases the sense of belonging to the deaf community, connection that deaf people used to gain only by attending deaf clubs and more recently, working in deaf-sector employment. This study investigated the association of CMC with employment characteristics of deaf people. Study results can augment disability policy, public policy, and Deaf Studies. The next section encompasses descriptions of the study design, the benefits of a Web survey, and the data analysis and verification procedures.

Section 3: Research Methodology

The purpose of the study was to examine the association between CMC and employment of deaf people. The first Section introduced the background and significance of the problem. Research questions addressing the problem were also presented in section one. The second section reviewed the literature related to the study, identifying several issues that might affect deaf people's employment such as type of sector, education background, and communication. Section three presents the research design, participant protection procedures, and a discussion of the methods of data analysis.

Research Design

For this quantitative study, the researcher used a Web survey to collect descriptive data from a sample of employed deaf people. The purpose was to identify associations between CMC (independent variable), the nature of employment (dependent variable), and job satisfaction (dependent variable). The study included an examination of demographic data for association with CMC. The research design was a Web survey. Surveys allow researchers to gather data and examine associations between variables in a controlled way (Glicken, 2003, p. 139). Sample surveys help investigators monitor trends in society and test theoretical understanding of social and social psychological phenomena (Rossi, Wright, & Anderson, 1983). Surveys are also useful for describing large populations and explaining social events (Babbie, 2004, p. 277).

Traditional approaches to studying deaf people are limited to mail surveys, interview surveys, and qualitative studies. Each of those methods present challenges to

studying people who are deaf and hard-of-hearing in the 21st century. Mail surveys generally yield poor response rates (Fink & Kosecoff, 1985) and have not shown high response rates among deaf people in particular (Foster, 2004; Gallaudet University, 2007; Trochim, 2005). Low literacy rates, reliance on ASL, and general mistrust of hearing researchers might contribute to poor response rates to mail surveys among deaf people (Bowe, 2002; Foster, 2004; Geyer & Schroedel, 1998; Lipton, Goldstein, Fahnbulleh, & Gertz, 1996; Terzian & Saari, 1982; Tigh, 1994). Alternatively, researchers in deaf studies have used interview surveys to gather demographic data about the deaf population (Crammatte, 1968; Geyer & Schroedel, 1998; Klein, 1988b; Lipton & Goldstein, 1997; Lunde & Bigman, 1959; Pollock, 1993; Schein & Delk, 1974; Winn, 2006). Interview surveys often involved field agents to administer the questionnaire. That approach poses concerns about the reliability of the data.

Cultural and technological changes present new opportunities for using self-administered Web surveys (Dillman, 2007, p. 9). In schools throughout the country, and at all ages, students are exposed to deaf studies. The opportunity for hearing people to communicate in ASL and learn about deaf culture might help to address misconceptions about deaf people's ability to contribute to society. Likewise, being a witness to hearing people's attempt to learn about deaf culture may reduce guardedness on the part of deaf people who have learned to mistrust hearing people. Greater access to closed captioning, access to mainstream education, and the use of computer-mediated technology to deliver

information in American Sign Language and English simultaneously may improve literacy among deaf people.

Video technology enables one to conduct an interview survey over the phone just as phone surveys are conducted with hearing people. However, the disadvantages of a phone survey are present regardless of whether one is surveying deaf or hearing people. Phone surveys have to be short in duration or risk intrusiveness and invalid data (Trochim, 2005, p.94). Some people do not have listed phone numbers; and many find phone surveys intrusive. Like landline and cell phones, videophone numbers are proprietary and many people secure their phone lines by exercising their right to place their phone number on a "do not call" registry, which automatically blocks callers without permission to call.

Technology allows researchers to replace interview surveys, automated phone surveys, and mail surveys with Web surveys. Interactive survey technology increases the amount of data collected and enhances the validity and reliability of the data (Bowe, 2002; Lipton, Goldstein, Fahnbulleh, & Gertz, 1996; Terzian & Saari, 1982; Tigh, 1994). A Web survey can minimize the amount of missing data if it is designed so that each element must be completed before one can submit the entire survey.

There are several other benefits to using a Web survey. Smart phones enable people to easily respond to the survey when they are away from their desktops. The time it takes for a respondent to send data to a researcher is relatively short. A Web survey is efficient at maintaining the anonymity of the respondent. There is little cost to using a

Web survey other than a computer and Internet access. Most people enjoy access to the Web, although for some, the access is limited. Many Web survey programs are compatible with existing statistics software or have software bundled into the survey engine. Web surveys allow consistent administration of the survey, leaving little room for administrator error (Trochim, 2005, p.93). These qualities all make Web surveys attractive to researchers (Dillman, 2007, p.352). However, a Web survey also carries potential risks. Many Internet services rely on a Web survey to gather demographic information about their subscribers. Growing weary of Internet advertisements and unsolicited surveys, people may begin screening out the survey advertisements and other low priority email from their system. Some potential recipients may not have access to surveys because software contains safety protocols, which can isolate survey announcements as junk email. People differ in their preference for Internet browsers, and although all access the Internet, they do not all accommodate the various survey software. The ability to require participants to answer each question before moving on to the next question might conflict with the right of participants to decide not to answer a particular question and may pose challenges in seeking institutional review board (IRB) approval (Dillman, 2007). The Walden University IRB approved this research # 394492. This same characteristic of a Web survey design might cause respondents to withdraw from the survey prematurely.

Participants

Study participants were deaf adults at least the age of 18 working in the United States or one of the territories; and employed or self-employed, either full or part time, when they responded to the Web survey. The study was divided into two phases. Phase I consisted of a three-step pretest process that involved pilot testing the questionnaire for validity, reliability, format, and comprehension. Phase I also examined the study delivery method, data collection, and data analysis (Dillman, 2007). Phase II involved delivering the survey to deaf and hard-of-hearing people across the United States and collecting the data.

In Phase I, two purposeful samples were used to pretest the questionnaire and one additional purposeful sample to pilot test the instrument and report back to the researcher any questions or concerns about the instrument and its administration. Professional and personal relationships between the researcher and members of the deaf community were the basis for inviting members of the deaf community to participate in the pretest and pilot study. The study researcher has worked in deaf social service agencies for the past 15 years and at Gallaudet University for the past 7 years. The sample was diverse in gender, hearing loss, ethnicity, occupation, employment sector, education, and employment status.

Phase II of the study consisted of distributing the survey to the deaf community throughout the United States. The researcher advertised the survey in two waves. Wave I included advertisements placed with various online newspapers geared to the deaf

community weekly for two months. These included Deafdigest (51,000 subscribers),Deaf Times (60,000+ subscribers), and Deaf Weekly (11,000 subscribers). Wave II consisted of two months of advertisements of the study through several organizations for the deaf including Deaf and Hard-of-Hearing in Government, Association of Deaf and Rehabilitation Agencies (Maryland State Commission for the Deaf and Hard-of-hearing, District of Columbia Association for the Deaf, Gallaudet University Alumni News (3,200 subscribers), and DeafNetwork.com. The study researcher contacted other organizations and they declined to advertise the study. One in particular, the National Association of the Deaf, originally agreed to assist with advertising the study (see Appendix I), but the researcher was unsuccessful at contacting the agency once the second wave was ready to launch. Each wave advertised the study with an electronic link to the survey website to assure that potential respondents had received the electronic newsletters and newspapers advertising this study and to allow enough time for deaf people to access the website hosting the survey. Advertisement in public internet newspapers required advertisement fees (see Appendix J). Advertisement in the Deaf and Hard of Hearing in government did not charge a fee for advertising the study in their organization (see Appendix L).

Sampling Size

This researcher found no agreed upon formula to determine the number of pilot-study participants needed. Earlier studies vary in the number of pilot study participants used, ranging from two (Wolf, 2007) to several hundred (Dillman, 2007). Crammatte

(1987) used a convenience sample of 50 deaf and hard-of-hearing people. Fink and Kosecoff (1985, p.42) do not prescribe a specific number of pilot-test participants but suggest that one try to get as many as possible. The pretest used two purposeful samples of six people and the pilot test used a purposive sample of six people because these samples are in line with the recommendations for pre- and pilot testing by Dillman (2007). Phase II of the study used a convenience sample of the deaf and hard-of-hearing populations. Estimating the sample size is difficult because there are no reliable calculations for the number of deaf or hard-of-hearing adults in the United States. One reason for the lack of a reliable sample estimate is that national data use several different constructs to identify people with hearing loss, including hard-of-hearing, sensory impaired, hearing loss, hearing impaired, deaf, and Deaf. National census data use these terms interchangeably and often do not make distinctions among them. The online statistical software program Raosoft (www. Raosoft.com) yielded an expected sample size of 377 respondents given a margin of error of .5%, a 95% confidence level, and a population size of 20,000 or greater. The researcher was able to collect 335 usable responses for the study.

Compensation

Participants were not compensated for taking part in either Phase I, which involved pretest and pilot testing the Web survey or Phase II, which involved collecting data from the sample. To take part in the study, participants had to acknowledge their understanding that they would not receive compensation for their participation and that

their participation was voluntary. They did so by checking the appropriate box on the introduction page of the Web survey.

Survey Dissemination

The study posted an advertisement for the Web survey on several websites frequented by deaf people (see Appendix C). Advertisements were in English and were designed to create interest in the study (see Appendix F). The advertisement explained the purpose of the study and the confidentiality policy guiding the study (see Appendix G). Advertisements for the study contained a link to Survey Monkey (surveymonkey.com) which maintained the survey. Upon entering the Survey Monkey website, participants again read a brief description of the study, a confidentiality statement, a list of potential risks, and researcher contact information.

After viewing the confidentiality statement, participants were directed to a question on the consent form that asked whether the participant fully understood and agreed to participate in the study. If the participant clicked the button "Yes, I consent to participate in this survey" and then clicked "Next," the first question on the survey immediately appeared. If the person chose not to participate and clicked "no," Survey Monkey immediately took that respondent to the last item on the survey that thanked the person for considering participating in the study and provided contact information for study results. Whether to agree to participate was the only compulsory question in the survey; this was designed to ensure that people who did not consent to participate were

not included in the study. Participants were able to withdraw at any point during the survey.

Study participants read each question and clicked their choice of responses using their computer mouse. Participants were able to navigate back and forth through the questionnaire. Each participant was only able to submit one finished survey from each Internet protocol address. Survey Monkey has the capability of matching IP addresses and questionnaire submissions to assure against double submissions. On completing the survey, respondents received a statement of appreciation and were given contact information if they were interested in the study results.

Measures

The Web survey comprises 11 pages. The first page provided an introduction to the study which includes information about the researcher, the purpose of the study, risk and benefits of participation, compensation policy, confidentiality statement, and contact information. The second page described the survey procedure. The third page provided a statement of consent to participate in the study and asked participants to acknowledge that they understand and agree to consent. On that page, participants read the consent statement and were asked whether they consent to participate in this study. Participants were given a choice between two statements, “Yes, I consent to participate in this survey” and “No, I choose not to participate.” Persons marking the first statement were taken to the questionnaire. The fourth page included questions about employment characteristics. Questions about communication at work made up the fifth and sixth pages. The study

asked participants whether they work with hearing coworkers in a logic-based design, so that if the answer was "yes" participants were automatically guided to a question about communication with hearing coworkers. If participants clicked "no," signifying not having hearing coworkers, the questionnaire guided them to a similar question asking if the participants had deaf coworkers. Once they answered the question about coworkers' hearing status, they were asked a series of questions about communication between them and their coworkers. Page seven included questions about technology in the workplace; questions about job satisfaction made up page eight of the questionnaire. Page nine contained questions about the social community with which they were involved outside of work. Like demographics, aspects of respondents' social relationships might also prove to be associated with CMC and choice of job sector. Page 10 had questions about participants' education and page 11 presented questions about participants' demographics. Lastly, the study included a statement of appreciation on page 12, with contact information if the participant wished to discuss the study results. Page 13 contained a list of follow-up questions designed for pretest participants, but which were not included in the actual survey administered to the deaf community.

Instrument

The Deaf Employment and Technology Survey (DETS) was created for this study to collect information about deaf people's use of technology in the workplace, communication preferences, job characteristics, and demographics. With copyright permission (see Appendix H), this study incorporated questions asked of deaf and hard-

of-hearing people in the Professional Employment Questionnaire (Crammatte, 1987). The instrument also incorporated questions from a survey recently administered by the Deaf and Hard of Hearing in government organization (see Appendix K).

Instrument Reliability and Validity

A reliable survey is one that "will provide a consistent measure of variable characteristics despite background fluctuations" (Fink & Kosecoff, 1985, p. 48). Validity is determined by the degree to which the measure matches the construct under examination. A measure is invalid if it produces data unrelated to the construct under examination (Neuman, 2004, p.117). Because the DETS survey was created for this study, there are no preexisting peer-reviewed reliability or validation studies on the DETS in its entirety (see Appendix E). However, this study adopted items from Crammatte's (1987) survey, for which he had performed a pilot study and made corrections. However, this researcher could not find in the literature any discussion of the exact nature of those changes.

Alderfer examined the constructs of existence, relatedness, and growth with the primarily concern of whether those constructs could be measured objectively. According to Alderfer (1972), ". . . the first step in testing hypotheses from a theory is to see whether the variables defined conceptually can be measured operationally" (p. 71). Alderfer tested the validity of his instrument by comparing the convergent and discriminate validity, which he measured by referring to coefficients obtained between different methods used to measure the same traits (p.73). Alderfer also tested the validity of the questionnaire by

examining correlations between different measures of similar traits. In determining whether those items met the criteria for validity, Alderfer asked three questions. First, were correlates greater than those between two different measures for different traits? Second, were correlates greater than the correlates of the same method testing two different traits? Third, was the direction of correlation similar between methods? Criterion one and two adequately supported the use of his instrument, but Alderfer was not confident that the instrument met criterion three.

Alderfer's theory on motivation in the workplace addresses three constructs. Alderfer described existence as physiological and material safety; relatedness as safe relationships and esteem from others; and growth as the product of stimuli from a person's environment to develop certain abilities and opportunities to use certain capacities (Alderfer, 1972, p. 11). The Deaf Employment and Technology Survey measures the construct of existence by asking participants to list their salary. DETS measures relatedness in the workplace by asking whether respondents feel safe against discrimination based on their hearing loss and whether respondents socialize with coworkers about things other than work. A detailed list of questions and the concepts they measure can be found in Appendix E. To determine survey reliability and validity of the DETS, the instrument was tested in two phases (see Dillman, 2007).

Pretest

The researcher used a purposive sample to assess the validity of the survey items (see Dillman, 2007). The study obtained expert advice on the substantive content of the

survey. This group of participants comprised six colleagues from various disciplines at Gallaudet University and known in Deaf studies. Specific disciplines represented by this group included linguistics, sociology, social work, psychology, business, and Deaf studies. This group was asked to comment on the clarity of the questions, whether the choice of responses were exhaustive, whether the purpose of each question was salient; the group was also asked to make any recommendations to ensure understanding of the questions by the general deaf and hard-of-hearing population. Participants were also asked to comment on the degree that subsections of the survey reflected the research questions. To a large extent, this group recommended shortening the questions, correcting for ambiguity, and ridding the survey of redundancy. Participants also suggested making the choice of responses more exclusive from one another.

Pilot Test

Changes were made to the survey based on the feedback from the pretest. Prior to pilot testing the revised survey, the researcher examined the survey access through different Web search engines (Netscape, Firefox, Internet Explorer, Google, and Safari). The study researcher consulted with an information technology staff member at Gallaudet University for this aspect of the pilot study. The staff member, who is deaf, was asked to participate in the pilot study because of his expertise in computer and graphic design, as well as survey and Web technology. The survey was found to be accessible through all five search engines listed above. The consultant also confirmed that administering the

survey through email lists from respected organizations and through e-news advertisements would reduce the risk of it being identified as "spam" and subsequently blocked from people's view.

The researcher then pilot tested the survey by requesting 10 people to take it online (see Appendix B). Pilot test participants read the advertisement, accessed the survey via the online link, and completed the survey. Originally, the researcher was to be present while this group of participants took the survey. They were going to be asked to think out loud while taking the survey so the researcher could interview each member to find out how the questions were interpreted and whether the intent of each question was salient (Dillman, p. 142). The researcher thought that choosing all second-phase participants for interviews would have been limiting to the extent that participants would have been from the DC metropolitan area and might not have represented other groups within the U.S. deaf population in education, literacy, occupation, and ethnicity. Two pilot study participants who live near the researcher were chosen for interviews. The Web survey was modified to include a section under each question in which pilot-study participants could write comments or questions about the question and choice of responses. Instructions were also provided to all second-phase participants asking them to write down any thoughts that immediately entered their minds as they proceeded through the survey. The pilot test version of the survey was administered to eight participants who resided throughout the United States.

The study also used a retrospective approach (see Dillman, p. 144) by asking all 16 pilot-study participants to comment on the length of the survey, clarity of the questions, length of time it took to complete the survey, whether any question was uncomfortable to answer, whether the purpose of each question was clear, and whether the participant remained interested in the survey until its completion. Pilot-study participants were also asked for suggestions as to how best to reach the Deaf population to advertise the study and any other comments they may have about the study and the survey.

Pilot Test Results

One participant recommended that since the study was examining technology and its relationship to employment, that availability of technology be an item in examining the importance of items when looking for a job. Question #33 was modified by adding "availability of communication technology." Question #34, which asked if the participant felt discriminated against, was adjusted at the recommendation that the study add the phrase "because of my hearing loss." The rationale was that "more participants might identify with that phrasing" and the study might gather more accurate datum on this item. The change in phrasing also articulates the intent of the question, which is to ascertain the relationship between experience with discrimination and job sector. The researcher also added question # 35, which concerns self-employed participants and whether they felt discriminated against because of their hearing loss. The study included this question to examine a relationship between feeling discriminated against and choice of job sector in

which to do business. A pilot-study participant also suggested splitting question #37 into two, one asking about preference for communicating with d/Deaf friends and one about preference for communicating with hard-of-hearing or hearing friends. The rationale was that splitting the questions would help gather more accurate information since to just ask about communicating with "friends" was ambiguous and might not reflect the extent of deaf people's social integration. Another recommendation was to change the phrase *ASL and voice* to *ASL and call sign language with voice "SYMCOM*." The reason being that ASL does not allow for the simultaneous use of voice since the grammatical structures of English and ASL are different. Participants also suggested changing question #48, which asks for racial identity, to include Arabic and Biracial. Changes were made to be more inclusive. A category of "other" remained where participants could type in a response not already provided in the list of responses.

Analyses of Data

The study examined the relationship between CMC and its association with employment of deaf people. The study used parametric tests for examining whether a relationship exists between communication technology and employment characteristics of deaf people.

Parametric statistics were used to examine the sample of currently employed deaf people in the United States who share characteristics with the deaf population. Researchers use parametric statistics when "making inferences from a large sample that is more than 30 to a population, and when repeated samples produce values that

approximate the shape of a normal curve"(Salkind, 2000, pg. 150). According to Salkind, use of parametric analysis relies on knowing that a variable is normally distributed. The researcher had no reason to believe that a normal distribution did not exist among the sample and with the variables examined for an association with CMC and employment. Sample size is also a consideration when deciding between using parametric or nonparametric tests. Salkind recommended using parametric tests with "samples of 30 or more" (p. 150). The response rate to the survey was greater than 190 for each of the variables. Population parameters were not established and a nonrandom sample was used. However, the researcher was able run frequency statistics on demographic information, examine the data for correlations, and use multivariate linear analysis to examine the effect CMC has on job satisfaction.

The researcher used Survey Monkey to collect data and assign numerical values to nominal answers. The researcher downloaded data into an Excel format and placed it in the Statistical Package for the Social Sciences for statistical analysis (SPSS©, graduate Pack, version 16.0). Descriptive statistics allowed for the organization of data in categories and description of the dataset characteristics (Salkind, 2000, p.8). Analysis of descriptive data involved descriptive statistics (mean, standard deviation, and frequencies) using Likert-scale responses.

Human Subjects Rights

The study protected the rights of participants in a number of ways. First, being Web-based, the study did not infringe upon the privacy rights of deaf and hard-of-hearing

people by pushing the survey onto them through email, or by forcing Web subscribers to take the survey prior to entering their chosen website. Instead, the study advertised the survey in various website pages and Web newspapers so that deaf and hard-of-hearing people would have the opportunity to decline participation. Second, the study did not ask for identifying information such as address, Internet protocol number, place of residence, or employment. Since the deaf community is relatively small and close in social proximity, categories that would normally allow easy identification in the deaf community, such as specific description of a job, are categorized broadly enough as to guard against identification. Few deaf people are stockbrokers, so if that was a specific choice, it might be simple to identify the person. By asking only if the person is in financial services, the study guards against identification. Third, the study made participants aware of their rights in participating and the right to confidentiality. The study contained instructions for completing the questionnaire at the beginning of the survey in an appropriate literacy level for a population for who many English is a second language. That measure was taken not only for reliability, but also to assure that participants did not feel frustrated or harbor other negative feelings while completing the survey. Further, the study provided information so that participants could contact the researcher through email, videophone, or through a video relay interpreter at any point during or after the study with any questions or concerns they may have about the study or its data.

Section Four presents the findings from the study and statistical analysis of those findings. Section Five discusses those finding related to the purpose of the study, the implications of the study results for social policy, and programming for deaf people seeking employment.

Section 4: Results

Introduction

This study was conducted to ascertain whether computer mediated communication(CMC) has an effect on deaf people's choice of job sector, to test the ability of Alderfers' (1972) theory on motivation in explaining study results, and to gather demographic information on deaf workers in the United States. This chapter analyzes data collected through questionnaire responses from the DETS, which was distributed to deaf people in the United States and its territories. The data are discussed in four sections: (a) study sample characteristics, (b) research questions, (c) limitations of the study, and (d) summary.

Study Sample Characteristics

Study participants were sought in two waves. The first wave produced 274 responses and involved advertising the study through online newspapers for the deaf. The second wave, which produced 79 additional responses, involved advertising through websites, simple syndication feeds, organization email, and online news advertisements. Respondents were sent a questionnaire which began with a question regarding consent to participate. Of the 343 people who started the survey, nine declined to participate once they began. Participants were permitted to skip questions, which resulted in an inconsistent number of responses in all sections of the questionnaire. The instrument was divided into eight sections: employment, communication with hearing coworkers, communication with deaf coworkers, technology, job satisfaction, social, education, and personal characteristics.

The study used data from 343 respondents with different number of respondents among the variables. Most of the participants are between 50 and 59 years old (Figure 1).

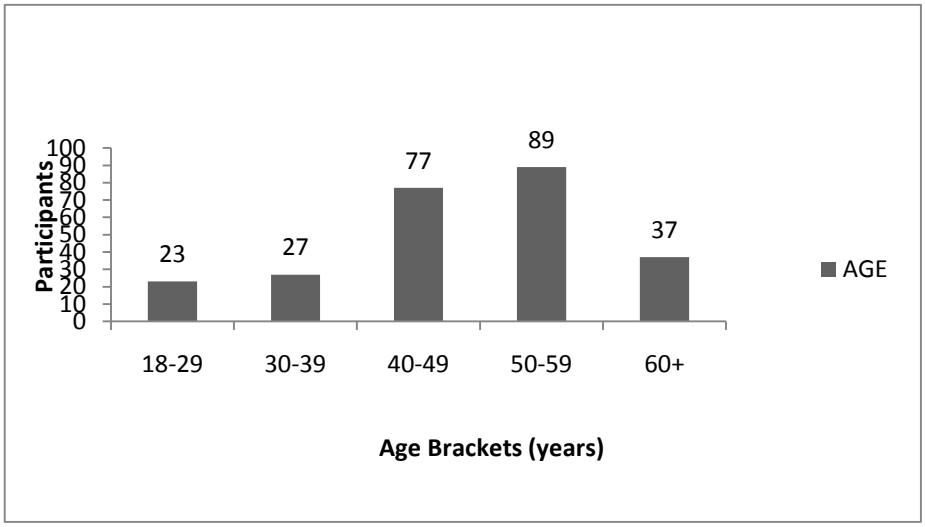

Figure 1. Age of respondents (years) with specific age ranges compiled into age brackets by number of participants (*n*).

As Table 1 shows, most of the respondents (75%) consider themselves deaf, 22% identify as hard-of-hearing, and seven participants (2.7%) identify neither as deaf nor hard-of-hearing (*n*=257). A majority (42.4%) hard-of-hearing participants report their hearing loss was first noticed after they were 6 years old. Forty-three percent were born deaf (*n*=198). Literacy requirements in the 21st-century service-based job market might pose new challenges to employment of deaf people. Crammatte (1987) showed those who lost hearing after age 6 were more likely to read and write on grade level than those born deaf.

Table 1

Participant Characteristics by Identity

Characteristics	Identity					
	Hard-of-hearing		Deaf		Total	
	n	%	*n*	%	*n*	%
Gender						
Female	*(41)*	*69.5*	(109)	55.1	(150)	58.4
Male	(18)	30.5	(89)	14.9	(107)	41.6
Total	(59)	100	(198)	100	(257)	100
Hearing loss						
Less than severe	(16)	21.1	(6)	3.1	(22)	8.6
Severe	(28)	47.5	(35)	17.9	(63)	24.7
Profound	*(12)*	*20.3*	(147)	75.0	(159)	62.4
Unknown	(3)	5.1	(8)	4.1	(11)	9.2
Total	(58)	100	(196)	100	(254)	100
Culture						
White	(49)	84.5	(183)	93.4	(232)	91.3
Black or African American	(4)	6	(2)	1.0	(6)	2.4
American Indian	(2)	3.4	(2)	.5	(3)	1.2
Asian	—	—	(3)	1.5	(3)	1.2
Hispanic	(2)	3.4	(3)	1.5	(5)	2.0
Arab	(1)	1.7	(2)	1.0	(3)	1.2
Biracial	—	—	(2)	1.0	(2)	.8
Other	(1)	1.7	(3)	1.2	(4)	1.3
Total	(58)	100	(196)	100	(254)	100
Age at which hearing loss discovered						
Born deaf	(13)	22.0	(86)	43.4	(99)	38.5
Less than a year	(5)	8.5	(24)	12.1	(29)	11.3
Between 1-3	(6)	102	(4)	23.7	(53)	20.6
Between 3-6	(7)	11.9	(1)	8.6	(24)	9.3
Over 6 years old	(25)	42.4	(22)	11.1	(47)	18.3
Unknown	(3)	5.1	(2)	1.0	(5)	1.9
Total	(53)	100	(198)	100	(257)	100

Education

Deaf people seek higher education to be competitive with their hearing counterparts. Crammatte (1987) studied deaf and hard-of-hearing professionals and found that deaf managers are more likely to earn an advanced degree than hearing managers. Pressman (1999) concluded that deaf business owners were more likely to seek an advanced degree than were hearing business owners. Public education, the labor market, and the economy all changed since 1987 and this study examined the relationship between CMC and education in influencing how deaf workers participate in the labor force.

Table 2

Percent of Respondents Who Recorded the Highest Degree Earned

	Skipped		Deaf		Hard-of -hearing		Not deaf or hard-of- hearing		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped this question	(73)	21.2	-	-	-	-	-	-	(73)	21.2
Doctorate	-	-	(4)	1.2	(4)	1.2	(1)	.3	(9)	2.9
Graduate degree	(2)	.6	(71)	20.6	(27)	7.8	(5)	1.5	(105)	30.5
Post-masters study	(1)	.3	(22)	6.4	(2)	.6	(0)	0	(25)	7.3
Undergraduate	-	-	(69)	20.1	(11)	3.2	-	-	(80)	23.3
Some college	(2)	.6	(28)	8.1	(14)	4.1	(1)	.3	(45)	13.1
High school diploma or GED	(1)	.3	(3)	.9	(1)	.3	-	-	(5)	1.5
Less than high school or GED	-	-	1	.3	-	-	-	-	(1)	1
Total	(79)	23	(198)	57.6	(59)	17.2	(7)	2.0	(343)	100

Note. Included in this chart are the number and percent of respondents who skipped this question.

The type of school a deaf child attends for primary and secondary education is a characteristic of a culturally deaf person (Padden & Humphreys, 1988). Table 3 shows that 35.1% (92) of deaf respondents attended a school for the deaf for elementary school

and 20.6% (54) attended a mainstream program with other deaf children (n=196). This table also shows that 33% (86) of deaf respondents attended a school for the deaf for middle school and 16.1% (42) attended a mainstream school with other deaf children. Respondents gravitated toward schools for the deaf for high school, with 37% (97) attending high schools for the deaf (n=196). The desire among adolescents to attend a culturally sensitive school for the deaf can be explained by a deaf adolescent's need to be a member of a peer group in which one can freely communicate as well as an awareness that a deaf community and culture exists separate from the general population.

Table 3

Percent of Deaf and Hard-of-Hearing Students by Education Setting Through Secondary Education

		Type of school											
School		School for the deaf		Mainstream with deaf students		Mainstream without deaf students		Home school		None of the above		Total	
Elementary		*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Hearing Status	Not deaf or hard-of-hearing	-	-	(1)	0.4	(5)	1.9	-	-	(1)	0.4	(7)	2.7
	Hard-of-hearing	(6)	2.3	(14)	5.3	(38)	15.5	-	-	(1)	0.4	(59)	22.5
	Deaf	(92)	35.1	(54)	20.6	(41)	15.6	(3)	1.1	(6)	2.3	(196)	74.8
	Total	(98)	37.4	(69)	26.3	(84)	32.1	(3)	1.1	(8)	3.1	(262)	100
Middle													
Hearing Status	Not deaf or hard-of-hearing	-	-	(3)	1.1	(3)	1.1	-	-	(1)	0.4	(7)	2.7
	Hard-of-hearing	(9)	3.4	(9)	3.4	(40)	15.3	-	-	(1)	0.4	(59)	22.6
	Deaf	(86)	33	(42)	16.1	(59)	22.6	(1)	.4	(7)	2.7	(195)	74.7
	Total	(95)	36.4	(54)	20.7	(102)	39.1	(1)	.4	(9)	3.4	(261)	100
High													
Hearing Status	Not deaf or hard-of-hearing	-	-	(4)	1.5	(2)	.8	-	-	(1)	.4	(7)	2.7
	Hard-of-hearing	(9)	3.4	(10)	3.8	(39)	14.9	-	-	(1)	.4	(59)	22.5
	Deaf	(97)	37.0	(33)	12.6	(61)	23.3	(1)	.4	(4)	1.5	(196)	74.8
	Total	(106)	40.5	(47)	17.9	(102)	38.9	(1)	.4	(6)	2.3	(262)	100

The need to feel a sense of belonging continues into young adulthood for deaf college-bound students. There are only two university programs and one university for deaf and hard-of-hearing students in the country. The assumption in this study is that for college-bound students, the choice to attend those institutions reflects a desire to feel a sense of belonging that they would not feel at other universities or colleges. Pressman (1999) found that 48% of deaf professionals in her study attended a college or university for the deaf. This study examined postsecondary school choice as a means of determining the level of comfort deaf respondents have when receiving a college education in the general sector. Table 4 shows that most (9.1%) students obtaining or who earned an associate's degree attended schools for deaf and hard-of-hearing students *(n*=75). Of those who earned, or are in the process of earning, a bachelor's degree, 46.7% reported attending a college or university for the deaf (see Table 5). Table 6 shows that of the deaf participants who received a graduate degree, 20.7% (53) were enrolled at a hearing college with other deaf or hard-of-hearing students and 9.1% (24) are enrolled in schools for the Deaf *(n*=191). These results can be explained in two ways. First, there may be a scarcity of graduate degrees offered in the three higher education institutions for the deaf in the United States. Second, as deaf students mature through their undergraduate years, they may feel more confident attending a graduate program in the general sector.

Table 4

Percent with Associate Degree by Degree of Hearing Loss and Type of School

	Associate degree									
Hearing status	Mainstream with other deaf students		Mainstream without other deaf students		School for the deaf		This question does not apply to me		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Not deaf or hard-of-hearing	3	(1.2)	-	-	0	-	3	(1.2)	6	(2.4)
Hard-of-hearing	8	(3.2)	10	(4.0)	1	(.4)	37	(14.6)	56	(22.1)
Deaf	36	(14.2)	16	(6.3)	23	(9.1)	116	(45.8)	191	(75.5)
Total	47	(18.6)	26	(10.3)	24	(9.5)	156	(61.7)	253	(100)

Note. A mainstream school is one that is primarily designed for the general population and accommodations are provided for students with disabilities.

Table 5

Percent with Bachelor Degree by Degree of Hearing Loss and Type of School

	Bachelor degree									
Hearing status	Mainstream with deaf students		Mainstream without deaf students		School for the deaf		Does not apply		Total	
	n	%	*n*	%	*n*	%	*n*	%	*N*	%
Not deaf or hard-of-hearing	3	(1.2)	–	–	–	–	3	(1.2)	6	(2.3)
Hard-of-hearing	9	(3.5)	17	(6.5)	13	(5.0)	20	(7.7)	59	(22.7)
Deaf	51	(19.5)	20	(7.7)	91	(35.0)	33	(12.7)	195	(75.0)
Total	63	(24.2)	37	(14.2)	104	(40.0)	56	(21.5)	260	(100)

Table 6

Percent with a Graduate Degree by Degree of Hearing Loss and Type of School

	Graduate degree									
Status	Mainstream with other deaf students		Mainstream without other deaf students		School for the deaf		Question does not apply to me		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Not deaf or hard-of-hearing	2	(.8)	3	(1.2)	-	-	2	(.8)	7	(2.7)
Hard-of-hearing	15	(5.9)	14	(5.5)	5	(2.0)	24	(9.4)	58	(22.7)
Deaf	53	(20.7)	31	(12.1)	24	(9.4)	83	(32.4)	191	(74.6)
Total	70	(27.3)	48	(18.8)	29	(11.3)	109	(42.6)	256	(100)

Note. A mainstream school accommodates students with disabilities.

Employment Characteristics

The trend in employment of deaf people shows that, as a community, deaf people are finding white-collar employment (Crammatte, 1987; Michael, 1999; Pressman, 1999; Schroedel & Geyer, 2000). This study explored whether employment characteristics for deaf people changed as the labor market became reliant on service industries. The degree to which one has hearing loss does not impede one's ability to achieve gainful employment. Table 7 shows that 70.3% (207) respondents work full time. Just under a half (49.4%) were profoundly deaf or had 90 decibel loss or more *(n*=129).

Table 7

Hours Worked by Level of Hearing Loss

	Extent of hearing loss									
	>70db		71-90db		90db<		Unknown		Total	
Job Type	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped	2	(.8)	4	(1.5)	7	(2.7)	-	-	13	(5.0)
Contractual	2	(.8)	2	(.8)	7	(2.7)	-	-	11	(4.2)
Part-time temp										
Part-time	2	(.8)	7	(2.7)	17	(6.5)	2	(.8)	28	(10.7)
Full-time tem	-	-	-	-	2	(.8)	-	-	2	(.8)
Full-time	16	(6.1)	49	(18.8)	129	(49.4)	13	(5.0)	207	(70.3)
Total	22	(8.4)	62	(23.8)	162	(62.1)	15	(5.7)	261	(100)

Note. Job type is defined by schedule of hours worked. >70db is classified as less than severe, 71- 90 db is severe; and 90db < is considered profound hearing loss.

The deaf community is characterized by members who have both a community cultural identity as a deaf person in addition to an audiological condition (Higgins & Nash, 1987). Since this study examined how CMC affects a deaf person's sense of belonging in the general sector, it was important to gather information that describes employment of culturally deaf participants. Table 8 shows that over half (58.8%) of the respondents who identified themselves as deaf work full time *(n*=207). Table 9 shows that the most frequently reported employer for both deaf (20.6%, *n*=198) and hard-of-hearing (8.4%, *n*=59) respondents is government (federal, state, or local) and excludes state schools. Table 10 shows that 20.1% of the deaf respondents earn an annual salary between $40,000 and $59,000. Twenty-two percent of deaf respondents earn up to $39,000 and 14.8% earn above $60,000.

Table 11 shows that the most frequently reported career for deaf respondents *(n*=198) is education (14.8%), second is community or social services (7.8%), and third is business or finance (7.3%).

Table 8

Identity by Hours Spent Working

	Hours spent working											
	Contract work		Part-time temp		Part-time		Full-time temp		Full-time		Total	
Identity	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Not deaf or hard-of-hearing	-	-	-	-	-	-	-	-	7	(2.7)	7	(2.7)
Hard-of-hearing	3	(1.1)	1	(.4)	7	(2.7)	-	-	48	(18.3)	59	(22.5)
Deaf	10	(3.8)	10	(3.8)	20	(7.6)	2	(.8)	154	(58.8)	196	(74.8)
Total	13	(5.0)	11	(4.2)	27	(10.3)	2	(.8)	209	(79.8)	262	(100)

Note. Contract work includes hours that change from week to week, full-time is 35 or more hours per week, full-time temp has a specific end date at 35 hours or more a week, part-time is under 35 hours a week and part-time temp is less than 35 hours a week with a specific end date.

Table 9

Identity by Type of Employer

	Identity									
	Skipped		Deaf		Hard-of-hearing		Not deaf or hard-of-hearing		Total	
Employer	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped	(50)	14.5	(2)	.6	-	-	-	-	(52)	15.1
Non profit	(4)	1.2	(27)	13.8	(11)	3.2	(1)	.3	(66)	19.2
Government	(16)	4.7	(71)	39.2	(29)	8.4	(5)	1.5	(121)	35.2
Education	(4)	1.2	(50)	25.5	(6)	1.7	(1)	.3	(38)	11.0
Private business	(4)	1.2	(38)	19.4	(12)	3.5	-	-	(54)	15.7
Self employed	(1)	.3	(10)	5.1	(1)	.3	-	-	(12)	3.5
Total	(79)	23.0	(196)	57.6	(59)	17.2	(7)	2.0	(343)	100

Table 10

Annual Salary Reported in Percent by Identity

	Identity									
	Skipped		Deaf		Hard of- -hearing		Not deaf or hard-of -hearing		Total	
Annual Salary	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped question	(52)	15.1	(2)	.6	(1)	.3	-	-	(55)	16
Less than $20,000	(6)	1.7	(32)	9.3	(8)	2.3	-	-	(46)	13.4
Between $20,000 and 39,999	(5)	1.5	(44)	12.7	(19)	5.5	(2)	.6	(70)	20.3
Between $40,000 and 59,999	(7)	2.0	(69)	20.1	(19)	5.5	(3)	.9	(98)	28.4
Between $60,000 and 79,999	(6)	1.8	(22)	6.4	(6)	1.8	-	-	(34)	9.9
Between $80,000 and 99,999	(1)	.3	(17)	4.9	(2)	.6	(1)	.3	(21)	6.1
Over $100,000	(2)	.6	(12)	3.5	(4)	1.2	(1)	.3	(19)	5.5
Total	(79)	23.0	(198)	57.6	(59)	17.2	(7)	2.0	(343)	100

Table 11

Percent of Primary Job Category by Self-Identification

	Identity									
Primary job	Skipped		Deaf		Hard-of-hearing		Not deaf or hard-of-hearing		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped question	(53)	15.4	(12)	3.5	(5)	1.5	(1)	.3	(71)	20.6
Architecture and engineering	-	-	(7)	2.0	-	-	-	-	(7)	2.0
Arts, design, entertainment, sports, media	-	-	(4)	1.2	-	-	-	-	(4)	1.2
Business and financial Operations	(3)	9	(25)	7.3	(8)	2.3	-	-	(36)	10.5
Community and social services	(3)	9	(27)	7.8	(5)	1.5	(1)	.3	(36)	10.5
Computer and mathematical Sciences	-	-	(8)	2.3	(5)	1.5	-	-	(13)	3.8
Education	(4)	1.2	(51)	14.8	(13)	3.8	(1)	.3	(69)	20.1
Office and administrative Support	(1)	.3	(15)	4.4	(2)	.6	-	-	(18)	5.2
Production	(1)	.3	(7)	2.0	-	-	-	-	(8)	2.3
Rehabilitation	(9)	2.6	(19)	5.5	(13)	3.8	(4)	1.2	(45)	13.1
Total	(79)	23.0	(198)	57.6	(59)	17.2	(7)	2.0	(343)	100

In terms of salary and occupation, data show that little has changed since the United States moved from a manufacturing-based economy to a service-based one. Crammatte (1987) found that over 75% of deaf people earned between $10,000 and $30,000. Without adjusting for inflation, results of this study show that 20% of the respondents earn between $40,000 and $59,000 (see Table 10). Since education and government continue to be the primary employer of deaf people, government intervention, to a large extent, is required to maintain deaf people's involvement in the workforce.

Crammatte (1987) first divided the labor force into deaf and hearing sectors and found that most deaf people with profound hearing loss worked in the deaf sector. In order to examine whether deaf people work exclusively in the deaf community, this study

divided the job sector by hearing status of clients, customers, or students. If the respondent works exclusively with deaf customers, then the respondent is considered to be working in the deaf sector. Otherwise, the respondent is working in the general sector. Table 12 shows that 84% (288) of survey respondents work in the general sector and 78% of deaf respondents work in the general sector *(n*=198). The change in workforce participation from 1987 to 2009 can be explained in a number of ways. Dividing the study participants by those who identified themselves as deaf, 75% of deaf participants are profoundly deaf and 17.9% are severe to profound. Passage of the American with Disabilities Act of 1990 might have led to mainstream employment since it made it illegal to discriminate against disabled people. Social integration through young adulthood may have led to deaf people feeling more comfortable working in the general sector. Computer mediated communication might also have made it more feasible to communicate with hearing coworkers and customers.

Table 12

Percent of Deaf and Hard-of-hearing Workers by Sector of Employment

	Identity									
	Skipped		Deaf		Hard-of-hearing		Not deaf or hard-of-hearing		Total	
Job sector	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Skipped question	(52)	15.1	(3)	.9	-	-	-	-	(55)	16
Deaf people	(5)	1.5	(41)	11.9	(9)	2.6	(1)	.3	(56)	16.3
Hearing people	(8)	2.3	(67)	19.5	(19)	5.5	(2)	.6	(96)	27.9
Mostly deaf people	(2)	.6	(27)	7.8	(10)	2.9	-	-	(39)	11.3
Mostly hearing people	(9)	2.6	(50)	14.5	(17)	4.9	(2)	.6	(78)	22.7
Same number of deaf and hearing people	(3)	.9	(10)	2.9	(4)	1.2	(2)	.6	(19)	5.5
Total	(79)	23.0	(198)	57.6	(59)	17.2	(7)	2.0	(343)	100

Deaf people desire to work with each other. Participants were asked how important it is to have deaf coworkers? (See survey question # 33.) About 73% suggested that working with other deaf people was, at the very least, important to them. The finding suggests that ease of communication and a sense of belonging in the workplace ranked high among deaf workers in their rating of desired employment characteristics.

Table 13

Importance of Specific Characteristics Influencing Job Satisfaction

	Degree of importance							
Adds to job satisfaction	Very important		Important		Not important		Total	
Deaf respondents	%	*n*	%	*n*	%	*n*	index	*n*
Deaf coworkers	38.7	(75)	35.1	(68)	26.3	(51)	2.1.2	194
Hearing coworkers	10.6	(20)	50.9	(98)	37.6	(71)	1.73	189
Challenging tasks	49.2	(96)	45.6	(89)	5.1	(10)	2.53	195
Promotion	58.8	(114)	35.1	(68)	6.2	(12)	2.27	194
Benefits	84.2	(165)	15.8	(31)	0.0	(0)	2.76	196
Salary	78.5	(153)	20.5	(40)	1.0	(2)	2.77	195
Supervision	40.1	(77)	36.3	(89)	13.5	(26)	2.27	196
Technology	77.4	(151)	21.5	(42)	1.0	(2)	2.76	195

In the latter half of the 20th century, a shift away from skilled and semiskilled labor took place. Deaf people found jobs in government or serving deaf and hard-of-hearing people in social services and education. The Americans with Disabilities Act (1990) opened the door for deaf people to find mainstream employment outside of government. However, hearing loss and deafness remained a disability in the workplace as long as jobs depended on the ability to hear effectively. The ability of communication technology to overcome the barriers hearing loss once caused in the workplace was examined.

Research Question 1

People with various degrees of hearing loss would rely on different technologies to communicate with customers. This study examined the association between how CMC

associates with sector of employment. To answer this question this study examined how, and for what purpose, deaf people use technology in both sectors. Participants were asked how much they depend on each type of CMC to perform job responsibilities. Deaf-sector employment consists of only deaf consumers, clients, or students. General-sector employment includes three categories: deaf and hearing, mostly hearing, or all hearing customers or students. Participants were asked how much of their communication with consumers, coworkers, supervisors, friends, and family involves email, instant messaging, video relay services, video Internet relay interpreting, and direct video chat. Table 14 shows that most (85.4%) deaf respondents rated email as essential to their job responsibilities in the deaf sector (n=45) and an average of 81.0% of deaf respondents rated email as essential in the general sector (n=154). Table 14 also shows that deaf employees find email essential when working with hearing or deaf customers, clients, or students.

Table 14

Degree of Reliance on Email by Sector of Employment and Identity

	Hearing status of customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf		Mostly hearing		About the same number of each		Total	
Reliance	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Deaf												
Essential	(35)	85.4	(56)	83.6	(25)	92.6	(34)	68.0	(8)	80.0	(148)	76
Useful	(5)	12.2	(6)	9.0	(1)	3.7	(11)	22.0	(1)	10.0	(24)	12
No opinion	-	-	-	-	-	-	(1)	2.0	(1)	10.0	(2)	1
Not useful	(2)	2.4	(2)	3.0	(1)	3.7	(1)	2.0	-	-	(6)	3
Item not available	(3)	-	(3)	4.5	-	-	(3)	6.0	-	-	(9)	5
Total	(45)	100	(67)	100	(27)	100	(50)	100	(10)	100	(195)	100
Hard-of-hearing												
Essential	(8)	100	(14)	90.0	(12)	100	(12)	80	(4)	100	(51)	88
Useful	-	-	-	-	-	-	(2)	13	-	-	(2)	04
No opinion	-	-	-	-	-	-	(1)	07	-	-	(1)	02
Not useful	-	-	-	-	-	-	-	-	-	-		
Item not available	-	-	(1)	10.0	-	-	-	-	-	-	(1)	02
Total	(8)	100	(15)	100	(12)	100	(15)	100	(4)	100	(55)	100

Note. Total percent was rounded off to the nearest 1.0. For the purposes of this study, Deaf-sector employment involves only those customers, clients, or students who are deaf. General sector employment involves hearing consumers with or without deaf consumers.

The study also examined instant messaging services by sector of employment and the results show that 17% reported instant messaging as not useful (see Table 15). Table 15 also shows that 29% of the respondents did not have access to instant messaging in their jobs (*n*=41). Of those deaf respondents working in the general sector, 33% (33) reported instant messaging essential and 33% (39) useful in performing their daily responsibilities (*n*=146).

Table 15

Degree of Reliance on Instant Messaging by Sector of Employment and Identity

	Hearing status of customer, client, or students											
Reliance	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		About the same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Essential	(5)	12	(16)	24.2	(6)	23.1	(11)	26.0	-	-	(38)	20
Useful	(9)	22	(20)	30.3	(6)	23.1	(13)	26.0	-	-	(48)	25
No opinion	(8)	20	(2)	3.0	(2)	7.7	(6)	12.0	(2)	20.0	(18)	10
Not useful	(7)	17	(9)	13.6	(4)	15.4	(2)	4.0	(4)	50.0	(26)	14
Item not available	(12)	29	(19)	28.8	(8)	30.8	(18)	36.0	(2)	20.0	(59)	31
Total	(41)	100	(66)	100	(26)	100	(50)	100	(8)	100	(189)	100
Hard-of-hearing												
Essential	-	-	(2)	11.1	-	-	(1)	5.9	-	-	(2)	03
Useful	-	-	(3)	16.7	(4)	40.0	(4)	23.5	(1)	25.0	(12)	20
No opinion	-	-	(3)	16.7	(2)	20.0	(2)	11.8	(2)	11.8	(9)	15
Not useful	(1)	11.1	(1)	5.6	-	-	(2)	11.8	(1)	25.0	(5)	08
Item not available	(8)	88.9	(9)	50.0	(4)	40.0	(8)	47.1	(2)	50.0	(31)	53
Total	(9)	100	(18)	100	(8)	100	(17)	100	(6)	100	(59)	100

Note. Total percent is rounded off to the nearest 0.10. Identity refers to whether the participants consider themselves as deaf or hard-of-hearing.

Research Question 2

Studies show that deaf people rely on email and instant messaging for communication in employment and social settings (Bowe, et al., 2005; Hogg, Lomicky, & Weiner, 2008; Power, Power, & Rehling, 2007). Video communication is common and is used mostly for social interaction. Hearing people enjoy the novel features of video

communication. For deaf people, it allows for communication in ASL and maintains the cultural integrity of the deaf community in cyberspace. Video communication also allows deaf people to interact freely with hearing people using video interpreting. The greatest benefit of video relay is that deaf people are now easily understood as contrasted with the past, when they would have to type to communicate with hearing people. This study investigated whether deaf workers are inclined to work in the general sector as a result of video technology's existence. This section discusses the results of asking participants how they use CMC in general and deaf sectors.

Three types of video communication were examined in this study. The first is using a webcam to communicate directly in sign language with another deaf person. Second is video relay services in which a webcam or video is used to communicate with an interpreter, who in turn calls the hearing person. The third is VRI and uses the same technology for a deaf person to speak with a hearing person in the same room, office, or building.

Customers, Clients, Students

Tables 16, 17, and 18 show the results of asking deaf and hard-of-hearing workers how essential they believe the three types of video technology are in their jobs. Results suggest that video relay service notwithstanding, workers in the deaf sector benefit from video communications, but those in the hearing sector do not. Table 16 shows that 35% (14) of deaf people working in the deaf sector report a Web camera essential and useful. Forty deaf people (26%) working in the general sector reported the webcam/video as

being essential to perform their jobs.

Table 16

Degree of Reliance on Web/Video Communication by Sector of Employment

	Hearing status of customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		About the same number of each		Total	
Reliance	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Deaf												
Essential	(14)	35.0	(10)	.15	(14)	.52	(9)	.18	(6)	.60	(53)	.28
Useful	(11)	27.5	(8)	.12	(6)	.22	(11)	.22	(3)	.30	(39)	.20
No opinion	(4)	10.0	(8)	.12	(1)	.04	(7)	.15	-	-	(20)	.10
Not useful	(3)	7.5	(8)	.12	(2)	.07	(3)	.06	-	-	(16)	.08
Item not available	(8)	20.0	(31)	.48	(4)	.15	(19)	.39	(1)	.10	(63)	.33
Total	(40)	100	(65)	100	(27)	100	(49)	100	(10)	100	(191)	100
Hard-of-hearing												
Essential	(2)	22.2	(1)	.06	(4)	.44	(1)	.07	(2)	.50	(10)	.19
Useful	-	-	-	-	(3)	.33	(2)	.14	(1)	.25	(6)	.11
No opinion	(1)	11.1	(2)	.12	-	-	-	-	-	-	(3)	.06
Not useful	-	-	(2)	.12	-	-	-	-	-	-	(2)	.04
Item not available	(6)	66.7	(12)	.71	(2)	.22	(12)	.86	(1)	.25	(33)	.61
Total	(9)	100	(17)	100	(9)	100	(14)	100	(4)	100	(54)	100

Note. Total percent is rounded to the nearest 0.10.

Table 16 also shows that 48% of deaf participants (31) working with only hearing customers do not have access to a webcam or other video technology. Just under half (48%, *n*=197) of deaf respondents reported that video relay service is essential to perform their job responsibilities (see Table 17).

Table 17

Degree of Reliance on Video Relay Services by Sector of Employment

	Hearing status of customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		About the same number of each		Total	
Reliance	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Deaf												
Essential	(23)	.56	(22)	.33	(16)	.59	(25)	.50	(7)	.70	(93)	.48
Useful	(14)	.34	(11)	.16	(8)	.30	(10)	.20	(1)	.10	(44)	.23
No opinion	-	-	(5)	.07	(1)	.04	(3)	.06	-	-	(9)	.05
Not useful	(2)	.05	(5)	.07	(2)	.07	-	-	(1)	.10	(10)	.05
Item not available	(2)	.05	(24)	.36	-	-	(12)	.24	(1)	.10	(39)	.20
Total	(41)	100	(67)	100	(27)	100	(50)	100	(10)	100	(195)	100
Hard-of-hearing												
Essential	(4)	.44	(2)	.11	(5)	.5	-	-	(2)	.5	(13)	.22
Useful	-	-	(4)	.22	(5)	.5	(3)	.18	(1)	.25	(13)	.22
No opinion	(1)	.11	-	-	-	-	(4)	.24	-	-	(5)	.09
Not useful	-	-	(1)	.06	-	-	(1)	.06	-	-	(2)	.03
Item not available	(4)	.44	(11)	.61	-	-	(9)	.53	(1)	.25	(25)	.43
Total	(9)	100	(18)	100	(10)	100	(17)	100	(4)	100	(58)	100

Note. Percent is rounded to the nearest .10.

Seventy one percent of deaf workers in the general sector report that video relay is essential for the performance of job tasks (*n*=154). Asked how essential is VRI in their jobs, 59% (*n*=119) of deaf workers reported VRI is not available (see Table 18). Therefore, those workers are not able to ascertain its usefulness.

Table 18

Degree of Reliance on Video Remote Interpreting by Sector of Employment

	Hearing status customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		About the same number of each		Total	
Reliance	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Deaf												
Essential	(2)	5	(5)	8	(4)	15	(3)	6	(1)	10	(15)	8
Useful	(5)	12	(5)	8	(3)	11	(4)	8	(2)	20	(16)	8
No opinion	(6)	15	(4)	6	(7)	26	(9)	18	(3)	30	(29)	15
Not useful	(3)	7	(8)	12	(3)	11	(3)	6	(1)	10	(18)	9
Item not available	(25)	61	(44)	67	(10)	37	(31)	62	(3)	30	(113)	59
Total	(41)	100	(66)	100	(27)	100	(50)	100	(10)	100	(191)	100
Hard-of-hearing												
Essential	(1)	10	-	-	-	-	(1)	5	-	-	(2)	3
Useful	-	_	(1)	6	(3)	23	-	-	(2)	50	(6)	10
No opinion	(2)	20	(1)	6	(3)	23	(4)	20	-	-	(10)	16
Not useful	(2)	20	(1)	6	(3)	23	(4)	20	-	-	(10)	.6
Item not available	(5)	50	(13)	81	(4)	31	(11)	55	(2)	50	(35)	56
Total	(10)	100	(16)	100	(13)	100	(20)	100	(4)	100	(63)	100

Note. Percent is rounded off to the closest 0.10.

Data suggest that VRI is not used as much as it could be. Table 18 shows that 16% (31) of deaf workers believe that - VRI is useful or essential (*n*=119). Yet more than half (61%) of the deaf respondents do not have VRI accessible to them.

This is not surprising because unlike VRS, VRI is provided by for-profit companies on a contractual basis and needs only a computer, Internet access, and screen. Video relay is publicly funded, requires special equipment, and relies on for-profit

companies to manage the devices and services. Email helps deaf people maintain a culture and community, although perhaps not as much as video since, in video, deaf people are able to use their native language. However, its effect on employment of deaf people remains uncertain. Some researchers suggest that deaf people use email across sectors (Bowe, et al., 2005; Power, Power, & Rehling, 2007). Others suggest that a service-based economy requires literacy that might challenge deaf workers when they compete for jobs in both general and deaf sectors (Lipset & Ray, 1996; Luft, 2000).

As Table 19 shows, more than a third of deaf people rely on email for most of their communication and another quarter rely on email for all their communication across the sectors. In both cases, less than a third of the respondents worked in the deaf sector (n=193). If not all or most, the remaining respondents report using email some of the time. These results are not surprising given the necessity of email in most occupations in the 21st century. These data also suggest that deaf people are not being left behind as the labor market moves away from manufacturing toward service-based employment.

Table 19

Extent of Email Use Reported by Deaf and Hard-of-Hearing Workers by Sector of Employment

Degree of use for communication	Hearing status of customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		Same number of deaf and hearing people		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	10	(24.4)	22	(33.8)	8	(29.6)	5	(10.0)	1	(10.0)	46	(23.8)
Most	15	(36.6)	24	(36.9)	14	(51.9)	26	(52.0)	7	(70.0)	86	(44.6)
Some	14	(34.1)	13	(20.0)	5	(18.5)	15	(30.0)	2	(20.0)	49	(25.4)
None	2	(4.9)	6	(9.2)	-	-	3	(6.0)	-	-	11	(5.7)
I do not have access to email	-	-	-	-	-	-	1	(2.0)	-	-	1	(0.5)
Total	41	(100)	65	(100)	27	(100)	50	(100)	10	(100)	193	(100)
Hard-of-hearing												
All	-	-	4	(21.1)	1	(10.0)	-	-	2	(50.0)	7	(11.9)
Most	4	(44.4)	8	(42.1)	7	(70.0)	11	(64.7)	1	(25.0)	31	(52.5)
Some	4	(44.4)	3	(15.8)	2	(20.0)	3	(17.6)	1	(25.0)	13	(22.0)
None	1	(11.1)	3	(15.8)	-	-	2	(11.8)	-	-	6	(10.2)
I do not have access to email	-	-	1	(5. 2)	-	-	1	(5.9)	-	-	2	(3.4)
Total	9	(100)	19	(100)	10	(100)	17	(100)	4	(100)	59	(100)

This study explored the use of CMC with consumers, clients, suppliers, and students as another means of examining how CMC affects employment of deaf people. Video remote interpreting (VRI) services are primarily used for group or individual meetings in the same building between deaf and hearing coworkers or deaf workers and hearing customers. As Table 20 shows, 17% (34) of deaf respondents have access to and use VRI (*n*=193). Slightly over 50% (30) of hard-of-hearing respondents report using VRI in their jobs (*n*=59). Data also suggest that there may be a lack of awareness of the existence of VRI technology or that positions held by deaf workers can function effectively using other technology. Data also raise the question of whether deaf people have positions that require little face-to-face communication with consumers and clients, and what that might mean for other characteristics of their employment.

Table 20

Video Remote Interpreting with Suppliers, Customers, Clients, and Students by Sector of Employment and Identity

	Hearing status of customers, clients, or students											
Degree of use for communication	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		About the same number of each		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Deaf												
All	4	(10)	2	(2.99)	-	-	-	-	-	-	6	(3.1)
Most	-	-	1	(1.49)	12	(3.8)	1	(2)	1	(10)	4	(2.07)
Some	7	(17.5)	7	(10.45)	2	(7.6)	6	(12)	2	(20)	24	(12.4)
None	10	(25)	12	17.91)	7	(26.9)	14	(28)	3	(30)	46	(23.8)
No access to video or webcam	18	(45)	29	(43.28)	15	(57.6)	25	(50)	4	(40)	91	(47.1)
I do not have VRI	1	(1)	16	(23.88)	1	(1)	4	(8)	0	(0)	22	(11.4)
Total	40	(100)	67	(100)	26	(100)	50	(100)	10	(100)	193	(100)
Hard-of-hearing												
All	-	-	1	(5.3)	1	(10)	-	-	1	(25)	3	(5.1)
Most	1	(11.1)	4	(21.0)	-	-	2	(11.8)	1	(25)	8	(13.6)
Some	4	(44.4)	2	(10.5)	8	(80)	4	(23.5)	1	(25)	19	(32.2)
None	1	(11.1)	3	(15.8)	1	(10)	4	(23.5)	1	(25)	10	(16.9)
I do not have VRI	2	(22.2)	1	(5.3)	-	-	1	(5.9)	-	-	4	(6.8)
No access to video or webcam	1	(11.1)	8	(42.1)	-	-	6	(35.3)	-	-	15	(25.4)
Total	9	(100)	19	(100)	10	(100)	17	(100)	4	(100)	59	(100)

Table 21 shows that video relay service (VRS) is far more likely to be used among deaf workers, with 83% (143) of deaf respondents reporting using it (*n*=194). Data also show that the degree to which a deaf worker uses video relay with customers is evenly spread across sectors. Most deaf workers rely on VRS for some of their communication rather than for all or most of their communication.

Table 21

Video Relay Service Use with Suppliers, Customers, Clients, or Students by Sector of Employment and Identity

Degree of use for communication	Hearing status of customers, clients, or students											
	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		The same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	14	(34.1)	11	(16.4)	5	(19.2)	5	(10.0)	2	(20.0)	37	(19.1)
Most	6	(14.6)	11	(16.4)	9	(34.6)	10	(20.0)	4	(40.0)	40	(20.6)
Some	18	(43.9)	14	(20.9)	10	(38.5)	20	(40.0)	4	(40.0)	66	(34.0)
None	3	(7.3)	8	(11.9)	1	(3.8)	5	(10.0)	-	-	17	(8.8)
No video phone or webcam	-	-	11	(16.4)	-	-	6	(12.0)	-	-	17	(8.8)
I do not have VRS service	-	-	12	(17.9)	1	(3.8)	4	(8.0)	-	-	17	(8.8)
Total	41	(100)	67	(100)	26	(100)	50	(100)	10	(100)	194	(100)
Hard-of-hearing												
All	-	-	1	(5.3)	1	(10)	-	-	1	(10)	3	(5.1)
Most	1	(11.1)	4	(21.0)	-	-	2	(11.8)	1	(10)	8	(13.6)
Some	4	(44.4)	2	(10.5)	8	(80)	4	(23.5)	1	(10)	19	(32.2)
None	1	(11.1)	3	(15.8)	1	(10)	4	(23.5)	1	(10)	10	(16.6)
No video phone or webcam	2	(22.2)	1	(5.3)	-	-	1	(5.9)	-	-	4	(23.4)
I do not have VRS service	1	(11.1)	8	(42.1)	-	-	6	(35.3)	-	-	15	(25.4)
Total	9	(100.0)	19	(100.0)	10	(100)	17	(100.0)	4	(100)	59	(100.0)

Instant messaging (IM) is a popular alternative to the telephone as a means of instant communication between coworkers. Instant messaging offers a deaf person another avenue to establish ties with coworkers and thus a sense of belonging with them. Bowe (2002) reported 35% of his study sample used IM at work (*n*=884). That study was not clear as to the context of how or with whom IM was used in the workplace. However, data from this study show that IM is not being used by deaf people as much as one would expect. As Table 22 shows, 33% (64) of deaf workers use IM to communicate with their customers or suppliers to some extent (*n*=194).

Table 22

Instant Messaging Use with Clients by Deaf Workers with Sector and Identity

	Hearing status of customers, clients, or students											
Degree of use in communication	Deaf people		Hearing people		Mostly deaf and some hearing people		Mostly hearing and some deaf people		About the same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	4	(10.0)	1	(1.5)	2	(7.4)	1	(2.0)	-	-	8	(4.1)
Most	1	(2.5)	2	(3.0)	2	(7.4)	5	(10.0)	1	(10.0)	11	(5.7)
Some	9	(22.5)	18	(26.9)	7	(25.9)	10	(20.0)	1	(10.0)	45	(23.2)
None	14	(35.0)	27	(40.3)	7	(25.9)	23	(46.0)	7	(70.0)	78	(40.2)
No access to IM	12	(30.0)	19	(28.4)	9	(33.5)	11	(22.0)	1	(10.0)	52	(26.8)
Total	40	(100)	67	(100)	27	(100)	50	(100)	10	(100)	194	(100)
Hard-of-hearing												
All	-	-	1	(5.3)	-	-	-	-	-	-	1	(1.7)
Most	-	-	-	-	-	-	-	-	-	-	-	-
Some	-	-	3	(15.8)	4	(40.0)	5	(31.3)	-	-	12	(20.7)
None	4	(44.4)	8	(42.1)	1	(10.0)	6	(37.5)	3	(75.0)	22	(37.9)
No access to IM	5	(55.6)	7	(36.8)	5	(50.0)	5	(31.3)	1	(25.0)	23	(39.7)
Total	9	(100)	19	(100)	10	(100)	16	(100)	4	(100)	58	(100)

As with IM, video remote interpreting (VRI) is not widely used by deaf workers in the general sector (see Table 23). Sixty-six percent (126) of the respondents report not using VRI for any of their communication with customers. This suggests that either those respondents do not have jobs that require face-to-face contact in the worker's office, or alternative methods of interpreting are used such as bringing in a live interpreter. The former explanation is more likely considering the cost savings of using VRI over bringing in a live interpreter and the employment characteristics of the sample.

Table 23

Video Remote Interpreting Use with Coworkers by Sector of Employment and Identity

	Hearing status of customers, clients, and students											
Degree of use in communication	Deaf people		Hearing people		Mostly deaf		Mostly hearing		About same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	-		1	(1.5)	-	-	-	-	-	-	1	(0.5)
Most	-	-	4	(6.2)	-	-	1	(2.0)	-	-	5	(2.6)
Some	7	(17.5)	3	(4.6)	3	(11.5)	1	(12.2)	2	(20.0)	21	(11.1)
None	31	(75.5)	36	(55.4)	18	(69.2)	33	(67.3)	8	(80.0)	126	(66.3)
I do not have hearing coworkers	2	(5.0)	1	(1.5)	-	-	-	-	-	-	3	(1.6)
No videophone or webcam	-	-	20	(30.8)	5	(19.2)	9	(18.4)	-	-	34	(17.9)
Total	42	(100)	65	(100.0)	26	(100)	49	(100.0)	10	(100.0)	190	(100)
Hard-of-hearing												
All	-	-	-	-	-	-	-	-	-	-	-	
Most	1	(11.1)	1	(5.3)	-	-	1	(5.9)	-	-	3	(5.1)
Some	-	-	-	-	4	(40.0)	2	(11.8)	2	(50.0)	8	(13.6)
None	3	(33.3)	3	(15.8)	2	(20.0)	4	(23.5)	1	(25.0)	13	(22.0)
I do not have VRI service	3	(33.3)	9	(47.4)	4	(40.0)	5	(29.4)	1	(25.0)	22	(37.3)
No video phone or webcam	2	(22.2)	6	(31.5)	-	-	5	(29.4)	-	-	13	(22.0)
Total	9	(100)	19	(100)	10	(100)	17	(100)	4	(100)	59	(100)

Deaf people use VRS more than VRI. Table 24 shows that just over 50% (95) of deaf workers use VRS to some degree across sectors. The explanation may be that deaf workers have jobs that require contact through telecommunications such as sales or case management in social services, rather than the face-to-face contact of a therapist, medical doctor, or attorney. More difficult to explain is that 13% (24) of deaf workers report using VRS in the deaf sector. One explanation might be that they have positions in the deaf sector, but occasionally speak to hearing people and they should have indicated that they work in the general sector. A second explanation may be that those workers are

working in the deaf sector with hearing coworkers who also work in the deaf sector. Another explanation might be that they use the same technology to speak to deaf coworkers and interpreted the question accordingly. Researchers replicating the study may want to include a qualitative approach to examine this and similar responses by deaf workers in the deaf community.

Table 24

Video Relay Service with Coworkers by Sector of Employment and Identity

	Hearing status of customers, clients, and students											
Degree of use for communication	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		About same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	5	(12.5)	2	(3.1)	-	-	1	(2.1)	2	(20.0)	10	(5.3)
Most	1	(2.5)	7	(10.8)	2	(7.7)	7	(14.6)	1	(10.0)	18	(9.5)
Some	18	(45.0)	13	(20.0)	15	(57.7)	17	(35.4)	4	(40.0)	67	(35.4)
None	16	(40.0)	22	(33.8)	6	(23.1)	14	(29.2)	3	(30.0)	61	(32.3)
I do not have a videophone or webcam	-		13	(20.0)	-	-	9	(18.8)	-	-	22	(11.6)
I do not have hearing coworkers	-	-	8	(12.3)	3	(11.5)	-	-	-	-	11	(5.8)
Total	40	(100)	65	(100)	26	(100)	48	(100)	10	(100)	189	(100)
Hard-of-hearing												
All	-	-	1	(5.8)	1	(50.0)	-	-	1	(33.3)	3	(8.5)
Most	1	(20.0)	4	(23.8)	-	-	2	(15.3)	1	(33.3)	8	(19.5)
None	1	(20.0)	3	(17.6)	1	(50.0)	4	(30.7)	1	(33.3)	10	(24.6)
I do not have a videophone or webcam	2	(40.0)	1	(5.8)	-	-	1	(8.0)	-	-	4	(9.8)
I do not have VRS service	1	(20.0)	8	(47.0)	-	-	6	(46.0)	-	-	15	(37.6)
Total	5	(100)	17	(100)	20	(100)	13	(100)	3	(100)	41	(100)

Coworkers

Video technology is quickly becoming imbedded in the mainstream as much as email and IM. Only 15.6 %(30) of the respondents indicated that they do not have a webcam or videophone, and of those respondents, none work in the deaf sector (see Table 25). As Table 24 also shows, approximately 56 % (108) of deaf people use a video or Web camera to communicate directly with their hearing and deaf coworkers *(n*=189).

Table 25

Webcam or Videophone Use with Coworkers by Sector of Employment and Identity

	Hearing status customers, clients, or students											
Degree of communication use	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		About same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	3	(7.3)	2	(3.0)	6	(22.2)	2	(4.2)	2	(20.0)	15	(7.8)
Most	7	(17.1)	4	(6.1)	2	(7.4)	7	(14.6)	3	(30.0)	23	(12.0)
Some	21	(51.2)	15	(22.7)	12	(44.4)	17	(35.4)	5	(50.0)	70	(36.5)
None	10	(24.4)	25	(37.9)	6	(22.2)	13	(27.1)	-	-	54	(28.1)
I do not have a videophone or webcam	-	-	20	(30.3)	1	(3.7)	9	(18.8)	-	-	30	(15.6)
Total	41	(100)	66	(100)	27	(100)	48	(100)	10	(100)	192	(100)
Hard-of-hearing												
All	-	-	-	-	-	-	-	-	1	(25.0)	1	(1.7)
Most	-	-	2	(10.5)	3	(30.0)	1	(6.0)	-	-	6	(10.3)
Some	3	(33.3)	2	(10.5)	5	(50.0)	5	(31.3)	1	(25.0)	16	(27.6)
None	3	(33.3)	5	(26.3)	2	(20.0)	5	(31.3)	2	(50.0)	17	(29.3)
I do not have a videophone or webcam	3	(33.3)	10	(52.6)	-	-	5	(31.3)	-	-	18	(31.0)
Total	9	(100)	19	(100)	10	(100)	16	(100)	4	(100)	58	(100)

As is the case between deaf workers and customers, the primary method of communication with deaf workers and coworkers is email (see Table 26). Eighty-one percent (182) of deaf respondents use email at least for some communication with coworkers *(n*=198). Of that group of participants, 47% (91) mostly use email to communicate with coworkers.

Table 26

Email Use Reported by Deaf and Hard-of-hearing Workers with Coworkers by Sector of Employment and Identity

	Which best describes your customers, clients, or students											
Degree of use for communication	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		About same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	12	(29.3)	22	(33.3)	7	(25.9)	7	(14.3)	5	(50.0)	53	(27.5)
Most	18	(43.9)	28	(42.4)	17	(63.0)	25	(51.0)	3	(30.0)	91	(47.2)
Some	11	(26.8)	8	(12.1)	3	(11.1)	14	(26.5)	2	(20.0)	38	(19.5)
None	-	-	8	(12.1)	-	-	2	(4.1)	-	-	10	(5.2)
I do not have access to email	-	-	-	-	-	-	2	(4.1)	-	-	1	(.5)
Total	40	(100)	66	(100)	27	(100)	64	(100)	10	(100)	193	(100)
Hard-of-hearing												
All	-	-	3	(15.8)	1	(10.0)	1	(5.8)	1	(25.0)	6	(10.2)
Most	4	(44.4)	11	(57.8)	7	(70.0)	8	(47.1)	3	(75.0)	33	(55.9)
Some	4	(44.4)	3	(15.8)	2	(20.0)	8	(47.1)	-	-	17	(28.8)
None	-	-	1	(5.3)	-	-	-	-	-	-	1	(1.7)
I do not have access to email	1	(11.1)	1	(5.3)	-	-	-	-	-	-	2	(3.4)
Total	9	(100)	19	(100)	10	(100)	17	(100)	4	(100)	59	(100)

Note. Percents are rounded off to the next .10.

Instant messaging is a tool for deaf people to communicate with coworkers in both sectors. As Table 27 shows, approximately 44% (86) of the respondents use IM at least to some degree to communicate with coworkers *(n*=193). One explanation as to why deaf people use IM less than email or video relay with coworkers might be that the jobs held by deaf people do not require the speed of communication provided by IM.

Table 27

Instant Messaging Use Reported by Deaf and Hard-of-hearing Workers with Coworkers by Sector of Employment and Identity

	Hearing status of customers, clients, or students											
Degree of use in communication	Deaf people		Hearing people		Mostly deaf people		Mostly hearing people		About the same number of each		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
All	4	(9.8)	4	(6.0)	3	(11.1)	2	(4.1)	2	(20.0)	15	(7.8)
Most	2	(4.9)	12	(18.2)	1	(3.7)	6	(12.2)	-	-	21	(10.9)
Some	11	(26.8)	18	(27.3)	7	(25.9)	14	(28.6)	-	-	50	(25.9)
No	13	(31.7)	13	(19.7)	8	(29.6)	17	(34.7)	7	(70.0)	58	(30.1)
I do not have access to IM	11	(26.8)	19	(28.8)	8	(29.6)	10	(20.4)	1	(10.0)	49	(25.4)
Total	41	(100)	66	(100)	27	(100)	49	(100)	10	(100)	193	(100)
Hard-of-hearing												
All	-	-	1	(5.3)	-	-	-	-	-	-	1	(1.7)
Most	-	-	-	-	-	-	1	(5.9)	-	-	1	(1.7)
Some	1	(11.1)	4	(21.1)	3	(30.0)	6	(35.3)	1	(25.0)	15	(25.4)
None	3	(33.3)	7	(36.8)	2	(20.0)	6	(35.3)	2	(50.0)	20	(34.0)
I do not have access to IM	5	(55.6)	7	(36.8)	5	(50.0)	4	(23.5)	1	(25.0)	22	(37.2)
Total	9	(100.0)	19	(100.0)	10	(100.0)	17	(100.0)	4	(100.0)	59	(100.0)

Research Question 3

The extent to which a deaf worker chooses to use a particular type of CMC depends in part on the characteristics of the person and in part on the workplace characteristics. Literacy is required for email communication and deaf people are best understood when they use their native language of ASL. Availability of CMC also depends on the conditions that require communication with coworkers and customers and within that, the purpose behind the communication. This study examined the relationships among CMC, personal characteristics, and employment characteristics for

deaf workers.

The Pearson Correlation Coefficient and a two-tailed test for statistical significance were used to test for correlations between CMC at work, personal and employment characteristics (Pyrczak, 2003). Participants were asked how much they used specific technology in communicating with customers, coworkers, and supervisors (see survey, Q12-Q25). Respondents rated CMC use with a value between 0 and 5, with 0 being "not available" and 5 being "all their communication." The three personal characteristics tested for correlation with CMC use were level of education, salary, degree of hearing loss, and extent to which one worked from home.

Education

The study examined whether level of education correlates with salary and CMC among survey participants and customers, supervisors, and coworkers. The level of education was rated on a scale from less than passing a general education development test to doctorate or equivalent terminal degree (see survey, Q43). Salary and level of education are correlated *(r*=.23, *p*<.01). A statistically significant correlation was also found between highest level of education and video relay services (VRS) used to communicate with customers or clients *(r*=.23, *p*<.01). Data show a correlation between email use and highest level of education *(r*=.21, *p*<.01), as well. Correlations between CMC and communication with customers are not statistically significant. It is not surprising that deaf workers would rely on VRS, especially if they are self-employed, since the technology and service are publicly funded and readily available. The

correlation with level of education is unexpected since most deaf people who utilize VRS do so regardless of their education background. The strength of the correlation of VRS and level of education is slightly higher than that with email. Because email is a generally accepted method of communication, one would expect that it would share a stronger correlation with level of education than VRS did, which is primarily used to make phone calls to hearing people.

Whether or not relationships exist between level of education and CMC with coworkers was investigated. Four of the five types of CMC correlated with level of education: webcam *(r*=.17, *p*<.1), video relay services (r=.17, p<01), and email (*r*=.12, *p*<.05) are all significantly correlated with level of education. This may suggest that deaf people are employed in professions that either are in the deaf sector and may use the webcam and email to communicate directly with others, or in the general sector in which VRS and email are generally used to communicate with coworkers. Instant messaging (IM) was found to be negatively correlated with level of education *(r*=-.14, *p*<.05). This suggests that certain occupations may rely on IM instead of direct communication or email and that deaf people who may not have gone to college are working in those jobs.

Whether or not a relationship exists between level of education and CMC in communicating with supervisors was examined. There is a small, yet statistically significant correlation between VRS and highest level of education when communicating with supervisors *(r*=.16, *p*<.01). Email with supervisors and highest level of education also showed a small but statistically significant correlation *(r*=.15, *p*<.05). A similar

finding was made when IM with supervisors was examined *(r*=.14, *p*<.05).

Email and IM both require a certain understanding of English, which is grammatically different from ASL. Thus, it is not surprising that level of education correlates with the use of email and IM. Video remote interpreting, webcam, and highest level of education correlate, but do not reach statistical significance. The lack of correlation between webcam use and level of education *(r*=.078, *p*<.20, *n*=266) is not surprising considering that only 25 out of 191 deaf workers use webcams to communicate with supervisors. Also not surprising is the lack of a correlation between level of education and communication with supervisors involving VRI *(r*=.031, *p*<.617, *n*=266). Out of 193 respondents, 113 indicated that VRI equipment is not available at their place of employment.

Degree of Hearing Loss

Degree of hearing loss is another personal characteristic tested for correlation with deaf workers' use of CMC at work. Participants were asked the extent of their hearing loss in decibels (see survey Q51) against the type of CMC they use in the workplace with coworkers, supervisors, and customers. There was a positive correlation of small statistical significance between degree of hearing loss and instant messaging with coworkers *(r*=.16, *p*<.01). Email with coworkers showed no significant correlation with degree of hearing loss. Web camera, VRI and VRS with coworkers also showed no correlation with degree of hearing loss.

There was not a highly significant correlation between hearing loss, use of email, and instant messaging with coworkers across sectors. The lack of a strong correlation between email use with coworkers and level of education is unexpected given that email requires literacy and that deaf people's literacy is generally behind that of their hearing counterparts (Marshark & Spencer, 2003). Also, many jobs that require advanced education also require extensive written communication. The use of software to check grammar and spelling might explain the lack of correlation between level of education and email use. The same reason could explain the hearing worker's level of education and the use of email. This could be explored in future research. The weak correlation might be the result of people with moderate, moderate to severe, and profound hearing loss using many of the same computer-mediated devices. The fact that Video remote interpreting (VRI) and Video relay services (VRS) were not correlated with degree of hearing loss is explained by the fact that VRI was often used as an alternative to VRS, which cannot be used by two people in the same building. The use of Web cameras for social networking outside of employment explains a lack of correlation among Web cameras and variables in the workplace. In addition, many workplace computer systems do not allow sharing of video content, including images captured through video chat.

No correlation was found between degree of hearing loss and email, instant messaging, webcam, or video relay services with supervisors. A correlation with statistical significance exists between hearing loss and video remote interpreting (VRI) with supervisors *(r*=-.15, *p*<.05, *n*=266). The result involving VRI was unexpected given

the fact that participants rarely use VRI in their jobs. However, the fact that a significant correlation was found among a small sample size shows strength in the effect VRI has on supervision between employers and deaf employees. No CMC correlated with the degree of hearing loss in the context of communicating with customers or clients. This unexpected result suggests that most respondents with moderate, severe, or profound hearing loss would all be using computer mediated communication.

Employment Characteristics

The study explored whether a correlation exists between ability to work from home and CMC. Participants were asked what percent of their work is completed from home (see survey Q6). There is a negative correlation between hours worked at home and use of video remote interpreting (VRI) with customers and clients *(r*=.16, *p*<.01). This outcome is explained by the fact that VRI is generally used in a company office building and not in one's home unless the home was a place to meet with clients or customers. A somewhat stronger negative correlation exists between using video relay services (VRS) with customers and clients and hours worked from home *(r*=-.23, *p*<.01). This result is somewhat counterintuitive. One explanation is that the type of work that allows participants to work from home does not involve direct client contact and therefore does not require VRS. The use of email with customers and clients is negatively correlated and is statistically significant *(r*=.-11, *p*<.05). One explanation for these results might be that those people working from home do not have employment that involves communicating

with customers or clients. Neither IM nor the use of webcam with customers is statistically correlated with the percentage of work completed from home.

Deaf workers working from home use direct video communication in the deaf sector and video relay in the general sector. A statistically significant negative correlation exists between hours worked at home and use of video/webcam with coworkers *(r*=-.24, *p*<.01). Similarly, a statistically significant negative correlation exists between VRS with coworkers and hours worked at home *(r*=-.24, *p*<.01). The percentage of participants who work from home shows a small, but statistically negative, correlation with the degree to which workers rely on using email to communicate with their coworkers *(r*=-.22, *p*<.01). No statistical correlation exists between IM and percent of work completed at home. These results suggest that deaf workers might have positions that require little communication with coworkers while working in the same office and even less when separated. This explanation also suggests that deaf people working in the general sector obtain positions that require little interaction with others and they can accomplish tasks independently.

The more deaf persons work from home, the less they rely on any CMC with their supervisors. This too seems somewhat counterintuitive. A statistically significant negative correlation exists between the extent to which workers use VRI with supervisors and hours worked at home *(r*=-.20, *p*<.01). Email with supervisors is negatively correlated with hours worked at home *(r*=-.20, *p*<.01). There are small, negative and statistically significant correlations between VRS with supervisors and the percent of

work from home *(r*=-.18, *p*<.01); and between webcam use with supervisors and work from home *(r*=-.16, *p*<.01). The explanation for this might be similar to the one for lack of contact with coworkers. Data show that 84 respondents work from home and do so from 1% –24% of their work week (29.2%, *n*=288). The number of workers in either sector drops considerably past 24%. Supervisors of deaf workers might find that there is little need for direct supervision and communication when the deaf employees works at home. The deaf employee in the general sector might have jobs with tasks that can be completed independently and which require little supervision.

Research Question 4

According to the National Organization on Disability (2004), 22% of working people with disabilities feel discriminated against. Discrimination might affect deaf workers differently than people with other disabilities. Research has shown that deaf people feel resentment and mistrust toward hearing people (Bauman, 2004; Humphries, 1975; Lane, 1992; Padden & Humphries, 1988). Bowe, McMahan, Chang, and Louvi (2005) suggested that deaf and hard-of-hearing people can continue to expect resistance from employers in hiring, providing reasonable accommodations, promotions, and training. This might contribute to the increasing of employment in which deaf people provide services within the deaf community. Whether CMC facilitates deaf people's sense of belonging in the general sector and whether deaf people might prefer to work in the general sector over the deaf sector were explored in this study. Alderfer's (1972) theory of job satisfaction suggests that a sense of belonging and relatedness exists in the

deaf sector while the general sector maintains barriers against deaf workers feeling engaged with coworkers and supervisors.

Deaf people might prefer to work among deaf people, feeling the need for a sense of belonging that comes with working among people who share their culture or to avoid the effects of discrimination. Knowing if CMC lessens discrimination by creating opportunities for communication, collaboration, and socialization between deaf and hearing coworkers would help deaf people feel comfortable in exploring careers in the general sector. Job satisfaction scores were used in this study as a measure of the contentment that deaf workers have in both deaf and general sectors. The researcher also examined the influence of CMC on those scores.

This study investigated whether CMC minimizes low job satisfaction sufficiently for deaf people who have strong ties to deaf culture and language to want to work in the general sector. Data analysis involved statistically separating participants who identified as deaf from those who identified as hard-of-hearing. Identification as deaf also identifies participants who consider ASL as their native language and who have other strong ties with the deaf community.

Degree of Challenge

Job satisfaction was examined with respect to challenging tasks, supervision, relationships with coworkers, chance of promotion, salary, and benefits. Participants were asked about the degree to which they found their job tasks challenging (see survey Q27). Participants were also asked to rate the degree to which their job relies on the CMC (see

survey Q26). The results show that the degree to which their job depends on using email and to which it is challenging are correlated, albeit to a small extent (r=.18, p<.01). A slightly smaller but statistically significant correlation also exists between the degree to which job tasks are challenging and the degree to which job responsibilities rely on VRS *(r*=.14, *p*<.05). No other significant correlation was found between the extent that job tasks are challenging and the extent that job responsibilities depend on CMC. These results are unexpected because it was anticipated that there would be a higher correlation between email and challenge in view of the literacy involved in using email. Video relay service was not expected to show even a small correlation with the level of challenge since VRS is an easier pathway for effective communication with hearing clients, supervisors, and coworkers. Few jobs, if any, held by the study participants solely depend on telecommunications.

An alternative explanation may be that linguistic differences and poor translation on the part of the VRS interpreter may make using VRS challenging for both deaf and hearing people in a relay conversation. While no data could be found to support this explanation, there are instances that might lead to poor translation. Interpreters working for VRS are certified, but might not be experienced at meeting the idiosyncratic linguistic needs of the average deaf user and those with intellectual disabilities.

Supervision

Deaf people working from home notwithstanding, the type of CMC that deaf workers use with supervisors affects the type of satisfaction with supervision. Participants

were asked to rate their satisfaction with supervision (see survey Q30). Communication with supervisors using CMC showed a statistically small correlation with satisfaction with supervision including IM *(r*=.14, *p*<.05), VRI *(r*=.19, *p*<.01), VRS *(r*=.18, *p*<.01), and video or webcam *(r*=.18, *p*<.01). Email and satisfaction with supervisors showed a particularly strong correlation *(r*=.36, *p*<.01). The result was surprising given that English is a second language for most deaf ASL users. The result suggests that email allows for more efficient and frequent communication than face-to-face conversation, which relies on lip reading and writing back and forth. The outcome of frequent communication might be that the deaf worker feels more satisfied with the supervision. A second explanation might be that respondents who lost their hearing after the age of six have a greater understanding of English. They might have statistically weighted the results in favor of email in relation to satisfaction with supervisors.

Coworker

Computer-mediated communication has an effect on satisfaction with coworkers, but not in the context of how challenging communication is with coworkers. The study asked participants to rate how satisfied they are with their relationship with coworkers (see survey Q31) and compared that to how challenging communication is with their coworkers (see survey Q28). Socialization with coworkers was found to correlate with the degree to which communicating with coworkers is less challenging *(r*=.34, *p*<.01). Participants were asked to rate the extent that CMC is used to communicate with coworkers (see survey Q14-Q18). The degree to which communication with coworkers is

challenging is negatively correlated with the extent to which VRS is used *(r*=.-22, *p*<.01) and webcams are used *(r*=.-22, *p*<.01). Instant messaging, email, and VRI all show correlations but not at a statistically significant level.

An attempt was made to determine if satisfaction of coworker relationship and the degree of challenge communicating with coworkers were correlated. The correlation between the two was found not to be statistically significant. These results, on the surface, appear to be counterintuitive. It may be that the question (see survey Q28) was interpreted in a way other than intended. An alternative explanation might be that deaf workers, especially in the general sector, have grown accustomed to limited communication with coworkers and became satisfied with their existing relationships. This would suggest that because deaf workers now have the ability to communicate with the deaf community throughout the day and in a number of ways, they are content working in the general sector and feeling somewhat isolated from hearing coworkers.

Salary

The study examined the correlation between salary and CMC and found people who depend on email the most also have higher salaries than those who do not. Data show that salary is related with CMC use at work. Participants were asked what their salary for 2010 was, measured on a scale from less than $20,000 to over $100,000 in increments of $9,000 (see survey Q7). Responses were categorized in increments of $20,000 for analysis. Email use with customers and suppliers is positively correlated with salary *(r*=.20, *p*<.10). However, there is no significant correlation between IM, VRS,

VRI, or webcam with salary in the context of communicating with customers or clients. Email use with supervisors also shows a positive correlation with salary *(r*=.23, *p*<.01). However, no significant correlation exists between IM, webcam, VRI, or VRS and salary with respect to communicating with supervisors. There is a smaller but statistically significant positive correlation with using email to communicate with coworkers and salary *(r*=.17, *p*<01). Data do not show a significant correlation between IM, VRS, VRI, or webcam with salary in the context of communicating with coworkers.

The correlation between salary and email with both customers and supervisors may be the result of a confounding variable. The more a job relies on communication with email, the higher the education level required which also correlates with salary. Thus, in this instance, higher education level may be a covariate.

Promotion

The participants were asked to what degree their job responsibilities relied on CMC (see survey Q26). The degree of reliance on CMC was tested against satisfaction with chances for promotion in which participants rated their satisfaction with chances at a promotion (see survey Q29). Job responsibilities that rely on email and satisfaction of chances of promotion show a statistical, but small correlation *(r*=.17, *p*<.01). Job responsibilities that rely on IM, webcam, VRS, and VRI are not significantly correlated with satisfaction of chances for promotion. Participants were asked to rate their satisfaction with chances for promotion (see survey Q29) against their estimation of how much they rely on CMC with supervisors to determine if a correlation exists. Instant

messaging, VRI, and webcam are not significantly correlated with expectations of promotion. However, email use with supervisors was significantly correlated with expectations of promotion *(r*=.32, *p*<.01).

Given the known literacy gap between deaf and hearing people, a correlation between reliance on email and chances for promotion was not expected. However, in light of the correlation between satisfaction and supervision, salary, and level of education, it stands to reason that the more communication between supervisor and worker, the greater the chance of promotion.

Discrimination

The study examined the degree to which respondents felt discriminated against to determine if a correlation exists with CMC. Participants were asked to what degree they feel discriminated against in their job based on their hearing loss (see survey Q28). A statistically significant negative correlation exists between the degree of discrimination felt and the level of comfort using one's voice to communicate with hearing coworkers *(r*=-.13, *p*<.05).

The job satisfaction index was broken into seven variables: salary, benefits, challenge, deaf coworkers, hearing coworkers, supervision, and technology availability. Each variable was examined for a relationship with discrimination. The degree to which workers were satisfied with coworker relationships is negatively correlated with feelings of discrimination *(r*=-.23, *p*<01). Satisfaction with salary and feelings of discrimination are also negatively correlated *(r*=-.19, *p*<.01). There was no correlation between feelings

of discrimination with the remaining variables of the satisfaction index: chances for promotion, supervision, benefits, and availability of CMC.

Participants were asked to report on the degree of importance they placed on the availability of communication technology in the workplace relative to other aspects of job satisfaction. Asked to rate job characteristics that are considered when choosing a job, 75.0% *(n*=272) of the study participants ranked communication technology third in importance with an average ranking of 2.74, below salary (78.4%, *n*= 273) and benefits (81%, *n*=274).

Cultural ties and need for sign language as a primary means of communication suggest that working among deaf people would be more important to deaf workers than communication technology. Table 28 shows that 74% *(n*=195) of deaf respondents ranked available communication technology as very important to their job satisfaction compared with 38.7% *(n*=194) who reported deaf coworkers as very important. One explanation for this finding might be that computer-mediated technology has developed in such a way that deaf people feel connected to the deaf community and therefore no longer feel isolated when working in the general sector.

Table 28

Importance Placed on Characteristics Influencing Job Satisfaction

Characteristics	Very Important		Important		Not important		Total	
Deaf	*n*	%	*n*	%	*n*	%	*n*	%
Deaf coworkers	(75)	38.7	(68)	35.1	(51)	26.3	194	2.12
Hearing coworkers	(20)	10.6	(98)	50.9	(71)	37.6	189	1.73
Challenging tasks	(96)	49.2	(89)	45.6	(10)	5.1	195	2.44
Promotion	(114)	58.8	(68)	35.1	(12)	6.2	194	2.53
Benefits	(165)	84.2	(31)	15.8	(0)	0.0	196	2.84
Salary	(153)	78.5	(40)	20.5	(2)	1.0	195	2.77
Supervision	(77)	40.1	(89)	46.4	(26)	13.5	192	2.27
Technology	(151)	77.4	(42)	21.5	(2)	1.0	195	2.76
Hard-of-hearing	(12)	20.3	(21)	35.6	(26)	44.1	59	1.76
Hearing coworkers	(6)	10.2	(26)	44.1	(27)	45.8	59	1.64
Challenging tasks	(26)	44.1	(33)	55.9	(0)	0.0	59	2.44
Promotion	(33)	55.9	(25)	42.4	(1)	1.7	59	2.54
Benefits	(40)	67.8	(18)	30.5	(1)	1.7	59	2.66
Salary	(43)	72.9	(16)	27.1	(0)	0.0	59	2.73
Supervision	(29)	49.2	(22)	37.3	(8)	13.6	59	2.36
Technology	(39)	67.2	(19)	32.8	(0)	0.0	58	2.67

Linear Multivariate Regression

Job satisfaction is a complex concept incorporating several employment characteristics that can yield different outcomes on a measure of satisfaction. Computer mediated communication is equally complex in that it encompasses several types of technology, each emphasizing the use of different skills, knowledge, software, and hardware. This study employed the use of Linear Multivariate Regression or ANOVA to

determine if dependent variables have a predictive effect on job satisfaction in the presence of other dependent variables. A stepwise approach to a multivariate regression was used in order to show the independent variable effect on job satisfaction scores of deaf participants in the study.

Tables 29 and 30 show a regression predicting job satisfaction for deaf workers, controlling for the degree of reliance on the five types of CMC used with coworkers. For the remainder of this chapter, the tables present both unstandardized and standardized coefficients; in the discussion, standardized coefficients are presented in parentheses. The results indicated that email with coworkers has a small, albeit significant, effect on job satisfaction ($b=.178$, $p<.008$). Communication with hearing coworkers using video remote interpreting shows a highly significant correlation with job satisfaction ($b=.169$, $p<.013$). The small sample size using this technology and the significant correlation among other independent variables suggests that video remote interpreting might have an important role in satisfaction with coworkers and supervisors for deaf people working in the general sector.

Table 29

Analysis of Variance for Job Satisfaction and Communication with Coworkers

ANOVA[a]					
Model 1	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	393.107	5	78.621	3.193	.008[b]
Residual	6328.649	257	24.625		
Total	6721.757	262			

Table 30

Regression Table with Communication with Coworkers and Job Satisfaction

Coefficients[a]					
	Unstandardized		Standardized		
Model 1	*B*	Std. Error	Beta	*t*	Sig.
(Constant)	16.336	5.142		3.177	.002
Communication with CW w/video phone or webcam	-1.305	4.977	-.288	-.262	.793
Communication w/hearing CW using VRI	1.200	.480	.169	2.503	.013
Communication w/hearing CW using VRS	.770	5.002	.169	.154	.878
Email w/CW	1.044	.388	.178	2.694	.008
IM w/CW	-.409	.279	-.091	-1.465	.144

[a]Dependent variable: Job Satisfaction index

Model 1 Summary

R	*R* square	Adjusted *R* square	Std. error of the estimate
.242[a]	.058	.40	4.96237

[a]Predictors: (constant), IM w/CW, communication w/hearing CW using VRI, email w/CW, communication with CW w/video phone or webcam, communication w/hearing CW using VRS.

Tables 31 and 32 show a regression predicting job satisfaction for deaf workers, controlling for the degree of reliance on the five types of CMC used with supervisors. The results indicate that email with coworkers has a significant effect on job satisfaction as well *(b*=.316, p<000).

Table 31

Analysis of Variance Between Job Satisfaction and Communication with Supervisors

ANOVA[a]

Model 2	Sum of Squares	*df*	Mean Square	*F*	Sig.
Regression	1043.517	5	208.703	9.471	.000[b]
Residual	5641.246	256	22.036		
Total	6684.763	261			

[a] Dependent Variable: Job Satisfaction index. [b] Predictors: (constant), video phone or webcam w/supervisors, IM w/supervisors, VRI w/supervisors, email w/supervisors, VRS w/supervisors.

Table 32

Regression Table with Communication with Supervisors, Technology, and Job Satisfaction

	Coefficients[a]				
	Unstandardized		Standardized		
Model 2	*B*	Std. error	Beta	*t*	Sig.
(Constant)	13.746	1.192		11.529	.000
IM w/supervisors	-.322	.295	-.067	-1.092	.276
Email w/supervisors	1.538	.320	.316	4.802	.000
VRI w/supervisors	.483	.466	.066	1.037	.301
VRS w/supervisors	.275	.414	.052	.665	.507
Video phone or webcam w/supervisors	.450	.452	.081	.995	.320

[a]Dependent variable: Job Satisfaction index.

Model 2 Summary

R	*R* square	Adjusted *R* square	Std. Error of the Estimate
.395[a]	.156	.140	4.69426

The notion that deaf people would enjoy their jobs in general sector if they were able to communicate freely with their customers was investigated. It was assumed that deaf people would hold jobs that required client contact. Tables 33 and 34 show a regression predicting job satisfaction, controlling for the degree of reliance on the five types of CMC used with customers. The results indicate that email with suppliers, customers, and clients does have a significant effect on job satisfaction *(b*=.149, *p*<.024).

This suggests that deaf people who work in the general sector are no more satisfied with their employment as compared to those who work in the deaf sector and who communicate with customers using email. While technology ranked high in importance to deaf people, email with clients does not have a significant effect on overall job satisfaction in either general or deaf sectors.

Table 33

Analysis of Variance Between Job Satisfaction and Communication with Customers

ANOVA[a]					
Model 3	Sum of Squares	*df*	Mean Square	*F*	Sig.
Regression	203.699	4	50.925	2.024	.091[b]
Residual	6465.206	257	25.156		
Total	6668.905	261			

[a] Dependent variable: Job Satisfaction index. [b] Predictors: (constant), IM w/suppliers, email w/suppliers, communication w/customers using VRI, communication w/ suppliers using VRS.

Table 34

Regression Table with Communication with Customers, Technology, and Job Satisfaction

	Coefficients[a]				
	Unstandardized		Standardized		
Model 3	*B*	Std. Error	Beta	*t*	Sig.
(Constant)	19.160	1.071		17.892	.000
Communication w/customers using VRI	.102	.335	.019	.303	.762
Communication w/ suppliers using VRS	-.026	.257	-.007	-.100	.921
Email w/suppliers	.855	.377	.149	2.270	.024
IM w/suppliers	-.520	.324	-.100	-1.602	.110

[a]Dependent variable: Job Satisfaction index.

Model 3 Summary

		Adjusted *R*		
R	*R* square	square	Std. Error of the estimate	
.426[c]	.175[a]	.031	.015	5.01562

[a]Predictors: (constant), IM w/suppliers, email w/suppliers, communication w/customers using VRI, communication w/ suppliers using VRS

Table 35 presents a summary of the three models discussed above. These individual models indicate that technology has a significant effect on job satisfaction. It remains necessary to include all the independent variables tested above in a single stepwise regression model; the results of which are shown below.

Table 35

Analysis of Variance Between Communication with Customers, Supervisors, and Coworkers

ANOVA[d]						
Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	390.635	5	78.127	3.244	.007[a]
	Residual	5925.028	246	24.085		
	Total	6315.663	251			
2	Regression	1085.898	10	108.590	5.004	.000[b]
	Residual	5229.765	241	21.700		
	Total	6315.663	251			
3	Regression	1144.357	14	81.740	3.746	.000[c]
	Residual	5171.306	237	21.820		
	Total	6315.663	251			

[a]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, Email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS. [b]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, Email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS, VRI w/supervisors, VRS w/supervisors, Email w/supervisors, Video phone or webcam w/supervisors, IM w/supervisors. [c]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, Email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS, VRI w/supervisors, VRS w/supervisors, Email w/supervisors, Video phone or webcam w/supervisors, IM w/supervisors, Communication w/customers using VRI, Email w/suppliers, Communication w/ suppliers using VRS, IM w/suppliers. [d]Dependent Variable: Job Satisfaction index.

Models 1,2, 3 Summary

Model	*R*	*R* square	Adjusted *R* square	Std. error of the estimate
1	.249[a]	.062	.043	4.90770
2	.415[b]	.172	.138	4.65835
3	.426[c]	.181	.133	4.67117

[a]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, Email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS
[b]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, Email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS, VRI w/supervisors, VRS w/supervisors, Email w/supervisors, Video phone or webcam w/supervisors, IM w/supervisors. [c]Predictors: (Constant), Communication with CW w/video phone or webcam, IM w/CW, email w/CW, communication w/hearing CW using VRI, communication w/hearing CW using VRS, VRI w/supervisors, VRS w/supervisors, Email w/supervisors, Video phone or webcam w/supervisors, IM w/supervisors, Communication w/customers using VRI, Email w/suppliers, Communication w/ suppliers using VRS, IM w/suppliers.

Table 36 shows a stepwise regression predicting job satisfaction of deaf workers controlling for communication with supervisors, coworkers, and customers using the five different types of CMC (CMC). Email with coworkers and customers shows a significant relationship to overall job satisfaction (b=.513, p<.029). Similarly, video remote interpreting (VRI) with supervisors (b=.576, p<.068), customers (b=.399, p<.065) and coworkers (b=.548, p<.065) all maintain a significant relationship with job satisfaction. This might be due to the small sample size of those using VRI, but suggests that VRI use has a significant effect on job satisfaction in the general sector. Email with customers (b=.435, p<.089) and video relay services with customers (b=.348, p<.075) also shows significant relationships after factoring in all other types of CMC.

Table 36

Stepwise Regression Showing Coefficients of Job Satisfaction and Communication with Customers, Supervisors, and Coworkers.

	Standardized coefficients		
	Model 1	Model 2	Model 3
(Constant)			
Email w/CW	.189	-.003	-.029*
	(.393)	(.475)	(.513)
IM w/CW	-.084	-.146	-.171
	(.287)	(.432)	(.517)
VRS with hearing CW	.140	.079	.214
	(4.947)	(4.717)	(4.838)
VRI with hearing CW	.171	.041	.065*
	(.479)	(.522)	(.548)
Video phone or webcam with CW	-.271	-.258	-.364
	(4.923)	(4.685)	(4.773)
IM w/supervisors		.044	.040*
		(.468)	(.495)
Email w/supervisors		.251	.232
		(.414)	(.437)
VRI w/supervisors		.031	.068*
		(.520)	(.576)
VRS w/supervisors		.112	.118
		(.433)	(.460)
Video /webcam w/supervisors		.149	.157
		(.502)	(.507)
VRI w/customers			-.065*
			(399)
VRS w/ customers			-.075*
			(.348)
Email w/customers			.089*
			(.435)
IM w/ customers			.044
			(.562)

Note. Standard error of the coefficient is displayed in parentheses.
*Significance at the .005 level

Limitations of the Study

The primary purpose of the study was to determine how deaf people's use of CMC in the workplace is related to their employment. A second purpose of the study was to test the usefulness of a Web survey in collecting data from deaf people. The main method of advertising the study was through online news sites geared to deaf and hard-of-hearing people. Some organizations for the deaf also agreed to advertise the study. The deaf community is small and is the focal point of communication about anything that may affect or assist it. Therefore, this cannot be ruled out as having some effect on the participation rate. The number might be increased by using all state organizations for the deaf and hard-of-hearing for the second wave of advertising. Advertising the study might also have captured more interest from the deaf community and especially from those whose first language is ASL. American Sign Language is considered a cornerstone of the deaf culture and in many respects, the deaf community. Creating a questionnaire in both ASL through video with English subtext might elicit more participation than was shown in this study.

Responses were gathered from 344 participants. A larger sample size might show a different demographic picture of deaf workers in the United States. A video survey in ASL might portray a greater sense that the study respects deaf worker's culture, create curiosity about the study, and motivate workers to participate. Although the survey was pretested for clarity, validity, and reliability, the questions were evaluated through reverse translation. Reverse translation, otherwise known as *back translation*, is the process by

which people view the question in their native language and write the English equivalent. Then the resulting phrase is matched with the test question to examine any similarities and differences. There is a possibility that the participants may have misconstrued the questions. To guard against this, future research should include an ASL video representation of the questions alongside the question itself. It was clearly established that a Web survey is a viable means of gathering information from deaf workers. Further inquiry might determine whether the addition of a video component shortens or lengthens the time it takes for a deaf person to complete a Web survey.

Summary

This chapter was organized into four sections: descriptive statistics, research questions, limitations of the study, and the summary. Three hundred forty-four deaf and hard-of-hearing people responded to the survey and met the criteria for participation. The majority of respondents are between 40 and 59 years old. Most of the respondents are white and three times as many identified themselves as deaf than hard-of-hearing. About half of the respondents are prelingually deaf. More deaf participants work in education than any other field. Hard-of-hearing participants report working in both education and rehabilitation more than any other field.

This study was conducted with the assumption that deaf people will seek employment in the sector that satisfies basic needs for existence, relatedness, and growth (Alder 1972). Deaf people might choose to enter general sector employment over deaf-sector jobs if they believe that by doing so, they will fulfill their need for existence

through adequate salary; feel a sense of relatedness or cultural ties with coworkers, supervisors, and consumers; and experience job growth through increased responsibility, training, and promotion. Alderfer's (1972) theory on motivation does not suggest any one of the three carries any more importance than the other two. The assumption in this study is that deaf people have strong cultural ties and will seek employment in the deaf community to feel a sense of belonging in the workplace. A second assumption is that the change from manufacturing to service-based jobs would influence the employment of deaf people, given the degree of communication required in service jobs. A third assumption is that there exists an emerging employment sector which exclusively caters to the needs of deaf people. CMC technology has provided the deaf community an opportunity to socialize without depending on social gatherings to maintain a sense of community. This technology assists deaf people in both deaf and general sector employment. The study explored whether or not computer-mediated technology can overcome the cultural and systemic barriers that might otherwise lead deaf people away from working in the general sector.

Deaf people work mostly in the general sector with less than a quarter working in the deaf sector. Study results show 19.4% of the deaf people surveyed work exclusively in the deaf community; 33.3% work exclusively with hearing customers; and the remainder work in jobs that have a mix of deaf and hearing customers (n=288). The study found that only 5.2% of respondents work with exclusively deaf coworkers while 54.7% work with exclusively hearing coworkers. Based on these assumptions, it was anticipated

that the results would show more deaf people working in the deaf sector. The findings most likely rest on a number of considerations including, but not limited to, the Americans with Disabilities Act of 1990, change in the type of the U.S. economy, change in education of deaf children, and advancements made in technology.

The study examined how deaf people use the various types of computer-mediated technology available in the workforce including email, IM, direct video chat, VRS, and VRI. Results show that 42% mostly use email with supervisors; 46.2% mostly use email with customers; and 48.4% mostly use emails with coworkers. When results showing respondents who use email for all their communication are factored in, it becomes clear that email is the computer-mediated technology currently relied on by deaf workers across both sectors. The widespread use of VRS appears to be mostly for the purposes of social integration between deaf and hearing people. It also appears that literacy issues once thought to plague the deaf community are not impeding employment in the general sector. Explanations for this might include better education for the deaf, software to assist with grammar, and growing dependence on email over other forms of communication in the labor market.

Job satisfaction among deaf people was examined to determine what motivates deaf people to work in the general sector over the deaf sector. Results of this study suggest that deaf workers are split in satisfaction on the tangible aspects of the job that support what Alderfer (1972) calls “existence.” About 52% are satisfied with their salary and almost 39% are satisfied with their chances for promotion, which, in this context,

would lead to an increase in salary *(n*=276). Deaf workers are quite content with the aspect of their jobs that lead to what Alderfer calls "growth." Eighty-nine percent find their job challenging. Results of this study also show that deaf workers are satisfied with the interpersonal aspects of job satisfaction, which Alderfer calls "relatedness." Sixty-five percent are satisfied with their supervision and 72% are satisfied with their coworkers *(n*=276). Despite showing a sense of relatedness, 42.9% of deaf workers felt discriminated against because of their hearing loss and, of that number, twice as many work with just hearing people than just with deaf people. Results show a correlation between feeling a lack of discrimination and job satisfaction. As might be expected, a decrease in feelings of discrimination correlates with high scores on the job satisfaction index ($r = .27$, $p < .01$). Sixty-seven percent of deaf workers consider working alongside deaf coworkers as being important when they look for a job *(n*=276). Deaf people who consider working with deaf people as very important are in deaf-sector jobs or in general sector jobs where most of the customers are deaf. Similarly, those who consider working with deaf people as not important are mostly working in the general sector and have no deaf coworkers. Results show that deaf people are generally discontented with the ability of their jobs to support their need for an adequate salary and they see little hope for an increase in salary. This may be related to the global economic crisis experienced just before the study was conducted, which had a severe impact on the U.S. job market. The study shows that deaf people feel a sense of belonging or

relatedness in general and deaf sectors. The choice of sector depends on how important it is to the deaf person to work among deaf coworkers.

Results suggest that deaf workers choose to work in both sectors. Linear multivariate regression results between job satisfaction scores and CMC suggest that deaf workers rely on email with coworkers, supervisors, and customers. Study results also suggest having to rely on email has no negative effect on the relationship with coworkers, customers, or supervisors. The study shows that deaf people feel a sense of belonging in the workplace where few or no other deaf person uses email as a primary means of communication. One explanation might be that lower literacy might no longer be an impediment to white-collar employment (Bowe, 2002; Foster, 2004; Geyer & Schroedel, 1998; Lipton, Goldstein, Fahnbulleh, & Gertz, 1996; Terzian & Saari, 1982; Tigh, 1994). Early intervention, improved teaching strategies, and software might succeed in preparing deaf workers for service sector employment as contrasted to what was available previously. Having to communicate in English may not be as intimidating to a deaf worker and thus, the deaf person might be more content working among hearing people in the general sector.

The next and final section discusses the implications of these results with respect to social policy on education, civil rights, and vocational rehabilitation for deaf people. This study shows that CMC devices can affect job satisfaction in general and deaf sectors related to coworker, supervisor, and customers. Availability of CMC does not affect the choice of which sector to work in based on the overreliance on email in the workplace

and the type of work most deaf people are doing in the general sector. In summary, deaf people's job satisfaction is not likely to be influenced by the existence of video technology in the general sector and that email remains the primary means of communication in both sectors. The next chapter discusses the implications of these findings for social policy including education and vocational assistance to deaf people.

Section 5: Conclusion and Recommendations

Introduction

This chapter is organized into six sections. It opens with a review of the purpose of the study. Section two summarizes the conclusions of each research question. Section three offers recommendations for further research. Section four reflects on the research experience. Section five discusses the implications of the study. The sixth section provides a summary of the entire dissertation.

Review of Purpose and Study Design

America no longer has an economy that depends primarily on manufacturing. Instead, it relies on service industries that require information and communication technology. With traditional employment options for the deaf slowly disappearing, there is little information about the relationship between deaf people's employment and their use of CMC. The purpose of this study was to examine the association between CMC and employment of deaf people. The intent was to produce data that could be used to inform social policy and programs preparing deaf people for employment.

Answers to the study's research questions provided information that guided the study explored information about the demographics of the sample; characteristics of employment; methods of communication; use of computer-mediated technology; degree of job satisfaction; and attachment to the deaf community. The study focused on a nationwide sample of 343 deaf and hard-of-hearing people who voluntarily responded to a national Web survey advertised to the deaf community. The survey was administered in two waves of advertisement. Wave I included weekly advertisements placed on various

online newspapers geared to the deaf community for two months. These included Deafdigest (51,000 subscribers) and Deaf Times (60,000+ subscribers) and Deaf Weekly (11,000 subscribers). Wave II of the study advertised the study for two months through several organizations for the deaf, including Deaf and Hard-of-hearing in Government, Association of Deaf and Rehabilitation Agencies (Maryland State Commission for the Deaf and Hard-of-hearing, District of Columbia Association for the Deaf, Gallaudet University Alumni News (3,200 subscribers), and DeafNetwork.com. Each wave advertised the study with an electronic link to the survey. Potential respondents received the electronic newsletters and newspapers advertising this study early enough to allow sufficient time to take the survey.

Research Questions and Conclusions

The presentation of the conclusions derived from the questionnaire data is organized by a summary of the results and a discussion of the implications for social policy and programs preparing deaf people for employment. The following results and conclusions relate to the four research questions. The data from which conclusions are drawn are provided by 343 respondents representing deaf and hard-of-hearing people in the United States and its territories.

Research Question One

How does CMC associate with deaf people's choice between deaf and general sector employment?

The study investigated how computer mediated communication (CMC) is associated with deaf people's choice between deaf and general sector employment. For the purpose of this study, the general sector includes customers who are deaf, hard-of-hearing, and hearing. The deaf sector serves customers who are deaf or who are hard-of-hearing and prefer to communicate in sign language. For example, a school for the deaf represents deaf-sector employment while a mainstream school represents general sector employment. CMC includes instant messaging(IM), email, direct video chat, video relay services (VRS), and video internet interpreting (VRI) services.

The literature review showed that deaf people join a community organized around deaf culture, discrimination, mistrust of hearing people, and the lack of accessibility (Bauman, 2004; Humphries, 1975). This would lead to the conclusion that, given the opportunity, deaf people would rather work in the deaf sector than in the general sector. The common use of Web cam and video communication led the author to assume that a new labor market emerged for deaf people in the deaf sector in companies that provide Internet-based relay services. However, data show that twice as many deaf people work in the general sector as in the deaf sector.

Despite the ability to communicate through video chat, employees in both sectors share the reliance on email to perform essential tasks in the workplace. Most deaf

workers in both sectors consider email as the most essential computer-mediated form of communication in their jobs. The second most popular means of communication reported by deaf workers in both sectors is American Sign Language (ASL) used through video communication. Deaf workers use direct video communication and video relay services in both sectors but do not commonly use video Internet interpreting.

Cultural affiliation, sense of belonging, and ease of communication steer a deaf person to deaf-sector employment (Hinton, 2003; Lane, 1992; Padden & Humphries, 1988). Yet, over 75% of deaf people consider benefits, salary, and availability of technology as extremely important when looking for employment and only 38% of deaf people consider working with other deaf people as also extremely important. There is little difference in salary or benefits between deaf people working in the general and deaf sector. Deaf people in both sectors work in positions that are relatively equal in hours, salary, and benefits. Type of technology offered in the job is not as important to deaf workers as the existence of computer-mediated technology in the workplace.

Legislation and social services promote inclusion in the general sector. Deaf people might now trust people outside of their community because CMC helps to break down barriers to understanding one another. The Telecommunications Act (1996) assured that telecommunications equipment and services are accessible to people with physical and intellectual disabilities (47 U.S.C § 225). Another explanation might be that legislation promotes inclusion in the work place. Section 508 of the Rehabilitation Act

(1973), which took effect in June 2001, requires that federal employees with disabilities "have access to and use of information and data that is comparable to the access to and use of the information and data by Federal employees who are not individuals with disabilities" (29 U.S.C § 794d (a)(1)(A)(i)). In the past, section 508 has been shown to have minimal effect in creating access to e-government for people with disabilities (Jaeger, 2004). The present study showed that six years after Jaeger's study, computer-mediated technology and section 508 are sustaining, if not increasing the number of deaf people working in a government more and more dependent on the Internet. Yet, this study shows that deaf people remain dependent on government employment in the general sector and on education for employment in the deaf sector.

This study augments the work of Crammatte (1989) and Pressman (1999) by recommending that greater attention be placed on preparing deaf people for entrepreneurship in both sectors. Further, funding should support the advertisement and training of general sector employers on the benefits of using VRI, the use of which is lacking in the general sector. With more deaf-owned businesses in both sectors, employment may increase for deaf people with literacy rates below that of their hearing counterparts. Disability policy should include funding for seed grants to assist deaf entrepreneurs who wish to rely on computer-mediated technology.

Research Question Two

How do deaf people use CMC in both general-sector and deaf-sector employment?

This study investigated how deaf people use CMC in general-sector and deaf-sector employment. In both sectors, deaf workers rely on email more than any other CMC method to complete their tasks. Data from this study confirm previous research findings that literacy would become increasingly important in the 21st-century labor market and that deaf workers in both sectors will rely on email for communication (Bowe, et al., 2005; Power, Power, & Rehling, 2007). Thus, as Lipset and Ray (1996) predicted, the 21st-century service-based economy requires literacy in rapidly changing computer technology, which challenges deaf workers when they compete for jobs in both general and deaf sectors.

Deaf people working in both sectors report video communication as being the second most essential type of CMC. Video relay and video remote interpreting are recent advancements in technology. Deaf people working in the deaf sector use video communication as any employee uses the telephone to communicate with supervisors, coworkers, and customers. In the general sector, video relay service is less widely used, and VRI is virtually nonexistent. Thus, communication between deaf and hearing coworkers relies mostly on email or the ability to lipread, voice, and residual hearing on the part of the deaf person. Similar communication takes place between deaf workers and their supervisors in the general sector. Thus, communication between the two is somewhat inhibited because neither party can communicate freely without an interpreter.

This has implications for the type of supervision a deaf person receives. Although this study shows that deaf people are generally satisfied with supervision in the workplace, it is unclear whether or not chances of promotion or level of satisfaction would improve for the deaf worker if communication between the two were to use VRI for supervision.

The policy implications for people working in the general sector or in government with reliance on email are clear. Literacy must remain the focus of education for deaf children and young adults. Vocational rehabilitation services, while paying for undergraduate degrees, offer little in the way of continued support for deaf people to improve literacy in employment settings. Public funding should support research into software that can translate ASL to speech recognition for hearing people. Vocational rehabilitation support should be extended to help pay for such technology and for supplementing the cost of incorporating it into the employment setting of the deaf worker.

The government mostly relies on the private sector for research and development in communication technology. With respect to job performance evaluations and job satisfaction, future research should investigate the various methods of communication used by supervisors with their deaf employees. Of particular interest is whether VRI changes the experience and participation of deaf employees when meeting with supervisors or when attending meetings with coworkers. Vincent, Deaudelin, and Hotton (2007) found pocket devices that translated sign language into French useful for deaf

employees and employers in France. Several hand-held tablets are entering the electronics market and should be examined for their usefulness to deaf people working in the general sector, both as a means of translating ASL into English and as a telecommunications device. The implications of opening up communication in those two areas rest on the possibility of enhancing job performance, thus extending opportunities for promotion, and increasing job satisfaction.

Video communications do not replace the need for college level literacy in order to participate in the 21st-century labor market. A prudent step toward assuring that the education of deaf children and young adults is adequate to meet the demands of the 21st-century labor market would be to examine the literacy of email communication of deaf workers in both sectors. Research on literacy in the workplace for deaf people would allow the government to identify gaps or issues that inhibit productivity, growth, and promotion among deaf people working in the general sector.

Research Question Three

What are the relationships between CMC, employment sector, personal characteristics, and employment characteristics for deaf workers?

The study investigated whether culturally deaf people would choose to work in the deaf sector rather than the general sector and how CMC may play a role in that decision. The study investigated the relationships between CMC, employment sector, personal characteristics, and employment characteristics for deaf workers. Participants were asked to identify themselves as either deaf or hard-of-hearing. The assumption was

that deaf workers, who adhere to the norms of deaf culture, would identify themselves as deaf rather than hard-of-hearing (Lane, 1992). The survey also examined the degree of hearing loss, type of education setting, preferred language, and hearing status of friends as additional characteristics believed to be related to identification of the culturally deaf (Padden & Humphries, 1999). Deaf people prefer to communicate in sign language; attended schools for the deaf; had either severe or a profound hearing loss; and socialized with deaf people. Twice as many deaf people work in the general sector than in the deaf sector but, of those that work in the general sector, most interact with a combination of deaf and hearing customers.

Deaf people were asked how much they used CMC in each sector. The rise in the video relay industry expanded job opportunities in the deaf sector. Video communication technology has little effect on deaf people's participation in the work force. Most deaf people have jobs that rely on email more than IM or video communications. Those deaf people who work in deaf education or social services have little need to communicate across systems with video since most tasks involve email. Those deaf people who work in the general sector have jobs that require administrative skills and they have little need for face to face or telephone communication that would necessitate video relay.

Video chat, video relay, or video Internet interpreting have not yet opened direct service positions for deaf people in industries that involve hearing customers or clients such as hospitality, banking, or other industries requiring direct client contact. Deaf people in the deaf sector mostly work in education and deaf workers in the general sector

mostly work for the government. Video technology has not expanded job opportunities for deaf people in the private sector. Deaf people hold administrative responsibilities and rely on email in both sectors. The availability of CMC does not influence the degree to which deaf people telecommute either. Most deaf people work 35 hours a week and do not work from home. Deaf people have employment in the deaf sector that requires human interaction and case management or administrative responsibilities in general sector employment.

Crammatte (1288) found a relationship between the level of parent's education and the vocational outcome of the deaf child. This study explored the relationship between CMC and choice of vocation on the part of the deaf worker; it found no relationship between the two. The present study confirms the conclusions drawn by Schein and Delk (1974) who argued that vocational outcomes of deaf people are a result of decisions they make about the type of employment.

Despite the great strides in developing CMC, deaf-sector employment only offers three sources of employment: education of deaf children, social services to deaf people and, most recently, administering video relay services and technical support. The implication for disability policy is that both education and vocational rehabilitation services need to continue to focus on the skills that the job market is demanding of deaf people and should support education and training in those areas. If social policy does not require that the job market dictate the education and training of deaf people, then, in the 21st century, deaf people may find it increasingly difficult to obtain competitive

employment. Schools for the deaf are closing and states are increasing the number of mainstream programs. Social policy should provide employment opportunities for the culturally deaf with poor literacy levels who rely on deaf-sector employment. Government can accomplish this by supporting programs that promote partnerships between private sector employers, schools, and vocational rehabilitation services for deaf young adults.

Research Question Four

What are the relationships between CMC and job satisfaction?

This study investigated whether CMC mitigates potentially negative experiences deaf people might have when working in the general sector. Toward that end, the relationship between job satisfaction of deaf workers in both deaf and general sectors and their use of CMC was examined.

Alderfer's (1972) theory on Motivation in the Workplace with its constructs of existence, relatedness, and growth (ERG) in employment, provides the theoretical framework for this study. The premise of Alderfer's (1972) theory on motivation is that the need for existence, relatedness, and growth are present in all human beings and that the desires related to those needs have as much of an impact on behavior in the workplace as anywhere else. Alderfer suggested that all three needs can be satisfied through targeted interaction in the workplace between employee and coworkers, supervisors, and customers. Alderfer also suggests that the result of not fulfilling those needs will be workers with markedly diminished job satisfaction (p. 14).

Working with hearing people might present several potentially negative psychosocial outcomes that affect a deaf person's ability to satisfy existence, relatedness, and growth needs in the general sector (Higgins, 1987, p. 154). Problems caused by a lack of communication for a deaf person include social and family isolation, depression, and behavior difficulties (Lucas, Schiller & Benson, 2004). Social support is necessary for mental health, which suggests that deaf people might consider social support in a job when deciding whether to apply for it (Larisgoitia, 1996; Young, Ackerman, & Kyle, 2000).

Need for special accommodations, coworkers' lack of disability awareness, and lack of understanding of deaf culture cause stress for the deaf worker in the general sector (Crammatte, 1987). Alderfer's (1972) theory applied to deaf people posits that deaf workers might seek employment in sectors that they believe will offer the greatest opportunity to satisfy all three motivation related needs while causing the least amount of stress.

This study investigated whether CMC creates a workplace in the general sector that enables deaf people to satisfy all three needs described by Alderfer. Job satisfaction was explored measuring deaf people's satisfaction with hearing status of coworkers; challenge of tasks; chances for promotion; benefits; salary; supervision; and technology. Deaf people, whether culturally deaf or not, do not show a preference for working with hearing or deaf coworkers to the degree that they deliberately seek employment in one sector over the other. Satisfaction index scores were not significantly different between

deaf workers in deaf and general sectors. Benefits and salary are two characteristics that support what Alderfer termed "existence needs" and top the list of items that deaf people use to measure job satisfaction and which they consider extremely important when looking for a job. Deaf people consider technology as essential when considering employment characteristics that lead to a high level of job satisfaction. They feel less discrimination based on their deafness in jobs that do not require use of lip reading or voice. Data from this study also show that being able to communicate freely using sign language contributes to job satisfaction as it relates to supervision and discourse with coworkers. Deaf people would be more inclined to seek employment in the general sector if the employer, supervisor, coworkers, and the deaf worker had access to video Internet interpreting.

Feeling a sense of belonging in the workplace does not rank as a high priority among deaf workers as satisfying their need for salary and benefits. Deaf people do not choose employment based on whether the sector offers an opportunity to stay connected with the deaf community. Deaf people use the Internet to remain connected to family and friends through email, IM, and video communications. This study supports previous research that shows CMC is a valued tool which deaf people use to stay connected and which has replaced the need to attend social gatherings to maintain a sense of community (Hogg, Lomicky, & Weiner, 2008).

Computer mediated communication also minimizes feelings of discrimination, which in turn makes working in the general sector attractive to the deaf worker. Knowing

if CMC lessens discrimination by creating opportunities for communication, collaboration, and socialization between deaf and hearing coworkers informs disability policy, and helps to determine funding for services for deaf people entering the workforce.

Data from this study inform disability policy by suggesting that the cultural connection between a deaf person and the deaf community is not undermining legislative efforts to make the general employment sector accessible. Legislation helped to remove systemic barriers to working in the general sector. Computer-mediated communication provides the tools to minimize discrimination and mistrust between hearing and deaf people. Further, CMC equips the general sector to assign tasks and responsibilities to deaf workers that could also maximize the deaf employee's potential for an increase in salary, improved benefits, chances for promotion, and less dependence on government assistance.

Recommendations for Further Research

Additional research should examine the effect that CMC has on breaking down social barriers between deaf and hearing employees. Also, research into job satisfaction for deaf workers in both sectors can inform best practices for vocational rehabilitation counselors and case managers who assist deaf workers to integrate into the labor market. The study did not concentrate on the specific effect CMC has in the private sector for deaf employees or entrepreneurs. Further research should continue the work begun by

Pressman (1999) and examine deaf employees in the private sector for the impact CMC has on their choice between deaf and general sectors.

The study used a Web survey as the method of collecting data. When the study began, it was relatively certain that deaf people rely on the Internet for a number of social and economic tasks. However, as a research tool, it was uncertain if a Web survey would be successful in gathering responses from the deaf community. Generally, it is difficult to gather a significant rate of return with surveys that do not offer incentives (Leedy & Ormrod, 2005). However, using the recommendations suggested by Dillman (2007), the study was advertised to the deaf community by appealing to their sense of advocacy and empowerment and this led to a statistically useful rate of return. First, data from this study were offered to anyone who wished to know the results upon completion. Second, the study was advertised several times prior to making the survey available. Third, the advertised approval of organizations serving deaf people bridged the study's intentions with the values of the deaf community including self determination, empowerment, and transparency of research on the deaf community. Dillman (2007) suggests that for surveys to collect data, they must appeal to the belief that the benefit of investing one's time is greater than the cost of the time and effort. These steps led deaf respondents to feel that the potential benefit of the study to the deaf community outweighs the cost of their time and effort in completing the survey.

The study offers a few additional recommendations with respect to using the Internet for future examination of the deaf community. As Crammatte (1987) showed,

interview surveys gather a great deal of information that inform practice and policy. Future research can use video relay services to conduct interview surveys with deaf people worldwide. If a study were to involve users of ASL or Signed English, technology other than that used in this study can be used to create a multimodal approach to gather data. For instance, researchers can use Adobe Connect Pro to conduct interview surveys with individuals, run focus groups, or perform qualitative interviews in sign language. The Echo360 classroom enables one to record a video of a person using sign language to ask questions and offer choices of answers while simultaneously displaying the questionnaire. The rate of return would most likely include a larger number of participants and a broader cross section of deaf people who differ in level of literacy.

The study pretested the survey for validity and reliability and designed the layout of the survey according to Dillman's (2007) recommendations. However, there is little doubt that adding a video representation of the survey questions would minimize the chances of misunderstanding the questionnaire items. Back translation is a time consuming process that involves several people who can analyze the items in English and ASL to make sure the two modes of communication are in full agreement. Use of sign language in any aspect of researching the deaf population shows respect for deaf people's culture and may elicit support and participation from the deaf community. Another lesson learned from the study is that supervisors should pay particular attention to how job satisfaction surveys are administered to their deaf employees to assure accurate and valid responses.

Research is also needed on how different types of CMC specifically relate to a deaf person's actual choice of employment. Investigation into the cost-effectiveness and work performance of deaf people in both sectors using CMC will prove useful to determine which technology might prove cost effective and which might need government subsidy. The study demonstrates the need for research and development of software that can bridge ASL and English in the workplace so that deaf people with below average levels of literacy are able to find work in the information era.

Cultural Considerations

This study added to the body of knowledge about how to collect data from the deaf community using a Web survey. The deaf community is a closed social system that is guarded against research (Padden and Humphries, 1988). The deaf community's suspicion of researchers from outside the community comes from a long history of abuse and neglect by nondisabled people seeking to either ostracize or repair people with disabilities. Only recently has the public recognized deaf culture and embraced ASL. American Sign Language is now taught in public schools as a foreign language across over 30 states. It is important that future research maintain the practice of asking for endorsements from leading employees, organizations, and businesses serving the deaf community to build trust among deaf people. Statistical analysis of survey data are essential since the study demonstrated that simple cross tabulations are not sufficient to determine type or strength of associations.

It was originally intended to collect descriptive data and to use non-parametric statistics to draw associations between that data and job satisfaction. However, running simple cross tabulations proved insufficient in answering the research questions and an alternative approach was taken. The data were coded to test for significant correlations between use of CMC and job satisfaction. For example, type of education was coded by defining levels of inclusion. Data describing the type of program the respondent attended was rated from least inclusive to most inclusive. A multivariate linear regression of statistically significant correlations was used to determine the strength that CMC with coworkers, supervisors, and customers has on job satisfaction. Further examination of these data, and similar studies in the future could produce rich information about the relationship between CMC and socioeconomic status of deaf people in the United States. Finally, some observations on how it felt to conduct the study may offer insight that will prove useful to others wishing to conduct research on the deaf community.

Reflection on the Research Experience

The study was begun with some degree of trepidation because, like many cultural groups, members of the deaf community guard against research on the deaf community by social scientists who are not deaf. Qualitative studies or interview surveys would be well received because the sample would have seen that the researcher is familiar with their culture and language. Surveys do not allow for such familiarity and therefore, are more suspicious. The fact that the researcher worked at Gallaudet University, one of the

deaf community's cherished institutions, helped to gain some trust from the sample. Eight years of experience at Gallaudet University prior to the study helped to win acceptance as a scholar who recognizes deaf culture as a valued characteristic of the community. This too might have contributed to the response rate of the study. There was a question as to whether or not the sample would respond to advertisements for a Web survey that did not include a video explaining the study in ASL. However, some requests for the data showed that the advertisements for the study properly respected deaf culture. That respect may have overcome some skepticism by the deaf community. Further, offering the data to participants on completion of the study acknowledged the importance of empowerment to the deaf community. The lesson learned here is that when examining the deaf community, or any closed cultural system, researchers from outside the community should collaborate with valued institutions within the community.

Implications

The interface between humankind and CMC exists and ranges from social networking to purchasing goods and services. Software developers essentially design business systems to allow for real time communications from virtually any location with Internet access for both employees and customers. Deaf people are not excluded from advancements in communication technology. IPads offer Facetime, which is an application that allows for seamless video communication. Hospitals use Deafspeak, a mobile video relay computer, so that deaf people in the emergency room do not have to wait for an interpreter to arrive. Higher education is delivered on the Internet in real time

multimedia that include video chat, interpreting, and closed captioning.

Videos posted on the Internet can now have, and in many cases, must have closed captioning. Computer-mediated technology is changing the way business is conducted in both sales and service industries. The study shows that deaf people remain employed during this change in the global economy. While deaf people remained employed during recent changes in the economy, and, while they have benefited from CMC, the deaf community simultaneously faces the promise of further social change and the threat to its socioeconomic gains posed by the current economic crisis.

Social Change

For deaf people, computer-mediated technology is as much of a transformative agent of social change as were the Americans with Disabilities Act of 1990 and the Rehabilitation Act of 1973. The deaf community arose mostly in response to oppression. To survive, deaf people formed a closed socioeconomic system called the deaf community, in which members of the community share a common culture, values, language and a small but sustainable economy. Communication technology profoundly affects how the deaf community functions and its integration with society. Because of computer-mediated technology, the deaf community has opened up and moved considerably toward social integration. Deaf people not only socialize and work among hearing people in white-collar jobs, but they attend mainstream universities and now invite hearing people to learn their language and culture. Through the Internet, the public can learn ASL; read about newsworthy items about deaf people from around the world;

participate in the deaf community blogs; and communicate directly with deaf people through email, IM, and video chat.

The most revealing aspect of computer-mediated technology is its ability to maintain deaf people's participation in the workforce during the socioeconomic changes that mark the 21st century. The study shows that communication technology is responsible for deaf people keeping their jobs while they witness the reduction of traditional jobs for deaf people in education and manufacturing. Service-based industries in an information era would have posed a threat to deaf people if it were not for email, IM, and VRS. Further, the fact that more than two thirds of the deaf population work in general sector employment is a testament to the education they received in both deaf and mainstream schools that enabled them to use the technology that is imbedded in most workplaces.

Computer-mediated technology is transformative in providing the deaf community with an opportunity to create businesses catering to deaf people's needs and preferences, and thus, creating community ownership over the economic success of its members. This study shows the socioeconomic benefit that computer-mediated technology affords to deaf workers. The current economic downturn in the United States is a cause for alarm because it places those opportunities and resources at risk.

Government Spending

The national debt and jobless recovery fuel a national debate over how to control government spending. Federal and state governments have frozen expenditures;

implemented furloughs; cut benefits; and decreased salaries of state and federal workers. The debate centers on possible further curtailment in government spending. Education, vocational rehabilitation, research, welfare, and other human service programs are being targeted for cuts. Historically, discretionary spending is a target for cuts in state and federal budgets during economic downturns and there is no indication that the aftermath of the recent recession is any exception. Discretionary spending includes education, vocational rehabilitation, research, and welfare to work programs.

Budget deliberations threaten the research and social services that contributed to mainstream employment of Deaf people. Federal grants offer opportunities for research, education, training, and job placement for people with disabilities. This essential support contributed to the employment outcomes shown in this study, not the least of which is deaf people's use of computer-mediated technology. Through government assistance, deaf people are making gains in obtaining full time employment in the general sector. Education for deaf children and young adults must remain at a level where they can make gains in literacy because, as the study clearly shows, deaf workers rely on email more than any other CMC in the workplace. Funding for providers of video relay services leads to improved technology and employment opportunities for deaf people which might not exist if it were not for government support.

The Federal Communication Commission reduced its support for relay interpreting . This curtails job opportunities for deaf workers. Further cuts will slow

research into computer-mediated technology and negatively impact deaf owned businesses. As shown in this study, video relay service is an essential tool for deaf people. Making them rely exclusively on email will diminish their employment opportunities. Continued cuts in federal support will lead to layoffs, reductions in wages and benefits of relay workers, diminished services, slowing of research into computer-mediated technology for deaf people, and the eventual closure of deaf owned businesses that provide relay equipment and services. The study shows that video relay service is an essential tool used by deaf people in their jobs. Leaving deaf people to rely on email would diminish deaf people's capacity to broaden their participation in the general sector workforce. The result might be a reversal of the numbers of deaf people migrating into the general sector and possibly, an increase in the number of unemployed deaf people.

Preparing deaf people to work in the information era is more difficult than it was during the manufacturing era. The 21st-century information age requires different skills and knowledge to navigate technology and the Internet. Thus, education of deaf children requires that schools for the deaf and mainstream programs have the staff and technology where such literacy can be taught and skills in navigating computer-mediated technology can be learned. This kind of special education relies on government support to continue helping deaf people to acquire the skills required for working in cyberspace. This study has shown the positive impact of using CMC by deaf people. The important advances that have been made need to be maintained. Federal and state governments need to

consider that cuts in education will place deaf people on the brink of socio-economic disenfranchisement and increased welfare dependency.

Expenditures by the Department of Labor and Department of Education link education, training, and job placement for young adults who are deaf or otherwise disabled. Social service agencies for the deaf provide those services with the support of public funds. These agencies rely on federal and state funding to continue early education in CMC and teaching deaf young adults the necessary skills to work in cyberspace. Eliminating this funding will diminish these services, lead to more unemployed deaf people, and close agencies providing social services to deaf people. The study shows that public funding is instrumental in maintaining deaf people's involvement in the 21st century using CMC. Ultimately, the result of cuts in this support will be an increase in welfare dependency for many deaf people.

Summary

This study examined the relationships among CMC, personal and employment characteristics, and job satisfaction. Four research questions guided the study, which used a survey methodology. A Web survey was sent to a nationwide sample of deaf people who subscribe to online newspapers and who are members of local and national deaf organizations. Respondents who currently work in the United States and its territories met the criteria for inclusion in the study and comprised a purposeful sample that provided responses to the questionnaire. The answers to the four research questions

provided data that resulted in significant findings, implications, and recommendations for social policy and future research.

Implications for social policy, funding, and programming for deaf people were presented. The study suggests that social policy for deaf workers should concentrate on improving literacy among deaf college students, put more funding into research and development of software that can bridge the gap between English and poor literacy among deaf workers, and expand funding and training to encourage deaf people to enter the private sector. Participants in the study suggested that the availability of CMC is important in determining their employment. Participants also reported that video relay Internet interpreting was lacking in the general sector and that email remained the primary means of communication with supervisors, coworkers, and customers.

The usefulness of CMC clearly indicates that education and vocational rehabilitation can prepare deaf persons for employment in the general sector. Specific funding should be set aside to assist deaf entrepreneurs to start businesses that could hire other deaf people regardless of their literacy. A broad awareness campaign to general sector employers is needed about VRI and VRS. Deaf people urgently need to maintain their momentum as they mainstream into the 21st century labor market. Achievements toward social and economic integration of the deaf community can be a model for other disability groups as the United States becomes a service-based economy in an information era.

References

Albrecht, G., & Verbrugge, L. M. (2000). The global emergence of disability. In G. Albrecht, R. Fitzpatrick, & S. Scrimshaw (Eds.). *Handbook of social studies in health and medicine, (*pp. 293-307). London, England: Sage.

Alderfer, C. (1972). *Existence, relatedness, and growth: Human needs in organizational settings*. New York: The Free Press.

Alexander, T., DiNitto, D., & Tidblom, I. (2005). Screening for alcohol and other drug use problems among the deaf. *Alcoholism Treatment Quarterly, 23*(1), 63-78. doi:10.1300/j020v23n01_067

Americans with Disabilities Act of 1990, retrieved http://www.ada.gov/pubs/adastatute08.htm.

Austen, S. & McGrathy, M. (2006). Telementalhealth technology in deaf and general mental health services: Access and use. *American Annals of the Deaf, 151*(3), 311-317. doi:10.1353/aad,2006.0033

Babbie, E. (2004). *The practice of social research* (10th ed.). Australia: Wadsworth.

Bain, K., Basson, S., Faisman, A., & Kanevsky, D. (2005). Accessibility, transcription, and access everywhere. *IBM Systems Journal, 44*(3), 589-603. doi:10.1147/sj.443.0589

Barnartt, S. J. (1996). The educational and occupational attainment of prevocational deaf adults 1972-1991. In C. P. Higgins, & J. E. Nash (Eds.), *Understanding deafness socially: Continuities in research and theory* (2d ed., pp. 60-71). Springfield, Ill: Charles C. Thomas.

Batavia, A. I. (1993). Relating disability policy to broader public policy: Understanding the concept of "handicap." *Policy Studies Journal, 21*(4), 735-739.doi:10.1111/j.15410072.1993.tb02170.x

Bauman, H. D. (2004). Audism: Exploring the metaphysics of oppression. *Journal of Deaf Studies and Deaf Education, 9*, 239-246. doi:10.1093/deafed/enh025

Belknap, P. J., Korwin, K. A., & Long, N. M., (1995). Job coaching: A means to reduce unemployment and underemployment in the deaf community. *Journal of the American Deafness and Rehabilitation Association*, *28*(4), 21-38.

Bertalanffy, L. V. (1975). *Perspectives on general system theory*. New York, NY: George Braziller.

Bertalanffy, L. V. (1968). *General system theory: foundations, development, and application.* London, England: Allen Lane.

Boatner, E. B., Stuckess, R. E., & Moores, F. D. (1964). *Occupational status of the young adult deaf of New England and the need and demand for a regional technical-vocational training center.* West Hartford, CT: American School for the Deaf.

Bowe, F. G. (2002). Deaf and hard-of-hearing Americans instant messaging and e-mail use: A national survey. *American Annals of the Deaf, 147*(4), 6-10.

Bowe, F. G., McMahon, B. T., Chang, T., & Louvi, I. (2005). Workplace discrimination, deafness and hearing impairment: The national EEOC ADA research project. *Work, 25*, 19-25.

Bruce, L. K. (1995). *Understandings of vocational rehabilitation: Voices of deaf and hard-of-hearing people* (Unpublished master's thesis). University of Alberta, Canada.

Brunson, J. L. (in press). Visually experiencing a phone call: The calculated consumer labor deaf people perform to gain access through video relay services. *Disability Studies Quarterly*.

Buchanan, R. M. (1996). *Deaf students and workers in the United States, 1800-1950* (Unpublished dissertation). The University of Wisconsin-Madison.

Carr, M. E. (1951). *A study of the employment status of the adult negro deaf in Arkansas* (Unpublished master's thesis). Hampton Institute, Hampton, VA.

Chaikind, S. (2002, July). *Selected issues in the economics of deaf and hard-of-hearing individuals.* Paper presented at Deaf Way II, Washington, DC.

Clogg, C. C. (1979). *Measuring underemployment: Demographic indicators in the United States.* New York, NY: Academic Press.

Cook, J. D., Hepworth, S. J., Wall, T. D., and Warr, P. B. (1981). *The experience of work*: *A compendium and review of 249 measures and their use.* London, England: Academic Press.

Cordingly, K., & Loy, B. (2008). Enabling work: The role of assistive technologies (AT) in expanding work-at-home opportunities for people with disabilities. *The Exceptional Parent, 38*(1), 17-19. Proquest

Coye, T. H. (1987). Job finding methods. In A. B. Crammatte (Ed.), *Meeting the challenge: Hearing-impaired professionals in the workplace* (pp. 47-72). Washington, DC: Gallaudet University Press.

Craft, S. F. (1996). Telemedicine services: Serving deaf clients through cutting-edge technology. *South Carolina Department of Mental Health. Focus,* l-5

Crammatte, A. B. (1965). *The formidable peak: a study of deaf people in professional employment*. Washington, DC: Gallaudet University Press.

Crammatte, A. B. (1968). *Deaf persons in professional employment*. Springfield, IL: Charles C. Thomas.

Crammatte, A. B. (1987). *Meeting the challenge: Hearing-impaired professionals in the workplace*. Washington, DC: Gallaudet University.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions.* Thousand Oaks, CA: Sage.

Crocket, M. H. (1949). *Employment status of the negro deaf in North Carolina. American Annals of the Deaf, 87,* 449-450.

Deaf and Hard-of-hearing in Government, Inc. (August, 2008). *Video Communication Survey Results*. Retrieved from http://www.DHHIG.org

Debevc, M., & Peljhan, Z. (2004). The role of video technology in on-line lectures for the deaf. *Disability and Rehabilitation, 26*(17), 1048-1059. Proquest

Denzin, N. K., & Lincoln, S. Y. (Eds.). (1994). *The handbook of qualitative research.* Thousand Oaks, CA: Sage.

Department of Health and Human Services. (June 18, 2001). *The new freedom initiative: Executive order 13217.* Retrieved from http://www.cms.hhs.gov/NewFreedomInitiative/2009

Dick, J. E. (1996). *Signing for a high: A study of alcohol and drug use by deaf and hard-of-hearing adolescents* (Doctoral dissertation). Retrieved from UMI. (Order No. 9633689)

Dillman, D. (2007). *Mail and Internet surveys: A tailored design method.* Hoboken, NJ: Wiley.

Dowler, D. L., & Walls, R. T. (1996). Accommodating specific job functions for people with hearing impairments. *Journal of Rehabilitation, 62*, 35-43. Proquest.

Dubois, B. & Miley, K. K. (2005). *Social work: An empowering profession* (5th ed.). Boston MA: Pearson.

Edmunds, H. C. (1951). *A study of the employment status of the Negro deaf in Tennessee* (Unpublished master's thesis). Hampton Institute, Hampton,VA.

Fernandez, J. K., & Myers, S. S. (in press). Inclusive deaf studies: Barriers and pathways. *Journal of Deaf Studies and Deaf Education.*

Fink, A., & Kosecoff, J. (1985). *How to Conduct Surveys*. Beverly Hills, CA: Sage.

Foster, S. (1992). *Working with deaf people: Accessibility and accommodation in the workplace.* Springfield, IL: Charles C. Thomas.

Gallaudet Alumni Survey (2006). Retrieved on Sept. 1, 2009 from http: //aaweb.gallaudet.edu/documents/presofc/alumni_survey-2006_report.pdf

Glicken, M. D. (2003). *Social research: A simple guide*. Boston, MA: Allyn and Bacon.

Geyer, P. D., & Schroedel, J. G. (1998). Early career job satisfaction for full-time workers who are deaf or hard-of-hearing. *Journal of Rehabilitation, 64*(1), 33-37. Proquest

Geyer, P. D., & Schroedel, J. G. (1999). Conditions influencing the availability of accommodations for workers who are deaf or hard-of-hearing. *Journal of Rehabilitation, 65*(2), 42-50. Proquest

Gruneberg, M. M. (1979). *Understanding job satisfaction*. New York, NY: John Wiley & Sons.

Gubrium, J. F., & Holsten, J. A. (1997). *The new language of qualitative method*. New York, NY: Oxford University Press.

Harper, B., O'Connor, B., & Owens, J. (2008). A quantum change in deaf people's lives: From text to videotelephony. *The International Journal of Technology, Knowledge, and Society, 2*, 25-32.Proquest

Hinton, C. A. (2003). The perceptions of people with disabilities as to the effectiveness of the Americans with disabilities act. *Journal of Disability Policy Studies, 13*(4), 210-223.

Hogg, N. M., Lomicky, C. S., & Weiner, S. F. (2008). CMC and the Gallaudet University community: A preliminary report. *American Annals of the Deaf, 153*(1), 89-96.

Humphreys, D. R., & Johnson, L. A. (1951). *A study of the employment status of the negro deaf in Texas* (Unpublished master's thesis). Hampton Institute, Hampton, VA.

Jaeger, P. T. (2004). The social impact of an accessible e-democracy. *Journal of Disability Policy Studies 15* (4) 19-26.

Johnson, L. (2004). Utah Deaf video conferencing model: Providing vocational services via technology. *Journal of Rehabilitation, 70*(4), p. 33-37.

Jones, W. L. (1951). *The employment status of the Negro deaf in Virginia* (Unpublished master's thesis). Hampton Institute, Hampton, VA.

Karchmer, M., Lam, K., Mitchell, R., Hotto, S. (2006). *Gallaudet University Alumni Survey*. Washington, DC: Gallaudet University, Gallaudet Research Institute.

Keating, E., & Mirus, G. (2003) American sign language in virtual space: Interactions between deaf users of computer-mediated video communication and the impact of technology on language practices. *Language in Society, 32*, 693-714.doi:10.1017/s0047404503325047

Klein, D. H. (1988). *Follow-up study of mainstreamed hearing impaired high school graduates from 1980-1985* (Unpublished doctoral dissertation). University of Pittsburgh, PA.

Kluver, J. (2002). *An essay concerning sociocultural evolution: Theoretical principles and mathematical models.* Boston, MA: Kluver.

Kodama, M. (2000). New multimedia services in the education, medical and welfare sectors. *Technovation, 20*, 321-331.doi10.1016/s0166-4972(99)00134-0

Ladd, P. (2003). *Understanding deaf culture: In search of deafhood.* Buffalo, NY: Multilingual Matters.

Lane, H. (1992). *The mask of benevolence: disabling the deaf community.* New York, NY: Knopf.

Lane, H. (2005). Ethnicity, ethics, and the deaf-world. *Journal of Deaf Studies and Deaf Education, 10*(3) 291-308.doi10.1093/deafed/edi030

Lane, H., Hoffmeister, R., & Bahan, B. (1996). *A journey into the deaf-world*. San Diego, CA: Dawn Sign Press.

Lewin, K. (1951). *Field theory in social science*. New York, NY: Harper and Row.

Larisgoitia, D. C. (1997). *Factors that affect the employment status of adults who are deaf*(Unpublished doctoral dissertation). Temple University, Philadelphia, PA.

Leigh, W.I. (2009). *A lens on deaf identities*. New York, NY: Oxford University Press.

Light, J. S. (2001). Separate but equal? Reasonable accommodation in the information age. *Journal of the American Planning Association, 67*(3), 263-278. doi10.1080/01944360108976235

Lillienfeld, R. (1978). *The rise of systems theory an ideological analysis.* New York, NY: John Wiley & Sons.

Lipset, S. M., & Ray, M. R. (1996). Technology, work, and social change. *Journal of Labor Research, 17*(4), 613-626.doi10.1007/bf02685803

Lipton. D. S., & Goldstein, M. F. (1997). Measuring substance abuse among the deaf. *Journal of Drug Issues, 27*(4), 733-742. Proquest

Lipton, D. S., Goldstein, M. F., Fahnbulleh, F. W., & Gertz, E. N. (2002). The interactive video-questionnaire: A new technology for interviewing deaf persons. *American Association of the Deaf, 141*(5), 370-378.

Lucas, J. W., Schiller, J. S., & Benson, V. (2004). Summary health statistics for U.S. adults: National Health Interview Survey, 2001. National Center for Health Statistics. *Vital and Health Stat. 10* (218). Proquest

Luft, P. (2000). Communication barriers for deaf employees: Needs assessment and problem solving strategies. *Work, 14*, 51-59. Proquest

Lunde, A. S., & Bigman, S. K. (1959). *Occupational conditions among the deaf*. Washington, DC: Gallaudet University.

Macleod-Gallinger, J., & Foster, S.(1996). *Deaf supervisors and hearing employees.* Retrieved on June 16, 2009 from http://www.sunsite.utk.edu.cod/pec/products/1996/Macleod.pdf

Markham, A. N. (2004). Internet communication as a tool for qualitative research. In D. Silverman (Ed.), *Qualitative research: Theory, method, and practice* (2nd ed.) London, England:Sage.

Martens, E. H. (1937). *The deaf and hard-of-hearing in the occupational world.* Washington, DC: United States Department of the Interior.

Maslow, A. H. (1943). A theory of human motivation. *Psychology Review, 50*, 370-396.

Maslow, A. H. (1954). *Motivation and personality*. New York, NY: Harper and Brothers.

Maslow, A. H. (1982). *Toward a psychology of being* (2nd ed.). New York, NY: Van Nostrand Reinhold.

Maslow, A. H. (1998). *Maslow on management*. New York, NY: John Wiley and Sons.

Mason, J. (1996). *Qualitative research*. London, England: Sage.

Meadow-Orlans, K. P. (2000). Deafness and social change. In P. E. Spencer, C. J. Erting, & M. Marschark (Eds.). *The deaf child in the family and at school*. Mahwah, NJ: Lawrence Erlbaum.

Mowry, R. L., & Anderson, G. B. (1993). Deaf adults tell their stories: Perspectives on barriers to job advancement and on-the-job. *Volta Review, 95*(4), 367.

National Center for Education Statistics (1994). *Deaf and hard-of-hearing students in postsecondary education*. (NCES publication No. 94-394). Washington, DC: U. S. Government Printing Office.

National Organization on Disability (2004). *Harris survey of Americans with disabilities*. Retrieved April 1, 2005, from http://www.nod.org/index.cfm.

National Technical Institute for the Deaf (2008). *Annual report.* Rochester, NY: Rochester Institute of Technology.

Neuman, L. W. (2004). Basics of social research. Boston, MA: Pearson.

Neuman, L.W. (2006). *Social research methods* (6th ed.). Boston, MA: Pearson.

New Freedom Initiative. (2001). Retrieved January 31, 2009 from Http://www.cms.hhs.gov/NewFreedomInitiative

Padden, C., & Humphries, T. (1988). *Deaf in America: Voices from a culture*. Cambridge, MA: Harvard University Press.

Pfeiffer, D. (1993). Overview of the disability movement. *Policy Studies Journal, 21*(4), 724-734.

"Phone program for deaf is questioned." *Philadelphia Inquirer. | 01/25/2009.* Retrieved January 26, 2009 from http://www.philly.com/philly/business/38286939.html

Pollock, N. J. (1993). *The relationship between selected undergraduate status characteristics and factors pertaining to job status twenty-two months after graduation: A study of deaf university graduates* (Unpublished doctoral dissertation). The American University, Washington, DC.

Power, D, & Power, M. R. (2004). Everyone here speaks TXT: Deaf people using SMS in Australia and the rest of the world. *Journal of Deaf Studies and Deaf Education*, *9*(3), 334-343.doi:10.1093/deafed/enh036

Power, D., Power, M. R., & Rehling, B. (2007). German deaf people using text communication: Short message service, TTY, relay services, fax, and e-mail. *American Annals of the Deaf, 152*(3), 291-301.doi:10.1353/aad.2007.00390

Preminger, J. E. (1997). Computer assisted remote transcription (CART): A tool to aid people who are deaf or hard-of-hearing in the workplace. *Volta Review*, *99*(4), 218-229.

Pressman, S. E. (1999). *A national study of deaf entrepreneurs and small business owners: Implications for career counseling* (Unpublishedd). Virginia Polytechnical Institute and State University, Blacksburg, VA.

Raosoft, Inc. (2009). Retrieved on 2/11/2009 from http://Raosoft.com/samplesize.html

Rawlings, B., King, S. J., Karchmer, M. A., & Brown, S. C. (1985). *Gallaudet college alumni survey*. Washington, DC: Center for Assessment and Demographic Studies.

Rawlings, B., King, S. J., Skilton, J. C., & Rose, D. E. (1993). *The deaf population of the United States.* Washington, DC: Gallaudet Research Institute and the Office of Institutional Research, Gallaudet University.

Rehabilitation Research and Training Center (2005). *Reaching hard-of-hearing workers in the mainstream: Implications for consumers and human service professionals.* University of Arkansas: Fayetteville, Arkansas.

Rehabilitation Services Administration (2009). *RSA: About RS.* Retrieved September 1, 2009, 2009, from http://www.ed.gov/about/offices/list/osers/rsa/about.html

Saladin, S. P. (2004). *Psychosocial variables in the adoption of assistive technology among deaf and hard-of-hearing adults*. University of Texas, Austin. Retrieved from UMI. (Order number 3150722)

Salkind, N. J. (2000). *Statistics for people who think they hate statistics*. Thousand Oaks, CA: Sage.

Schein, D. J., & Delk, M. T. (1974). *The deaf population of the United States*. Silver Spring, MD: National Association of the Deaf.

Schein, J. Understanding deafness socially. In the Demography of Deafness, Higgins, P., & Nash, J. Eds., pp. 1-12. Springfield, Il: Charles C. Thomas.

Schirmer, B. R. (2001). *Psychological, social, and educational dimensions of deafness*. London, England: Allyn and Bacon.

Schroedel, J., & Geyer, P. (2000, October). Long-term career attainments of deaf and hard of hearing college graduates: results from a 15 year follow up survey. American Annals of the Deaf, 145(4), 303-314.Proquest

Silverman, D. (Ed.). (2004). *Qualitative research: Theory, method and practice* (2nd ed.). London, England: Sage.

Terzian, A. L., & Saari, M. E. (1982). *Employment and related life experiences of deaf person in New Jersey*. New Brunswick, NJ: Institute of Management and Labor Relations, Center for Human Resources.

Tighe, R. J. (1994). *The impact of using computer technology on people with disabilities* (Unpublished doctoral dissertation). University of Toronto, Canada.

The Rehabilitation Act of 1973. *Pub. law 93-112 93rd Con., H.R. 8070.* Retrieved on March 1st, 2010, from http://ftp.resource.org/gao.gov/93-112/00005FAE.pdf.

U.S. Department of Labor. (2007). *How many people with disabilities are working?* Office of Disability Employment Policy Workforce, Opportunity, and Leadership. Retrieved on December. 10th, 2009 from http://www.dol.gov/odep/faqs/working.htm

U.S. Department of Labor (2008). *Tomorrow's jobs.* Occupational outlook handbook 2008-2009. Retrieved on October. 10th, 2009, from http://www.bls.gov/oco/reprints/ocor001.pdf

U. S. Equal Employment and Opportunity Commission (2009). *ADA charge data by impairments/bases-receipts FY 1997-FY 2008.* Retrieved on October. 20th, 2009 from http://www.eeoc.gov/stats/ada-receipts.html

Valentine, G., & Skelton, G. (2008). Changing spaces: The role of the Internet in shaping deaf geographies. *Social & Cultural Geography, 9*(5), 469-485.doi:10.1080/14649360802175691

Vincent, C., Deaudelin, I., & Hotton, M. (2007). Pilot on evaluating social participation following the use of an assistive technology designed to facilitate face to face communication between deaf and hearing persons. *Technology and Disability*, *19*, 153-167.Proquest

Watson, S. D. (1993). Disability policy as an emerging field of mainstream public policy research and pedagogy. *Policy Studies Journal, 21*(4), 720-723. doi:1111/j.1541-0072.1993.tb02168.x

Wheeler-Scruggs, K. (2003). Discerning characteristics and risk factors of people who are deaf and low functioning. *Journal of Rehabilitation*, *69*(4), 39-46.

Welsh, W. A., & Foster, S. B. (1991). Does a college degree influence the occupational attainments of deaf adults? An explanation of the initial and long-term impact of college. *Journal of Rehabilitation, 57*(1), 41- 56.

Winn, S. (2006). Is there a link between hearing aid use, employment, and income*? American Annals of the Deaf, 151*(4), 432-441. doi:10.1353/aad.2006.0048

Woodcock, K., Rohan, M., & Campbell, L. (2007). Equitable representation of deaf people in mainstream academia: Why not? *Higher Education, 53*(3), 359-379.

Yin, K. R. (1994). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.

Zastrow, C. H., & Kirst-Ashman, K. K. (Eds.). (2007). *Understanding human behavior and the social environment* (8th ed.). Chicago, IL: Nelson-Hall.

Appendix A: Deaf Employment and Technology Survey (DETS)

Deaf Employment and Technology Survey

INTRODUCTION TO THE STUDY

Thank you for giving consideration to take part in this research study on how computer mediated communication is associated with the employment of deaf people. Your generosity in time and effort will add to Deaf Studies and help to highlight the current employment of deaf people.This survey is for people who are currently employed.

Background Information:
Little research exists that investigates how deaf people use computer mediated communication in the workplace and whether it is associated with the type of job they choose. The purpose of this study is to investigate the association between computer mediated communication, personal, and employment characteristics.

This study asks you to complete a survey that will include some personal characteristics, your current employment, and use of computer mediated communication.

Your participation should take approximately 20 minutes.

Risks and Benefits of participating in the Study:
As with any survey, there may be some questions that are uncomfortable to answer. The potential benefit of participating in this study is adding to the body of knowledge about deaf people in the United States and Deaf Studies in particular.

Compensation:
There is no compensation for participating in this study.Participation is voluntary.

Conflict of Interest:Participation in this study does not present a conflict of interest for the researcher.

CONFIDENTIALITY:
ALL information that you provide will be kept anonymous and confidential.If your data are used in a publication or presentation, your name or other identifying information will not be shown.

CONTACT INFORMATION:The principal investigator for this study is James Schiller,a Doctoral student at Walden University, School of Human Services and a faculty member at Gallaudet University's Department of Social Work.

Contact address is: Social Work Department, HMB338B, Gallaudet University. You may contact the researcher at any time in the course of this study via videophone at 202-651-7064 Voice and VP, or email at Jschi001@waldenu.edu, or James.Schiller@gallaudet.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. A relay, either tty or VRS will be needed as Dr. Leilani is hearing. Walden University's approval number for this study is ####### and it expires on IRB will enter expiration date.

PROCEDURE

The following are general instructions for this survey:

The survey will ask you for some information:
A)about your current employment,
B)about your communication preferences
C)about Computer Mediated Communication in your job
D)about your general characteristics and background

Deaf Employment and Technology Survey

Once you have answered all the items you wish to respond to on each page, the survey will direct you to click "NEXT" and proceed to the next page. You may navigate back and forth throughout the survey by clicking either "previous (prev)" and "next" buttons at the bottom of each page.

The black bar at the top of each page will indicate the percent of the survey you have completed at that point.

At any point, you may exit the survey by clicking the button on the upper right side of your computer screen marked "exit this survey." You answers will NOT be saved and will NOT be submitted to the study.

On the last page of the questionnaire, there is a button on the bottom of the page marked "Done" click that button to submit the questionnaire and exit the survey web site. Please click that button and exit from the web page.

Please keep in mind that the questionnaire should only be submitted once.

CONSENT

I have read the INFORMATION AND PROCEDURE PAGES and agree to participate in James Schiller's study on investigating computer mediated communication technology use among deaf people in the workplace. I understand that I can choose not to answer any question and I can withdraw from this study at any time. by choosing " not to participate " below, you will be taken directly to the end of the questionnaire and exit the survey.

You may save this page for your records by by right clicking on your computer mouse and then clicking bookmark this page.

1. Do you consent to participate in this study?

◯ Yes, I consent to participate in this survey

◯ I choose not to participate

EMPLOYMENT CHARACTERISTICS

This section asks you about the nature of your current employment including questions about amount of time working, occupation, consumers, co-workers, and salary. These data will help paint a picture of what current employment looks like for deaf people in the U.S.

Deaf Employment and Technology Survey

2. My primary job is?

- ◯ Full time (35 or more hours per week)
- ◯ Full time-temporary (has a specific end date)
- ◯ Part time (under 35 hours a week)
- ◯ Part time and temporary (has a specific end date)

3. Which major grouped occupation does your job belong to? (Please make sure you CLICK below and scroll up and down the list to make sure you see all items in the list)

If your occupation group is not listed, please type it in the box provided.

- ◯ Management
- ◯ Business and Financial Operations
- ◯ Computer and Mathematical Sciences
- ◯ Architecture and Engineering
- ◯ Life, Physical, and Social Sciences
- ◯ Community and Social Services
- ◯ Legal
- ◯ Education Training and Library
- ◯ Arts, Design, Entertainment, Sports, and Media
- ◯ Healthcare practitioners and Technical Occupations
- ◯ Healthcare support
- ◯ Protective service
- ◯ Food Preparation and Serving Related
- ◯ Building and Grounds, Cleaning, and Maintenance
- ◯ Personal care and Service
- ◯ Sales and Related
- ◯ Office and Administrative Support
- ◯ Farming, Fishing, and Forestry
- ◯ Construction and Extraction
- ◯ Installation, Maintenance, and Repair
- ◯ Production

Deaf Employment and Technology Survey

- ◯ Transportation and Material Moving

Other (please specify)

4. Which best describes your employment setting?

- ◯ Private business
- ◯ Self employed (own business)
- ◯ Educational Institution
- ◯ Government(federal, state, local, non-educational)

5. Which best describes your customers, clients, or students(if you work in education)?

- ◯ Deaf people
- ◯ Hearing people
- ◯ Mostly deaf and some hearing people
- ◯ Mostly hearing and some deaf people
- ◯ About the same number of deaf and hearing people

6. Which item best describes your co-workers?

- ◯ Deaf people
- ◯ Hearing people
- ◯ Mostly deaf with some hearing people
- ◯ Mostly hearing with some deaf people
- ◯ About the same number of deaf and hearing people

7. What percent of your job do you complete at home?

- ◯ 1-24%
- ◯ 25-49%
- ◯ 50-74%
- ◯ 75-100%
- ◯ I do not work at home.

Deaf Employment and Technology Survey

8. Your 2010 salary will be? (Please click below to see the choice of salary brackets.)

- ◯ less than $20,000
- ◯ Between $20,000 and 29,999
- ◯ Between $30,000 and 39,999
- ◯ Between $40,000 and 49,999
- ◯ Between $50,000 and 59,999
- ◯ Between $60,000 and 69,999
- ◯ Between $70,000 and 79,999
- ◯ Between $80,000 and 89,999
- ◯ Between $90,000 and 99,999
- ◯ Over $100,000

9. Do you have hearing co-workers?

- ◯ yes
- ◯ no

10. Do you have deaf co-workers?

- ◯ yes
- ◯ no

COMMUNICATION WITH HEARING CO-WORKERS

11. How comfortable are you in communicating with your HEARING co-workers using the following methods?

	Very comfortable	Comfortable	Uncomfortable	Do not use
Writing or Typing	◯	◯	◯	◯
Speech	◯	◯	◯	◯
Sign Language without speech	◯	◯	◯	◯
Sign language with speech at the same time (symcom)	◯	◯	◯	◯
Fingerspelling only	◯	◯	◯	◯

COMMUNICATION WITH DEAF CO-WORKERS

Deaf Employment and Technology Survey

12. How comfortable are you in communicating with your DEAF co-workers using the following methods?

	Very comfortable	Comfortable	Uncomfortable	Do not use
Writing or Typing	◯	◯	◯	◯
Speech	◯	◯	◯	◯
Sign Language without speech	◯	◯	◯	◯
Sign language with speech at the same time (symcom)	◯	◯	◯	◯
Fingerspelling only	◯	◯	◯	◯

TECHNOLOGY

The following questions will ask you what specific technology you use when communicating with others while at work. These data will help describe the kind of resources deaf people use in their jobs.

13. How much of your communication with co-workers involves using a video phone or webcam?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have a videophone or webcam

14. How much of your communication with hearing co-workers in the same building involves using Video Remote Interpreting (NOT VRS)?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have Video Remote Interpreting Service
- ◯ I do not have a video phone or webcam

Deaf Employment and Technology Survey

15. How much of your communication with HEARING co-workers outside of your office involves using Video Relay Services (NOT VRI)?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have access to a video phone or webcam
- ◯ I do not have VRS service

16. How much of your work related communication with people other than co-workers involves using Video Relay Services (VRS)?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have VRS service
- ◯ I do not have access to a video phone or webcam

17. How much of your communication with co-workers involves using email?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have access to email

18. How much of your communication with co-workers involves using Instant Messaging(IM)?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have access to IM

Deaf Employment and Technology Survey

19. How much of your work related communication with people other than co-workers involves using email?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have access to email

20. How much does your work related communication with people other than co-workers involves using Instant Messaging (IM)?

- ◯ All of my communication
- ◯ Most of my communication
- ◯ Some of my communication
- ◯ None of my communication
- ◯ I do not have access to IM

21. How much does your primary job responsibilities depend on using the following technology? (5=the item is essential to performing your tasks and 1=the item is not needed.)

	5	4	3	2	1	item not available
e-mail	◯	◯	◯	◯	◯	◯
instant Messaging	◯	◯	◯	◯	◯	◯
video/webcam	◯	◯	◯	◯	◯	◯
video Relay Services	◯	◯	◯	◯	◯	◯

JOB SATISFACTION

Job satisfaction is consistently explored in most studies concerning employment and helps to inform employers how to attract workers. The following few questions ask you how satisfied you are with some aspects of your current job.

22. How challenging is your job for you?

- ◯ Consistently challenging
- ◯ Sometimes challenging
- ◯ Not challenging
- ◯ Prefer not to answer

Deaf Employment and Technology Survey

23. How satisfied are you with your chances for promotion in your current job?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied
- ◯ No opinion
- ◯ Prefer not to answer

24. How satisfied are you with the supervision you receive?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied
- ◯ No opinion
- ◯ Not applicable
- ◯ Prefer not to answer

25. How satisfied are you with your working relationship with co-workers?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied
- ◯ I have no co-workers
- ◯ No opinion
- ◯ Prefer not to answer

Deaf Employment and Technology Survey

26. How satisfied are you with salary or income?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied
- ◯ No opinion
- ◯ Prefer not to answer

27. Suppose you were looking for a job, how important are the characteristics listed below to you?

	Very Important	Important	Not important
Deaf co-workers	◯	◯	◯
Hearing co-workers	◯	◯	◯
Challenging tasks	◯	◯	◯
Opportunity for promotion	◯	◯	◯
Benefits	◯	◯	◯
Salary	◯	◯	◯

28. How often do you socialize with co-workers about things other than work?

- ◯ Often
- ◯ Sometimes
- ◯ Never

29. Mark the extent you agree with this statement:
"I have felt discriminated against in my current job because of my hearing loss."

- ◯ Strongly Agree
- ◯ Agree
- ◯ Neither Agree or Disagree
- ◯ Disagree
- ◯ Strongly Disagree

SOCIAL

The next few questions will ask you about the community to which you belong outside of work. This information often helps to understand employment choices.

Deaf Employment and Technology Survey

30. People you mostly socialize with outside of work are?

- ◯ Deaf people who use sign language (ASL,SEE,other)
- ◯ Hard of hearing and oral deaf people who do not sign
- ◯ Hearing people who sign
- ◯ Hearing people who do not sign

31. How do you prefer to communicate with friends?

- ◯ Signed English (PSE,SEE)with speech
- ◯ Signed English (PSE, SEE) without speech
- ◯ American Sign Language (without speech)
- ◯ American Sign Language (with speech)
- ◯ Fingerspelling
- ◯ English (Written)only
- ◯ English (Spoken)only

Other (please specify)

32. How many of your friends use sign language to communicate with you?

- ◯ All
- ◯ Most
- ◯ Some
- ◯ None

33. Many people have access to IM, e-mail, and webcams. When you are contacting friends and family members from work, which technology do you use?

	Most often used	Used sometimes	Rarely used	Never used
IM	◯	◯	◯	◯
E-mail	◯	◯	◯	◯
Videophone	◯	◯	◯	◯
Webcam (i.e google video chat, ms messenger,Ichat, or yahoo)	◯	◯	◯	◯

EDUCATION

Deaf Employment and Technology Survey

The next few questions will ask you about your educational background.

34. Which type of elementary school did you attended? (You can mark more than one)

- ◯ School for the deaf
- ◯ Mainstream school with other deaf students
- ◯ Mainstream school without other deaf students
- ◯ Home Schooled
- ◯ None

35. Which type of middle school did you attended? (You can mark more than one).

- ◯ School for the deaf
- ◯ Mainstream school with other deaf students
- ◯ Mainstream school without other deaf students
- ◯ Home School
- ◯ None

36. Which type of high school you attended? (You can mark more than one)

- ☐ School for the deaf
- ☐ Mainstream school with other deaf students
- ☐ Mainstream school without other deaf students
- ☐ Home School
- ☐ None

37. Please mark the highest education degree earned.

- ◯ Less than High School or GED
- ◯ High school diploma or GED
- ◯ Some college
- ◯ Undergraduate degree
- ◯ Graduate degree
- ◯ Post-Masters study
- ◯ Doctorate

Deaf Employment and Technology Survey

38. If you earned a bachelor or associate degree, or are earning one now, mark the answer that best describes the college or university.

- ◯ Mainstream college or university with other deaf students
- ◯ Mainstream college or university without other deaf students
- ◯ College or university for deaf and hard of hearing students
- ◯ Mainstream college with A deaf and hard of hearing program
- ◯ This question does not apply to me

39. If you received a graduate degree (or earning one now)which best describes the college or university you received the degree from or are currently attending?

- ◯ Mainstream college or university with other deaf students
- ◯ Mainstream college or university without other deaf students
- ◯ College or university for deaf and hard of hearing students
- ◯ Mainstream college with a program for deaf and hard of hearing
- ◯ This question does not apply to me

PERSONAL CHARACTERISTICS

The next few questions ask for some basic information including nature of hearing loss, sex, age, and education status.

40. I am

- ◯ Female
- ◯ Male

41. What race do you identify with the MOST?

- ◯ White
- ◯ Black or African American
- ◯ American Indian and Alaska Native
- ◯ Asian
- ◯ Hispanic
- ◯ Native Hawaiian and Other Pacific Islander

Other (please specify)

[ ]

Deaf Employment and Technology Survey

42. How old were you at your last birthday?

43. I am

- ◯ Hard-of-Hearing
- ◯ Deaf
- ◯ Not Deaf or Hard- of- Hearing

Other (please specify)

44. The extent of your total level of hearing loss is?

- ◯ Less than 70db or less than severe
- ◯ Between 71-90db or sever
- ◯ More than 90db or profound
- ◯ Unknown

45. how old were you when you first noticed a hearing loss or became deaf?

- ◯ Less than 1 year
- ◯ Between 1 and under 3 years old
- ◯ Between 3 and 6 years old
- ◯ Over 6 years old
- ◯ unknown

STATEMENT OF APPRECIATION

Thank you very much for either considering this study and/or participating in it. Your time and effort are appreciated! I look forward to opportunities to share the results with the D/deaf community and other stakeholders. Please feel free to contact me at James.Schiller@gallaudet.edu if you wish to know the survey results.

PILOT STUDY QUESTIONS

I want to thank you for your time and effort thus far. I just have a few more questions to ask you about your overall experience answering this questionnaire. Some questions will provide you an opportunity to type your answer. Doing that will help me improve this survey and is greatly appreciated.

Deaf Employment and Technology Survey

46. How would you rate the length of the survey?

- ◯ Too long, became tired of answering questions.
- ◯ Long, but not tedious.
- ◯ Neither too long or too short.
- ◯ Short, could have asked more questions if needed.

Any other comment on the length?

47. What questions did did you find confusing or unclear?

48. How long did it take you to complete the questionnaire not including these summary questions?

- ◯ 0-5 minutes
- ◯ 5-10 minutes
- ◯ 10-15 minutes
- ◯ 15-20 minutes
- ◯ 20-25 minutes
- ◯ 25-30 minutes

49. Did any question make you feel uncomfortable to the point that you were hesitant to answer it? If so what suggestion do you have to help me make necessary changes to the question?

- ◯ Yes
- ◯ No

If yes, which ones?

50. Was the purpose of the questionnaire clear?

Deaf Employment and Technology Survey

51. Did the questionnaire hold your interest until the end? Is there anything about the questionnaire that could be improved to make it more interesting?

52. The intention is to advertise this survey on various deaf websites and invite participation. What recommendations would you make about what might attract the deaf community to participate in this survey? Your feedback is most valued!

53. Is there anything else you noticed while answering this questionnaire that I have not already asked about. Please feel free to type any comment you wish to make.

Appendix B: Request for Participation in the Pilot Study

Dear _____

I am writing to you because we have had a long standing relationship as colleagues in providing human services and education to deaf and hard-of-hearing people. As you might remember, I am pursuing my doctorate in social policy and planning at Walden University, School of Health and Human Services. The dissertation question focuses on the relationship of CMC on the employment of deaf people. I trust you agree that a study of this nature could prove useful to colleagues of ours in both human services and education of the deaf, not to mention deaf and hearing employers.

I am asking for your assistance by participating in a pilot study of a Web survey I intend to use to collect data. With your approval, I will send you the link to the survey and from that point, the design should be self explanatory. Under each question, I provide an opportunity for feedback on the clarity and format of the question. A few questions at the end of the survey ask you to comment on the overall experience. The survey is intended to take approximately 20 minutes.

Appendix B: Request for Participation in the Pilot Study (Cont.)

Participation in the study is anonymous, as there is no way to pair responses to specific individuals.

Should you agree to participate in the pilot study all that is required is a return email indicating your agreement. A decision not to participate in the pilot study will have no affect on our relationship as colleagues. Your cooperation is appreciated.

Please feel free to contact me via email or VP (XXX) XXX-XXXX should you wish to discuss this further.

Sincerely,
James Schiller

Appendix C: Request for Advertisement of the Study

Dear _____

I am writing to you in the hope that you may provide me with some assistance. I am a doctoral student at Walden University School of Health and Human Services. My dissertation examines the relationship that CMC has on the employment of deaf people. I will be using a Web survey to collect data and would like to advertise my study on your website for a limited time. After viewing the advertisement, you will have the option to click on a Web link to enter a separate website, which is hosting the survey. There is no compensation for participating in this study. The principal investigator for this study is James Schiller, a Doctoral student at Walden University, School of Health and Human Services. I f you have any questions regarding this research or the survey, You may contact the researcher at via videophone at [redacted] or email at [redacted] Thank you for considering this request. I look forward to hearing from you.

James Schiller MSW, LCSW-C

Appendix D: Request to Use Allen Crammatte's 1987 Survey

Hello [redacted],

I am working on my dissertation and am requesting to use parts of or the entire employment survey used in Allen Crammatte's work "Meeting the Challenge" 1987. I plan on using the survey, or parts of it, in my study of how technology is impacting employment of deaf people in the U. S.

I would create an online survey using the exact same questions and choices of answers used in his study. Of course the appropriate citation will be made.

Please let me know if there is anything I need to add to this request. Thank you for your assistance.

Jim Schiller

James Schiller MSW, LCSW-C

Mr. Schiller,

Gallaudet grants you permission to use parts of or the entire Professional Employment Questionnaire, Appendix C, pages 195 - 204 from *Meeting the Challenge: Hearing-Imparied Professionals in the Workplace* by Alan B. Crammatte (1987) as requested. Please include the citation "Used by permission of Gallaudet University Press."

Kind regards,
[redacted]

Appendix E: DETS Matrix

Construct	Items	Measures	Source
1. Demographics	**Age**	**Q49**	**Crammatte, 1987**
	Gender	**Q47**	**Crammatte, 1987**
	Identity	**Q50**	**Crammatte, 1987**
	Race	**Q48**	**Crammatte, 1987**
2. Hearing loss	**Decibel**	**Q51**	**Crammatte, 1987**
	Age of onset	**Q52**	**Crammatte, 1987**
3. Education background	**Elementary**	**Q40**	**Crammatte 1987**
	Middle	**Q41**	**Crammatte 1987**
	High school	**Q42**	**Crammatte 1987**

Highest degree	**Q43**	**Crammatte 1987**
Type of college or university AA degree	**Q44**	**Added**
Type of college or university BA degree	**Q45**	**Added**
Type of college or University (graduate)	**Q46**	**Added**

4. Social relatedness	**Hearing status of people socialize with outside work**	**Q36**	**Added**
	Method of Communicating for socializing	**Q37**	**Added**
	Amount of social contacts who use sign language	**Q38**	**Crammatte 1987**
	Use of technology with social contacts while at work	**Q39**	**Added**

5. Job satisfaction (existence, relatedness, and growth)	**Degree of challenge**	**Q27**	**Crammatte 1987**
	Degree of challenge for communication	**Q28**	**Added**
	Chances for promotion	**Q29**	**Crammatte 1987**
	Supervision	**Q30**	**Crammatte 1987**
	Co-workers	**Q31**	**Crammatte 1987**
	Salary	**Q32**	**Crammatte 1987**
6. Job satisfaction	**Item importance**	**Q33**	**Crammatte 1987**

7. Discrimination	**Perceived discrimination based on hearing loss**	**Q34**	**Crammatte 1987**
8. Computer-mediated communication technology	**Customers (vrs)**	**Q12**	**Added**
	Customers (vri)	**Q13**	**Added**
	Webcam/vp with co-workers	**Q14**	**Added**
	Vri use with hearing co-workers	**Q15**	**Added**

	Vrs with hearing co-workers	**Q16**	**Added**
	Email with co-workers	**Q17**	**Added**
	Im use with co-workers	**Q18**	**Added**
9. Computer-mediated technology (cont.)	**Email with customers**	**Q18**	**Added**
	Im with customers	**Q19**	**Added**
	Com. with supervisor im	**Q20**	**Added**

Computer- mediated technology (cont.)	**Com. with supervisor e-mail**	**Q21**	**Added**
	Com. with supervisor vri	**Q22**	**Added**
	Com. with supervisor vrs	**Q23**	**Added**
	Com. with supervisor webcam/vp	**Q24**	**Added**
	Job responsibility	**Q25**	**Added**

Computer- mediated technology (cont.)	**Reliant on type of tech.**	**Q26**	**Added**
10. Communication at work (with hearing co-workers)	**Comfort with communication methods with hearing co-workers**	**Q10**	**Added**
	Comfort with communication methods with deaf co-workers	**Q11**	**Added**
11. Employment characteristics	**Job status**	**Q2**	**Crammatte, 1987**

Employment characteristics(cont)	**Occupation**	**Q3**	**Crammatte, 1987**
	Employment setting	**Q4**	**Crammatte, 1987**
	Sector	**Q5**	**Crammatte, 1987**
	Telecommute	**Q6**	**Added**
	Salary	**Q7**	**Crammatte, 1987**
	Hearing status of co-workers	**Q8**	**Crammatte, 1987**
	Socialize with co workers	**Q9**	**Added**

12. Validity and reliability	**Length**	**Q48**	**Dillman (2007)**
	Clarity	**Q49**	**Dillman (2007)**
	Time	**Q50**	**Dillman (2007)**
	Invasiveness	**Q51**	**Dillman (2007)**
	Purpose	**Q52**	**Dillman (2007)**
	Attention span	**Q53**	**Dillman (2007)**
	Motivation	**Q54**	**Dillman (2007)**
	Open feedback	**Q55**	**Dillman (2007)**

Appendix F: Pre-announcement of the Survey

- **HOW FAR HAVE DEAF AND HARD-OF-HEARING PEOPLE COME IN EMPLOYMENT?**
- **WHAT ISSUES SHOULD WE CONSIDER AS DEAF AND HARD-OF-HEARING CHILDREN ENTER THE 21ST CENTURY MARKET PLACE?**
- **HELP ANSWER THESE QUESTIONS AND HIGHLIGHT THE EMPLOYMENT ACHIEVEMENTS OF DEAF AND HARD-OF-HEARING PEOPLE IN THE U.S.?**

LOOK FOR THE NATIONAL DEAF AND TECHNOLOGY IN EMPLOYMENT SURVEY COMING IN JULY 2010!!!!!!

Appendix G: Advertisement of the Study

Hello,

My name is James Schiller and I am a faculty member at Gallaudet University, Department of Social Work, and a doctoral student at Walden University, School of Health and Human Services. I am currently working on my dissertation in social policy and planning.

You are invited to take part in a research study on how technology impacts the employment of deaf and hard-of-hearing people. The purpose of this research is to influence social policy, programming, and funding sources so that they can continue providing resources to the deaf and hard-of-hearing community. At the end of this message, there is a link that will take you to a Web survey. The survey is confidential and, upon completion, all that is needed is for you to click the submit button. No identification is asked for. The survey is anticipated to take approximately 20 minutes.

Risks and Benefits of participating in the Study: As with any survey, there may be some questions that are uncomfortable to answer. The potential benefit of participating in this study is adding to the body of knowledge about deaf and hard-of-hearing people in the United States.

Compensation: There is no compensation for participating in this study. The principal investigator for this study is James Schiller, a Doctoral student at Walden University, School of Health and Human Services. I f you have any questions regarding this research or the survey, You may contact the researcher at via videophone at [redacted] or email at [redacted]

Appendix H: Professional Employment Questionnaire Copyright Permission

Please let me know if there is anything I need to add to this request. Thank you for your assistance.

Jim Schiller

James Schiller MSW, LCSW-C

Mr. Schiller,

Gallaudet grants you permission to use parts of or the entire Professional Employment Questionnaire, Appendix C, pages 195 - 204 from *Meeting the Challenge: Hearing-Imparied Professionals in the Workplace* by Alan B. Crammatte (1987) as requested. Please include the citation "Used by permission of Gallaudet University Press."

Kind regards,
[redacted]
Marketing Assistant
Gallaudet University Press

Appendix I: National Association for the Deaf Approval Letter to Advertise the Study

Hi Jim:

The NADezine currently has about 8,500 subscribers currently. I do feel comfortable letting our subscribers know about your survey. I can't promise a deluge of response, though (smile).

[redacted]

From: James **] On Behalf Of** [redacted]
Sent: Monday, March 16, 2009 1:57 PM
- Show quoted text: -
- Hide quoted text -

Hello [redacted];

I am examining how visual communication technology (text and video) impact the employment of Deaf people. I will be advertising the study and asking for volunteers to go to a website where they will see a survey administered in both english and ASL. Theoretically, the survey should be able to eluminate whether Deaf people using visual communication technology remain in the Deaf sector or are entering mainstream employment. Thus, this study holds promise to inform social policy in the way of small business development and education curriculum.

Please let me know if you are comfortable advertising the survey in your Ezine and if so, approximately how many peopel subscribe to Ezine. The survey itself will not be ready until probably the fall.

Thanks

Appendix J: DeafDigest Subscription Rates

Hello [redacted]

I am embarking on a research project in which I hope to administer an online survey. I was wondering what the advertising rates are. I was thinking to advertise my study in the Digest and a number of other places, and hopefully get people to go to the link where my survey would be located.

Let me know as much detail as possible about advertising charges,
Thanks

Jim

--
James Schiller MSW, LCSW-C

Hi James:

Glad to furnish you with information.

The following are options:

* short ads (up to 210 words):

$40.00 for one week or $30.00 per week if run for two or more weeks (many advertisers pick this 2 or more weeks option)

or

* long ads (exceeding 210 words):

$40.00 per week for the first 210 words plus $1.25 for each additional 8 words

Appendix K: Copyright Permission from Deaf and Hard-of-hearing in Government Organization

Yes – that information is public so you are free to use it and make it known that DHHIG is the source. You should be able to open the pdf files from DHHIG website. See link below.

http://www.dhhig.org/eNews.asp?code=News&e=link&id=214

If unable to find the pdf doc. use the search engine "video – survey" on the DHHIG website.

--
[redacted]
www.dhhig.org
From: James Schiller
Sent: Wednesday, October 21, 2009 9:00 AM
To: DHHIG.ORG
Subject: Video survey

Hello,

Along with being a faculty member in the Department of Social Work, Gallaudet University, I am also a Ph.D candidate at Walden University. I am currently working on my dissertation which is exploring the use of technology by D/deaf people who are currently employed and specifically, sector of employment and job satisfaction; and would very much like to review the survey you sent out to Government Workers. I downloaded the official results report, but wondered if I could get a copy of your actual survey and if appropriate, use some components of the survey in my study. Of course, if permission is granted, the appropriate citation will be made.

Thank you for considering my request and I look forward to hearing from you soon.

James Schiller

--
James Schiller MSW, LCSW-C
[redacted]

Appendix L: Request for Advertisement for Deaf and Hard-of-Hearing in Government

Hello [redacted]

As you may recall, I asked permission to view your survey on tech use among Government employees. That was extremely helpful. Now I am ready to submit my dissertation proposal and was wondering if I could purchase advertisement of the study in your newsletter. If so, please send me the rates so that I may include it in the proposal. I plan on using a link to a video advertisement of the study. Description of the study is below in a previous email I sent to you.

James Schiller

Hi again,
DHHIG does not have rates outlined. The survey results are public information. The survey creator is Wes Johnston and his email address is wesley.johnston@navy.mil for guidance.

DHHIG Board of Directors meet first Monday each month. The next meeting is April 5th at Gallaudet University, SLCC room 2301 from 5 pm to 7 pm. If you would like to present at the board meeting? Or post info on our web. There is no newsletter. If you would like to speak to members...next we meet on Thursday, May 13th at the Department of Commerce for a One Day Seminar with a General Members Meeting tentatively set after the seminar.if you prefer that?

[redacted]

Appendix M: IRB Certification

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **James Schiller** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 02/12/2010

Certification Number: 394492

Curriculum Vitae
James A. Schiller MSW, LCSW-C

EDUCATION: Enrolled in Walden University's Doctoral program in the school of Human Services with an emphasis on Social Policy Analysis and Planning. Anticipated completion date August 31, 2011.
M.S.W., 1994, Adelphi University, School of Social Work
B.A., 1988, University of Southern California, Majors: Psychology and Sociology.

LICENSURE:
L.C.S.W.-C, 2003, Licensed Clinical Social Worker, Maryland, #1185-Current
CISW, 2000, Licensed Independent Certified Social Worker, AZ.#1681-expired 2003
CSAC, 2000, Certified Substance Abuse Counselor, AZ #. SA-1681-expired 2003

EXPERIENCE:
6/01/09-9/15/2010 Director of Field Instruction, Department of Social Work, Gallaudet University. Responsible for placing BSW and MSW students in practicum sites locally, nationally, and internationally. Responsible for assuring appropriate supervision, outcome measures of student learning, and logistics of placement. Responsible for annual reports on student learning outcomes, fiscal management of interpreting expense, and recruitment efforts. Also responsible for assuring that field placements meet both CSWE and University accreditation standards and contributing to periodic self study in both BSW and MSW programs.
Received a Technology Grant from Gallaudet University to examine the benefits of using group conferencing software with students placed nationally, and internationally. The research entails examining what benefit such technology will have to the overall learning experience in field and toward academic outcomes. 5/12/09 Proposed and received approval to begin researching the use of VRI technology and its impact on student placements. The research question addresses whether VRI offers an efficacious and cost effective method of communication access and whether it can replace interpreters. 05/01/09

9/03-5/15/09 Faculty-Social Work Department, Tenure Track position.
Gallaudet University, Washington DC. Instruct deaf, hearing, and hard-of-hearing students in both BSW and MSW programs. Teach courses on to general social work practice.
Designed and taught an elective course in substance abuse. Taught substance abuse prevention and treatment for the counseling master's program. Areas of emphasis include

substance abuse and disability policies. Co-authored RSA grant for a graduate certificate program in substance abuse treatment for the Deaf.

Co-authored SAMHSA conference grant for substance abuse information dissemination project specifically designed for Deaf youth and adults.

Performed an analysis of prevention programming on Gallaudet Campus and submitted it for consideration in change of policy.

Incorporated various groundbreaking academic technology in teaching social work to Deaf college students.

7/00 to 10/02 Coordinator of Children and Adolescent Services
CODAC Behavioral Health Services inc. 3100 N. 1st Ave. Tucson, AZ 85719.
Coordinated mental health and substance abuse services to youth ages 1-17. Maintained contracts with various funding agencies. Liaison between department programs and community resources. Managed a combined budget of approximately $1,745,000.00/year. Chief architect of a CSAT grant awarded to CODAC amounting to $4,000,000 over 5 years. Chief architect of the only Drug Court residential treatment program run inside the Juvenile Center. Primary mental health and substance abuse trainer for Pima County Juvenile Court Center.

1998-2000 Clinical Supervisor
Treatment is Available Program, COPE Behavioral Services inc. 1101 E. Broadway, Tucson Az. 85745. Provided substance abuse treatment, including case management, clinical social work, marriage and family counseling, and rehabilitation to individuals with co-existing disabilities. Coordinated treatment efforts with other community based agencies in Arizona and throughout the United States. Promoted full accessibility in the other substance abuse treatment facilities and programs.

1999-2002 Adjunct Faculty Pima Community College, Central Campus/ DMAFB instructed students in introduction Psychology and Sociology Classes.
1999-2002 Park College, DMAFB. Teaching Introduction to Psychology and Social psychology classes.
1995-2002 Private Practitioner
Provided evidenced based approaches for individual, group, and family counseling addressing a variety of issues including: substance abuse, domestic violence, anger management, disability, healthy parenting, and behavior modification." Specialize in the area of disabilities including: Mental Illness, Deafness, Blindness, Deafblindness, Brain Injury, and Developmental Delay.

1996-1998 Lead Clinician**.** *Golden Dawn/Psychiatric Management Resources PHP. 655 N. Alvernon, Tucson, Az. 85711.* Provided group and individual therapy to chemically dependent individuals who have a serious mental illness and who are developmentally delayed. Administered treatment related assessments. Responsible for clinical supervision, crisis intervention, case management, and facilitating a team approach toward treatment. Responsible for quality management and managed Medicare/Medicaid reimbursement.
1994-1996 Facilitated a Statewide training in Deafblindness.Coordinator of Services for Individuals with Deafblindness,*Community Outreach Program for the Deaf, 268 W. Adams Street, Tucson AZ.* Provided individual, group, and family therapy, Substance abuse counseling, case management, and advocacy for Deaf and Deafblind individuals with other cognitive and emotional disabilities. Supervised day treatment and training program for individuals who are developmentally delayed.

1990-1994 Instructor Behavior Modification**,**
Helen Keller National Center for Deafblind youths and Adults, Port Washington N.Y. Provided training in behavior interpretation and change, behavior modification theory and practice, behavior management techniques, and crisis intervention. Developed training programs geared towards meeting the specific needs of the clients. Assisted students in their transition back home states upon completion of evaluation and training. Provided consultation to outside agencies and families who address the needs of individuals who are Deafblind.

PROFESSIONAL AFFILIATIONS/ACTIVITIES:
Member of the Council on Social Work Education 5/01/05 -present
American Society for Public Administration- 2004-2005
National Association of Social Workers-1994 to 2004
ATOD subsection of NASW 1998 to 2003
Member-Professional Standards Committee NASW-MD 2003 to 2005
Member-Nominations Committee NASW-MD 2003 to 2005
Chair, Md NASW task force on committee reorganization 2003-2005
Member- American Association of Deaf-blind Persons. 1990 to p1995
PUBLICATIONS:
Crowe Mason, T. & Schiller J.(2009) College Drinking among Deaf and Hard-of-hearing. *Journal of the Association of Deaf Rehabilitation Agencies* 42(2) p.92-116
Titus, J.C., Guthmann, D., and Schiller, J. (2008) Characteristics of youths with hearing loss admitted to substance abuse treatment. *Journal of Deaf Rehabilitation and Deaf Education* 13(3),p.336-350.

Substance Abuse Among The Hearing Impaired Population: A question of accessibility. *Hearing Health* Magazine Nov. 2000 p.34

PRESENTATIONS:

Annual Meeting of Association of Deaf Rehabilitation Agencies. Presented with two colleagues on "Prevention and Treatment of Deaf substance abuse consumers: current research, best practices, and implications for funding." San Antonio, Texas. April 15-18, 2009.

Joint Meeting of Adolescent Treatment Providers. Co-presented "Substance Abuse Treatment in the deaf adolescent population: The challenge to build a better future." Washington, DC. 2005

Council on Social Work Education. Presented "Effectiveness of government intervention in creating social equality for individuals with disabilities." Chicago, Illinois, 2004

Pima County Juvenile Court Center. Principal trainer for over 100 detention staff on issues regarding mental health of inmates and effective communication strategies. Tucson, Arizona 2000-2002

NASW Arizona Section Conference. Presented on "Substance Abuse Treatment with Individuals who have Co-Existing Disabilities." Phoenix, Az. 1999

NASW Arizona Section Conference. Presented on "Best Practices in Working with Families Whose Members Have Disabilities. Phoenix, Arizona 1998

Helen Keller National Center, NY.

As part of a national training team I have presented on the topics of "Behavioral Analysis." and" Behavior as a means of communication." These have been provided both on the HKNC campus as well as at sites throughout the country. 1989-1994

Northern Illinois University, DeKalb Ill. Presented at a national training seminar "Therapeutic intervention with Deafblind individuals" and "From Institution to an Equal and Fulfilling Life: the road to recovery." January 1995 and January 1996

Presented in Rehabilitation Counseling Graduate classes on "Adult Service Delivery Systems in meeting the needs of Deafblind individuals and the SMI population." University of Arizona, Tucson, AZ 1994-95

Presented in special education classes on "Deafblindness", "Behavior as a means of communication", and "Systemic Issues Involving VR and DDD." University of Arizona, Tucson, AZ 1994-95