ATHABASCA UNIVERSITY

EXPERIENCES OF DEAF AND HARD OF HEARING STUDENTS IN UNDERGRADUATE AND GRADUATE DISTANCE EDUCATION

BY

CATHERINE ELIZABETH GRATER-NAKAMURA

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF EDUCATION IN DISTANCE EDUCATION

FACULTY OF GRADUATE STUDIES, CENTRE FOR DISTANCE EDUCATION

ATHABASCA UNIVERSITY

MARCH, 2016

Approval of Thesis

The undersigned certify that they have read the thesis entitled

"Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education"

Submitted by

Catherine Grater-Nakamura

In partial fulfillment of the requirements for the degree of

Master of Education in Distance Education (MEd)

The thesis examination committee certifies that the thesis and the oral examination is approved

Supervisor:

Dr. Tom Jones
Athabasca University

Committee Member:

Dr. Martha Cleveland-Innes
Athabasca University

External Committee member:

Dr. Marguerite Koole
University of Saskatchewan

March 9, 2016

Acknowledgements

The completion of this thesis project was supported by several people – some who offered support and encouragement throughout the entire process, and others who may not even know how they influenced my work or the impact they made. Although these acknowledgements may seem somewhat long-winded, I would like the following people to know that their influence did not go unnoticed.

First and foremost, I am deeply grateful for the time and the insight provided by the study participants. Although it goes without saying that without their efforts, the completion of this project would not have been possible, I want them to know that I truly appreciate their support.

Also, I appreciate the time and work of my thesis committee. In particular, I would like thank Dr. Tom Jones, my thesis supervisor, for his ongoing and valuable support, guidance, and encouragement throughout the process. He offered his advice freely, never hesitating to tell me when I was on the right track, as well as steering me back on course when I seemed to be heading off on some divergent path. I would also like to express my sincere thanks to Dr. Martha Cleveland-Innes and Dr. Marguerite Koole for their time, effort, and input into my learning experience.

I would also like to acknowledge the help of the faculty and staff at Athabasca University who helped me accomplish my goal. In particular, thank you to Ms. Serena Henderson of the Centre for Distance Education, who attended to allllll the unseen, behind the scenes details, and Ms. Gail Leicht of the Office of Research Ethics, who heard from me on several occasions and helped me ensure all the ethics ducks were in a row.

Thank you, also, to all my work colleagues who let me bounce ideas off them (and sometimes express my frustrations), and who offered support and encouragement. In particular, I would like

to thank Indu Dhir, Shelley Getty, Shari Morrow, Melanie Cohen, and Cathy Edson-Frauts for their ears (figuratively, of course) and the kicks (figuratively, of course) I often needed.

On the home front, I would like to thank everyone who had anything at all, big or small, to do with the completion of this project: Sylvia and Sam, Devon and Tyler et al., Adam and Marzella et al., Janet et al, and Doug et al. And, most importantly, to Lawrence, for whose never-ending support I will be forever grateful. I never, never-ever took for granted everything you did for me – particularly all the domestic chores you took on. Thank you for encouraging me when I felt overwhelmed, for inspiring me to keep on keeping on to fulfil this dream, and for being there every step of the way.

Abstract

This exploratory case study investigates the experiences of university distance education (DE) students with hearing loss. Nine individuals responded to an online questionnaire designed to obtain information about demographic characteristics, education level, hearing loss, and experience with academic accommodation and support services. Six respondents completed the questionnaire, and three participated in semi-structured interviews in which they described their experiences in DE, and their perceptions of accessibility issues, particularly related to instructional design. Results showed that, despite their physical limitations and any accessibility barriers, participants were able to navigate DE courses and support themselves with limited, if any, institutional assistance. Students who did not seek accommodation did not consider it necessary or did not think to ask for it. To continually promote universal accessibility, course designers should consistently ensure that all audio-video content is captioned, and that all assignments with an audio or video component have a grade tied to accessibility.

Table of Contents

Approval of Thesis ii
Acknowledgements iii
Abstract v
Table of Contents vi
List of Tables viii
List of Figures ix

Chapter 1 - INTRODUCTION 1
- Purpose of the Research 2
- Research Questions 3
  - Central Question 3
  - Sub-Questions 3
- Contribution of the Research to the Literature 5
- Scope and Limitations 6
  - Delimitations 6
  - Limitations 6
- Operational Definitions of Key Terms 9
  - Academic Accommodation 9
  - Assistive Devices / Assistive Technologies 10
  - Disability 10
  - Distance Education 11
  - Instructional Design 11

Chapter II – REVIEW OF THE LITERATURE 12
- Background and Overview 13
  - Canadians with Disabilities 13
  - Attributes of Distance Learners 14
  - Hearing Loss 15
  - Protecting the Rights of Disabled Individuals 18
- Review of Relevant Research 21
  - Influence of Hearing Loss on Distance Education Students 21
  - Accessibility: Barriers and Solutions 23
  - Online Instructional Design and D/deaf or Hard-of-Hearing Students 26
  - Conclusions 29

Chapter III - METHODOLOGY 32
- Role of the Researcher 32
  - Personal Connection to the Research 33
- Study Design 34
  - Exploratory Case Study Approach 34
  - Assumptions 35
  - Participants 36

Data Collection Procedures 36
Phase 1: Online Questionnaire 37
Phase 2: Semi-Structured Interviews 37
Strategies for Ensuring Validity and Trustworthiness 39
Data Analysis 39
Bracketing Presuppositions 40
Analysis of Quantitative Data 40
Analysis of Qualitative Data 40
Ethical Considerations 44

Chapter IV - RESULTS AND DISCUSSION 45
Part 1: Online Questionnaire Findings 45
Response Rates 46
Demographic Characteristics and Education Data 47
Hearing Loss 49
Academic Accommodations and Support Services 50
Description of Participants 53
Part 2: Interviews 55
Findings 55

Chapter V - CONCLUSIONS AND RECOMMENDATIONS 75
An Intrinsic and Interpretivist View 75
Confirmed Suppositions and New Insight 76
Recommendations 76
Embedding Closed Captions in all Video Files 78
Assessing Accessibility Using Rubrics 79
Implications for Practice and Looking to the Future 79

REFERENCES 82
APPENDIX A - Recruitment email and Letter 101
APPENDIX B - LimeSurvey Consent Page 104
APPENDIX C - LimeSurvey Questionnaire Questions 105
APPENDIX D - Guiding Interview Questions 111
APPENDIX E - Athabasca University Research Ethics Board Approval 113
APPENDIX F - Focal Theme 1: Use of Assistive Technologies / Support Services 114
APPENDIX G - Focal Theme 2: Challenges Related to Hearing Loss 115
APPENDIX H - Focal Theme 3: Responsibility for Reducing Barriers 118

List of Tables

Table 1 – Sub-Topics and Sub-Questions Related to the Research Question 4
Table 2 – Access Challenges and Solutions for Students with Hearing Loss 28
Table 3 – Demographic Information 48
Table 4 – Education 49
Table 5 – Hearing Loss 50
Table 6 – Academic Accommodations and Support Services 51
Table 7 – Focal Themes and Supporting Sub-Themes 56

List of Figures

Figure 1 – Example of Initial Coding using Colour and Process Codes 43
Figure 2 – Thematic Relationships 56

Chapter 1 - INTRODUCTION

Over the past several decades, distance education has grown exponentially. Increased use of information and computer-based technologies has enhanced opportunities for adults seeking to further their postsecondary education. As more and more courses and programs are offered primarily or exclusively online, and distance education continues to become more mainstream, access to higher education improves. The many benefits associated with distance education, such as flexibility for part-time study and fitting course work around family, employment, and social obligations, attract a wide variety of adult learners (Abrami, et al., 2006; McGill, 2008; Moore & Kearsley, 2012) including those with physical, sensory, psychosocial, and learning impairments (Brown, 2008; Burgstahler, 2006; Butcher & Rose-Adams, 2015; Fichten, Jorgensen, Havel & Barile, 2006; Fichten et al., 2009; Kim-Rupnow, Dowrick, & Burke, 2001; Richardson & Woodley, 1999; Sharpe, Johnson, Izzo, & Murray, 2005). Distance education can, therefore, provide students with a wide range of abilities with a learning environment that may enable them to achieve academic success. However, despite the ready availability of distance-delivered university programs, disabled learners, including those who are D/deaf or hard-of-hearing (Dd/HH), still experience accessibility barriers that may have a negative impact on their learning (Brown, 2008; Fichten et al., 2006; Fichten et al., 2009; Seale, Draffan & Wald, 2008; Schmetzke, 2001).

Current technological, social, academic, and legislative realities suggest that program administrators and instructional designers have an inherent responsibility to ensure that online programs and courses are accessible for all students (Burgstahler, Corrigan, & McCarter, 2005; Mercado, 2013). However, despite these expectations, barriers continue to hamper some students in their attempts to access course materials and fully participate in class activities (Fichten,

Asuncion, & Scapin, 2014). If the idea of *accessibility* is reconceptualised and accepted to truly mean *universal accessibility*, online learning environments may be further adapted to improve the focus on teaching and learning processes, rather than attending specifically to the unique needs and abilities of individual students or groups of students (Cavanagh, 2004). Routinely including strategies to support inclusion may become the norm once the idea of universal accessibility is accepted by distance education leaders, institution administrators, and by a critical mass of educators at the grass roots level. Attending to accessibility needs may level the playing field by making learning experiences more equitable, enhancing learning outcomes, and promoting success for all learners (Brown, 2008; Burgstahler, 2006; Fichten et al, 2009; Mercado, 2013; Opitz, 2002; Tallent-Runnels et al., 2006; University of Ottawa, 2011). In the meantime, research continues to focus on attending to the accessibility needs of students with disabilities, including those with hearing loss (Bastedo, Sugar, Swenson, & Vargas, 2013; Fichten, et al., 2014; Mercado, 2013).

Purpose of the Research

The experience of Dd/HH students in traditional mainstream educational settings appears to have been studied extensively. However, there is a lack of empirical evidence related to the experiences of Dd/HH students studying at a distance. The primary purpose of this study is to develop specific recommendations for distance education course designers for enhancing the accessibility of course material for learners with hearing loss. Recommendations will stem from the insight gained by investigating the experiences of university students with hearing loss who are enrolled in, or recently completed, a course or program delivered at a distance. In particular, participants' assessments of factors that enhance the accessibility of instructional design elements, or act as barriers to full participation in course activities, will be sought. This

exploratory case study will add to the body of knowledge related to accessibility issues experienced by adult students with disabilities, specifically those with hearing loss. From a policy perspective, it is important that instructional designers have a broad-based understanding of the needs of a wide variety of students, including those with diverse educational backgrounds, communication preferences, ethnic, racial and cultural backgrounds (Liversidge, 2003) and physical and mental abilities (Moisey, 2004). Thus, adding to the knowledge base in this area may inform policy decisions (Burgstahler, 2006; Mercado, 2013; Tallent-Runnels et al., 2006).

Research Questions

This investigation was non-experimental and exploratory in nature, and was conducted using a case study approach. Case studies are-concerned with exploring, describing, and explaining complex and specific real-life phenomena (Creswell, 2013; Patton, 2015; Yin, 2009).

Central Question

The following central question guided the inquiry: What specific recommendations can be made for enhancing the accessibility of course material for university-level distance learners with hearing loss?

Sub-Questions

The following sub-questions were used to support further examination and understanding of the overall topic of interest. Sub-topics and related sub-questions are outlined in Table 1.

Table 1

Sub-Topics and Sub-Questions Related to the Research Topic

Sub-Topic	**Related Sub-Questions**
Demographics	• What are the general demographics of participants?
Hearing Loss	• What is the nature of hearing loss experienced by participants? • What assistive technologies do participants use to help support their learning?
Contextual Conditions	• How many distance education course(s) and /or programs have participants completed? • What is the nature of participants' academic achievements? • What academic accommodation or support services to participants receive?
Accessibility of Instructional Material	• What experiences have university students who have hearing loss and are studying at a distance had related to accessing course materials included in distance education courses? • Do participants use assistive technologies or computer software programs to access course materials or complete coursework? • What preferences do participants for the types of media used to deliver course materials? • What specific suggestions do the participants have to reduce accessibility barriers?

According to Yin (2009), the boundary between the phenomenon of interest and its context is not always clear. Answering such questions will not only help determine the scope of the study, doing so will help the researcher differentiate which data are related to the phenomenon (i.e., the subject of the case) and which are related to the context (i.e., external to the case).

Contribution of the Research to the Literature

Research that informs about instructional design strategies to promote accessibility for students with hearing loss is still somewhat limited. In order to develop a deeper understanding of this topic, more research is required to enhance the existing body of literature.

Identifying and addressing potential barriers for a relatively small population of students may prove challenging (Moisey, 2004; University of Ottawa, 2011); however, because hearing impairment is prevalent among the general population (Feder et al., 2015; Statistics Canada, 2009; Statistics Canada, 2013) and not all students with hearing loss will disclose their disability (Brown, 2008; Fichten, Jorgensen, Havel, & Barile, 2006; Richardson, Long & Woodley, 2004; Richardson & Woodley, 1999), the needs of Dd/HH students should not be discounted. Therefore, adding to the knowledge base in this area may encourage policy-makers to consistently adopt accessibility guidelines, and course designers to develop and implement instructional design strategies that are universally inclusive (Burgstahler, 2006; Mercado, 2013; Tallent-Runnels et al., 2006). Furthermore, doing so will fulfil legislative requirements (British Columbia Human Rights Code, 1996; Canadian Charter of Rights and Freedoms, 1982; Human Rights Code, 1990; Ontarians with Disabilities Act [ODA], 2001).

Successful removal of the barriers attributed to possible deficiencies in instructional design will take cooperation among institution policy-makers, administrators, course designers, instructors, and students. However, despite any perceived or real challenges associated with planning, implementing, and evaluating design strategies, attending to accessibility concerns may level the playing field by ensuring instructional design elements are accessible to students with a diverse range of characteristics, thereby making learning experiences more equitable, enhancing learning outcomes, and promoting academic success for all learners (Brown, 2008;

Burgstahler, 2006; Coombs & Banks, 2000; Fichten et al., 2009; Mercado, 2013; Opitz, 2002; Tallent-Runnels et al., 2006; University of Ottawa, 2011).

Scope and Limitations

Delimitations

The breadth of the study was delimited mostly by the inclusion criteria identified in the central research question. That is, participation in the study was delimited to students enrolled in undergraduate or graduate programs and were completing (or had recently completed) distance education courses and who also have hearing loss. Therefore, the study did not include students whose education takes place in face-to-face learning environments, who had not participated in a university course delivered at a distance, or who did not self-identify as having hearing loss.

A further delimitation of the study involved the collection of data. Data were obtained primary from an online questionnaire and semi-structured interviews, and from course and university documents when appropriate. Due to the scope of the study, data collection strategies were less exhaustive than those used in the comprehensive case studies conducted for doctoral dissertations or institutional research (Creswell, 2013).

Limitations

Limitations related to the study design, sampling, data collection, and analysis procedures may have influenced study results. Most limitations stemmed from time and cost restraints, as well as the need to establish boundaries to define the scope of the study (Creswell, 2013; Yin, 2009).

Due to the nature of the study, it was anticipated that the sample size was going to be very small (i.e., 3 to 5 participants). Therefore, a limitation is that the experiences described by participants cannot be considered representative of all students with hearing loss in post-

secondary distance education. Therefore, any inferences about the population of interest cannot be made from the study findings. That is, findings cannot be generalized beyond the case to a larger population or assumed to apply to different settings (e.g., conventional face-to-face delivery). However, it is important to note that this research is not designed to compute frequencies or make statistical generalizations; instead, readers may draw conclusions about whether the findings can be connected to their own contexts or transferred to other contexts (Borrego, Douglas & Amelink, 2009; Liversidge, 2003; Yin, 2009). In addition, all participants were volunteers, so the number of participants was limited by their availability and willingness to participate in the study.

A minor limitation resulted from an oversight that occurred during the pre-test of the online questionnaire. When navigating the survey, one of the response parameters did not jump to the appropriate element. That is, if respondents replied “No” when asked if they had hearing loss, the response should have resulted in a jump to the presentation of a “Thank you for participating” screen. Instead, two respondents answered “No” to the hearing loss question and were still able to complete the questionnaire in its entirety. However, because the respondents in this situation did not meet the inclusion criteria, their responses were discarded; therefore, this oversight was of minor consequence and did not affect the outcome of the research.

The researcher’s and the participants’ sensory disability was the source of a major potential limitation. Those with hearing loss may not accurately hear what is being said, thereby contributing to a breakdown in effective communication. Therefore, in order not to degrade the quality of investigation, frequent member checks to assess the accuracy the information received were conducted (Creswell, 2013; Koelsch, 2013). However, the researcher’s hearing loss when

transcribing the interviews contributed to the need to spend additional time and resources to complete the research project.

A limitation associated with the analysis of the data stemmed from the researcher's novice status. Coding and categorization loosely followed "cycle coding" procedures outlined by Saldana (2009). Therefore, although the researcher took steps to consider all elements of participants' responses, some finer details and nuances in the data may have been inadvertently overlooked.

In addition, as previously discussed, the nature of qualitative investigation suggests the researcher is often intimately connected to research processes (Chenail, 2011; Creswell, 2013; Neuman, 2006; Patton, 2015; Yin, 2009). Neuman (2006) suggests that interpretive social scientists believe that researchers cannot separate themselves from what they know. Therefore, because of the investigator's affinity with the research population, previous experiences, and intrinsic interest in the topic, investigator bias may have inadvertently influenced research processes. Although steps were taken to eliminate or minimize investigator bias, this limitation may have been manifested in the selection of supporting literature, collection and analysis of data, and the reporting of findings.

Lastly, a further limitation in applicability of the research can be attributed to bias stemming from the reader's values and beliefs. Because an explanation of a particular phenomenon is neither measurable nor observable, some (those with a positivist perspective, in particular) may find the idea of "truth" stemming from qualitative data challenging to accept (Angen, 2000; Neuman, 2006). However, there can be no understanding of what constitutes truth unless research data - quantitative and qualitative - are analyzed and interpreted. Therefore, using accepted strategies designed to limit bias and increase validity also increases the trustworthiness

of qualitative research (Díaz Adrade, 2009). If these perspectives were accepted, then the idea that reality is created in a negotiated process between researcher and participants (since researchers cannot distance themselves from the process) must also be accepted (Angen, 2000; Neuman, 2006). In this way, if all parties involved in the research were to agree that the data collected is "factual," the resulting evidence must also be considered good. Consequently, the findings from interpretive, qualitative case research may provide valuable insight into a particular phenomenon by offering *a* truth even if they are not accepted as *the* truth (Angen, 2000; Díaz Adrade, 2009; Neuman, 2006).

Overall, despite the limitations described above, sufficient steps were taken to ensure the researcher remained objective, the quality of the research was maintained, and the recommendations made were sound. Ultimately, it is up to readers to draw conclusions from the research, and determine if the findings can be connected to their personal circumstances or applied to institutional contexts (Borrego, Douglas & Amelink, 2009; Liversidge, 2003; Yin, 2009).

Operational Definitions of Key Terms

Several key terms used in this paper are defined below.

Academic Accommodation

Academic accommodations are designed to remove barriers associated with accessing course materials, participating in class activities, and successfully completing course requirements. Academic accommodations may include, but are not limited to, increased time to complete course requirements or courses, alternative formats (e.g., large print, transcripts of audio files, etc.), and modification of course load (Athabasca University, 2015; National Educational Association of Disabled Students [NEADS], n.d.; Roberts, 2013).

Assistive Devices / Assistive Technologies

The operational definition of "assistive device" or "assistive technology" is any device or technology that is used to reduce the impact of hearing loss or to improve hearing capabilities (S. 2561--100th Congress, 1988).

Disability

The operational definition of "disability" used in this study report is derived from the World Health Organization's International Classification of Functioning, Disability and Health (ICF) disability framework (World Health Organization [WHO], 2001). The ICF defines disability as an umbrella term for functional and structural impairments, activity limitations, or participation restrictions (p.3). Throughout this study report, reference to disabled students /learners and students /learners with general or specific disabilities will, therefore, be used. Some terms may be used interchangeably (e.g., "students with hearing loss" and "D/deaf or hard-of-hearing students"). It is recognized that some groups may prefer one term over another; no disrespect is intended when such terminology is used.

Deaf and hard-of-hearing.

The terms *Deaf* (as a cultural-linguistic distinction)*, deaf*, *hard-of-hearing*, and *hearing impaired* are all used in the literature to various degrees; however, operational definitions of these terms are frequently not provided. Powers, Gregory, and Thoutenhoofd (as cited in Liversidge, 2003) note that discrepancies in the definitions make it difficult to validate previous research. For the purposes of this study, *D/deaf or hard-of-hearing* (Dd/HH) is used as an umbrella term to describe individuals with any type of permanent hearing loss, regardless of degree of hearing loss or identification with a cultural-linguistic group.

Distance Education

Currently, distance education is fundamentally portrayed as the occasional or permanent physical and geographical separation of learners from instructors and classrooms, and by the dependence on computer technologies for course delivery and communication (Moore & Kearsley, 2012). For the purposes of this study, discussion of distance education is limited to the delivery of formal postsecondary education, particularly university courses using a web-based delivery format.

Instructional Design

In the literature, there are many definitions and viewpoints for the concept of educational instructional design. One of the most straightforward definitions was put forth by Smith and Ragan (2005) who suggest that the term *instructional design* refers to "the entire process of design, development, implementation, and revision of instruction" (p. 8). The above-mentioned description is the operational definition of *instructional design* within the context of this study.

Chapter II – REVIEW OF THE LITERATURE

In order to gain an understanding of the current body of knowledge related to the topic of interest, including existing research and areas where research is lacking, and to substantiate the need for further study, a review of the literature was conducted. To locate pertinent sources, combinations of the following search terms were used: *distance education, distance learning, online learning, computer-mediated education /learning, e-learning, postsecondary, university, hearing impaired, hearing impairment, hearing loss, hard of hearing, deaf, disability, universal instructional design, course design, accessibility, academic accommodation,* and *Canada.* Peer reviewed articles, and theses and dissertations were accessed from the following databases: Academic Search Complete, Ed/ITLib, ERIC, Proquest Dissertations and Theses, Proquest Education Journals, and Athabasca University's Digital Thesis & Project Room. Additional articles were found by reviewing reference lists, and additional information was obtained from various reputable websites.

This chapter is divided into two parts. The first part provides a general overview of literature related to disability, characteristics of distance learners, hearing loss, and protecting the rights of individuals with disabilities. The second part focuses on the relationships between distance education, instructional design elements, and hearing loss. In particular, relevant literature pertaining to accessibility and inclusion, the influence of hearing loss on distance education students, online instructional design elements as they relate to students with hearing loss, and instructional design barriers, solutions, and recommendations was reviewed.

Background and Overview

Canadians with Disabilities

The disability rate among working-age Canadians (i.e., 15 to 64 years of age) remained at approximately 10% between 2001 and 2012 (Cossette & Duclos, 2002; Statistics Canada, 2015). In 2012 to 2013, approximately 3% of Canadians aged 40 to 49 were identified as having moderate to profound hearing loss (Feder et al., 2015).

However, the concept of disability is multi-faceted and evolving, so it is difficult to develop a full understanding of the phenomenon simply by looking at a snapshot of the prevalence of disability at any given time. The Government of Canada and the WHO, among others, recognize that "disability" is not limited to bio-medical functions. While the Government of Canada does not use a single or official operational definition (Human Resources and Skills Development Canada [HRSDC], 2013, p. 2), the WHO suggests disability is an umbrella term for functional and structural impairments, activity limitations, or participation restrictions that involve complex interactions among an individual's body /functions and contextual elements, such as environmental and personal /societal factors (WHO, 2001, p. 3). When viewed through a societal lens, disability is considered "a natural part of society, where attitudes, stigma and prejudices present barriers to people with disabilities, and prevent or hinder their participation in mainstream society" (HRSDC, 2013, p. 2). For example, Canadians with a disability are at increased risk for having a lower employment income than those who do not have limitations. Lower income levels may be related to reduced participation in the workforce or to lower earnings when employed (Galarneau & Radulescu, 2009; Turcotte, 2014). In addition, those with a disability are less likely to earn a college diploma or university degree (Brennan, Gombac, & Sleightholm, 2009; Emmett & Francis, 2015; Galarneau & Radulescu, 2009; Turcotte, 2014).

Lower income, therefore, may also be indirectly related to the level of education attained, rather than to the disability itself. Ensuring that postsecondary programs are accessible to all those who wish to seek a higher education may help bridge the income gap between those with disability and those who are not disabled.

Attributes of Distance Learners

Research has shown that in distance education, individual attributes, organizational abilities and external factors influence learners' success in fulfilling course objectives (Wang, Peng, Huang, Hou, & Wang, 2008). Furthermore, because control of the learning experience is essentially transferred from instructors to students (Galagan, 2000), successful distance learners have high degrees of autonomy, self-efficacy, self-discipline, and self-awareness; are highly motivated, flexible and resourceful; and have a strong internal locus of control (Cascio, Botta, & Esmeralda, 2013; Eschenmann, 2012; Wang, et al., 2008).

Distance learners with disabilities may need to demonstrate more or different types of resourcefulness than their non-disabled peers to achieve academic success. For example, because they must understand their needs, and may need to seek, acquire, and link required academic accommodations to attain their goals, self-determination, self-advocacy, and motivation are important attributes for students with disabilities (Brinckerhoff, 1994; Prater, Redman, Anderson, & Gibb, 2014; Skinner & Lindstrom, 2003; Stodden, Whelley, Chang, & Harding, 2001; Test, Fowler, Wood, Brewer, & Eddy, 2005). Attaining a higher education is also influenced by students' knowledge of laws related to disability and accommodation, perseverance, and the severity of the disability (Skinner & Lindstrom, 2003). Some students with disabilities may also have study, organizational, and time-management skills deficits which can lead to decreased self-confidence and self-esteem, and increased anxiety, stress, and fear of

failure when compared to their non-disabled counterparts (Richardson & Woodley, 1999; Skinner & Lindstrom, 2003; Stodden et al., 2001). As a result of such challenges, students may take longer to complete their program, may change their course of study, or may drop out entirely (Skinner & Lindstrom, 2003; Stodden et al., 2001; Brennan, Gombac, & Sleightholm, 2009).

Hearing Loss

Hearing impairment is a generic umbrella term used to describe any deviation from what is considered normal hearing (Shemesh, 2010). Depending on the cause, hearing impairment may be "temporary or permanent; progressive, regressive or static; intermittent or continuous" (WHO, 2001, p.12).

Hearing loss is a sensory dysfunction that is characterized by an inability to detect, localize, or identify sounds. Loss of hearing may be congenital or acquired, unilateral or bilateral, occur prior to speech development or after language acquisition, and range from mild to profound deafness (American Speech-Language-Hearing Association [ASHA], n.d.; Canadian Academy of Audiology [CAA], n.d.; Shemesh, 2010). Hearing loss is frequently sensorineural in nature or related to sound conduction. Loss of hearing resulting from damage to the inner ear, or to the nerve cells connecting the inner ear and the brain, is known as *sensorineural hearing loss* (SNHL). SNHL is usually permanent, is linked to aging, infection or injury, genetics, drug toxicity, or exposure to loud noise, etc., and cannot usually be corrected physically. Those with SNHL may not be able to clearly hear speech and other sounds, and may perceive that people are mumbling (ASHA, n.d.; CAA, n.d., Shemesh, 2010). Conducive hearing loss occurs when the conduction of sound is impeded. It may result from physical abnormalities, damage to the middle or outer ear, or blockage caused by fluid or wax buildup in the ear canal, infection, or damage to

the ear drum, etc. Conductive hearing loss is frequently temporary, and may resolve spontaneously, or be corrected medically or surgically (ASHA, n.d.; CAA, n.d., Shemesh, 2010). A combination of sensorineural and conductive impairment may contribute to a *mixed hearing loss* (ASHA, n.d.; CAA, n.d., Shemesh, 2010).

Regardless of the type of hearing loss experienced, individuals who are hard of hearing have some loss of function. Deprivation of auditory function may interfere with the effective reception of verbal messages (Antia, Jones, Reed, & Kreimeyer, 2009; Anita, Sabers, & Stinson, 2007; Eriks-Brophy, et al., 2006) and those with hearing loss rely on residual hearing to support communication (Shemesh, 2010). Therefore, impaired hearing acuity and resultant communication breakdowns may impact individuals' day-to-day living by "negatively affect[ing] physical, cognitive, behavioural and social functions, as well as general quality of life" (Arlinger, 2003, p.17), as well as limiting their ability to participate fully in society (HRSDC, 2013). Because hearing loss is an "invisible" disability, its prevalence is often underestimated (Arlinger, 2003). However, data from the 2012/2013 *Canadian Health Measures Survey* revealed that approximately 19.2% (estimated 4.6 million) Canadians 20 to 79 years of age had some degree of hearing loss. The vast majority of those - 12% of Canadians - had mild hearing limitations and the remaining 7% had moderate to profound hearing loss. Those with mild loss are less likely notice the impairment, and as a result, to report their hearing loss (Feder et al., 2015).

Assessment of hearing loss.

Hearing loss is identified and diagnosed by comprehensive audiologic testing, including a combination of an individual's health history, and physiological and behavioural tests (Shemesh, 2010). Audiometric tests, which are physiological hearing tests, are designed to measure an

individual's ability to hear pure tones of varying pitch (i.e., frequency) and loudness (i.e., intensity) (Franks, 2001; Richardson, 2001; Rutka, 2011). As described by Richardson (2001),

> a hearing loss of less than 25 dB, averaged across the frequencies of 500, 1000, 2000 and 4000 Hz (the range of frequencies involved in the perception of speech), is regarded as being within the range of normal hearing…an average hearing loss of 25 dB or more in both ears is regarded as a significant hearing loss, and an average hearing loss of more than 70 dB in both ears can be regarded as deafness (p. 183).

Individuals with varying degrees of hearing loss may, therefore, benefit from the use of assistive technologies.

Assistive technology.

The term "assistive technology device" is an umbrella term that refers to "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (S. 2561--100th Congress, 1988, p.3). This definition is one that is generally accepted and frequently used in relevant literature (Scherer, 2002). According to the World Health Organization, "assistive devices and technologies such as wheelchairs, prostheses, mobility aides, hearing aids, visual aids, and specialized computer software and hardware increase mobility, hearing, vision and communication capacities" (WHO, n.d.). There are many types of computer technologies available, including alternative keyboards and other input devices, screen readers and magnifiers, and speech recognition programs (Apple Inc., n.d.; Microsoft Corp., n.d.). Assistive technologies are used by individuals with loss of function to reduce barriers and to promote independence; they may increase efficiency, reduce stress, and improve learning outcomes (Seale, Draffan & Wald, 2008).

Assistive technology for individuals with hearing loss.

Assistive hearing devices are used to help individuals with hearing loss to better function in their daily lives. Such devices may include hearing aids or cochlear implants (National Institute on Deafness and Other Communication Disorders [NIDCD], 2013; Shemesh, 2010).

Other assistive devices may also be used to help Dd/HH individuals communicate. Communication devices may include assistive listening devices, augmentative and alternative communication devices, and alerting devices (NIDCD, 2013). In addition, a variety of assistive computer technologies designed specifically for those who are deaf or hard of hearing, may support communication. For example, some computers include closed captioning, textural instant messaging and video chat functions, flash screens, and various audio functions (Apple Inc., n.d.; Microsoft Corp., n.d.).

In distance education, it is particularly important for students with disabilities to have access to assistive devices, as well as the computer hardware and software used for educational applications. To help students achieve academic success, assistive technologies should be intuitive and easy to use.

Protecting the Rights of Disabled Individuals

Legislative requirements.

For over thirty years, substantial policy discussions related to disability issues have resulted in positive and valuable inroads into protecting the rights of Canadians with disabilities (Equity and Diversity Directorate, 2011). On a federal level, Section 15(1) of the Canadian Charter of Rights and Freedoms is designed to protect individuals who may be discriminated against because of a personal characteristic, including physical or mental disability, and to

safeguard the right of every Canadian to equal protection and benefit of the law, regardless of ability level (Canadian Charter of Rights and Freedoms, 1982).

The responsibility for governing postsecondary education rests with the provinces and territories (Canada, 2015), and each jurisdiction has legislation and guidelines designed to ensure that qualified students with disabilities have equitable access to higher education regardless of the type or extent of disability. For example, legislative requirements are described in the Ontarians with Disabilities Act, 2001 and the Ontario Human Rights Code, 1990; guidelines may include the Alberta Human Rights Commission, 2010 and the Ontario Human Rights Commission, 2004.

Institutional policy and professional organizations.

To ensure compliance with relevant federal and provincial human rights legislation, most institutions have formal policies and support services departments for the provision of reasonable and appropriate academic accommodations for all qualified students. In addition, a number of professional associations and organizations are working to promote equitable access to postsecondary education (NEADS; n.d.).

Despite the efforts to ensure equal access, accommodation and accessibility issues have arisen and have been successfully challenged in the courts (Roberts, 2013). The outcomes of such legal challenges have implications in the planning and provision of disability services. For example, postsecondary institution service providers and instructional designers need to ensure that accommodations and services are provided in a non-discriminatory manner, that comprehensive documentation related to the disability and requests for accommodation is maintained, that undue hardship to the institution must occur before accommodation requests can be denied, and that all course materials, websites, and web content and applications, etc. are fully

accessible (Roberts, 2013). However, notwithstanding all the safeguards that are in place to protect the rights of postsecondary students with disabilities, not all students may be aware of the possibility that they may be entitled to accommodation. As a result, uninformed students may not seek accommodation, thereby limiting their access to a barrier-free education. Thus, ensuring that courses and programs are designed for universal access may eliminate some of the obstacles students with disabilities, including hearing loss, may encounter.

Academic accommodation versus universal instructional design.

When considering improving access for disabled students, it is common to think about providing academic accommodations (Brown, 2008; Moisey, 2004; Roberts, 2013). Academic accommodation is the general term applied to a variety of strategies that are employed to ensure that students who are disadvantaged for a variety of reasons have a fair and equitable opportunity to successfully complete their postsecondary education. This is accomplished by addressing the specific needs of individual students in order to reduce the barriers that impede them from meaningfully participating in courses and programs, and developing the same abilities as all students – without compromising academic standards or providing unfair advantage over non-disabled students. As previously mentioned, strategies include, but are not limited to, increased time to complete assessments and other course requirements, alternative formats of course materials (e.g., large print, transcribed audio files, etc.), and modification of course load (Athabasca University, 2015; NEADS, n.d.; Roberts, 2013).

In contrast, universal instructional design suggests that a wide range of students is considered during the planning phase of a course, rather than waiting until the need to accommodate a student with a disability arises. To be considered universally accessible, each method used to deliver course content needs to be accessible to students with a variety of

disabilities, as well as to students without disability, rather than attending to the unique needs of individual students (Burgstahler, 2002; Cavanagh, 2004; Di Iorio, et al., 2006).

Review of Relevant Research

A review of relevant research revealed four broad categories related to the topic of interest. Literature related to the influence of hearing loss on distance education students, concepts of accessibility, online instructional design elements (as they relate to students with hearing loss), and instructional design barriers, solutions, and recommendations was reviewed.

Influence of Hearing Loss on Distance Education Students

As previously noted, 19.2% of Canadians aged 20 to 79 reported having hearing loss in 2012/2013 (Feder et al., 2015). Results of the 2006 *Participation and Activity Limitation Survey* showed that approximately 40% of Canadians with hearing loss reported that their condition influenced their education choices. For example, 22% of students with hearing loss took fewer courses and 25% took longer to complete their education (Brennan, Gombac, & Sleightholm, 2009), suggesting that hearing loss can negatively impact some Dd/HH students' ability to achieve a higher education.

Distance education institutions in Canada with accessibility policies.

At the macro level, barriers Dd/HH students may experience while enrolled at postsecondary institutions include a lack of information available related to available support services, and a general lack of awareness of instructors and peers (Canadian Hearing Society, as cited in University of Ottawa, 2011; Wooten, 2014). Such barriers may reduce some students' ability to fully integrate into their classes, including online classes.

As of 2012, there were two universities in Canada that focused entirely on distance education: Athabasca University and TÉLUQ (Canadian Virtual University, 2012), and eight

other universities have a strong focus on online learning (Canadian Virtual University, 2012; Contact North, 2012). Seven of ten universities offering significant online programs have policies have accessibility policies for students with disabilities. These include:

- Royal Roads (2009) and Thompson Rivers (2009) in British Columbia;
- Athabasca (2000) in Alberta;
- University of Manitoba in Manitoba (2015);
- Laurentian (2013) and Concordia (2003) in Ontario; and
- Memorial (2013) in Newfoundland.

The University of Waterloo in Ontario appears to offer accommodations for students, but does not appear to have comprehensive policy related to accessibility or accommodations for students with disabilities. Instead, the *Access Ability Services* policy webpage simply states that "the University will strive to undertake reasonable efforts to provide goods or services in a way that respects the dignity and independence of persons with disabilities" (https://uwaterloo.ca/disability-services/policy). TÉLUQ in Quebec also appears offer support services for students with disabilities (http://www.teluq.ca/site/services/besoins_speciaux.php), but no policies related to accommodations or other support are evident. Lastly, the Cégep à distance in Québec does not appear to have any policies directly related to disability or accessibility. Instead, item 7.1.4 of the *Policy of School Integration and Intercultural Education* suggests that the school will comply with any reasonable and appropriate requests for accommodation "in accordance with the laws and the *Charter of Rights and Freedoms of Quebec"* (Rosemont College, 2002).

Providing academic accommodations to support students with disabilities, including hearing loss, may improve communication or otherwise contribute to barrier-free or barrier-reduced learning experiences (Brown, 2008; Burgstahler, 2006; Fichten et al., 2009; Roberts, 2013). Institutions that do not include clearly defined policies related to accessibility may

inadvertently create unnecessary obstacles that impose on students' human rights, and may, as a consequence, find their unwritten policies legally challenged (Roberts, 2013).

Accessibility: Barriers and Solutions

Successful completion of post-secondary education, whether it is delivered face-to-face or online, depends on students' ability to overcome accessibility barriers related to their disability.

Supporters of distance education consider ease of access, flexibility, and convenience to be key benefits (Abrami, et al., 2006; Butcher & Rose-Adams, 2015; McGill, 2008; Moore & Kearsley, 2012) and that distance education may provide students with disabilities, including those with hearing loss, with opportunities to achieve academic success (Brown, 2008; Di Iorio et al., 2006; Fichten et al., 2009; Moisey, 2004). Critics point to accessibility issues as potential barriers to the equitable inclusion of students with disabilities (Burgstahler, Corrigan, & McCarter, 2005; Di Iorio, et al., 2006).

However, the distance learning environment changes as technology changes. Now, course material is not only delivered in a textual format, it is also delivered using complex audio and video media, and it sometimes requires a high degree of interactivity (Fahy, 2008). As a result, despite the many benefits associated with distance education and the ready availability of distance-delivered university programs, there are also many accessibility issues related to online learning, including technology issues; poor course design; student, faculty, and administrator attitudes; and limited support (Brown, 2008; Muilenburg & Berge, 2005; Valentine, 2002). Accessibility challenges can result in frustration and boredom (Artino & Stephens, 2007; Capdeferro & Romero, 2012), threats to self-efficacy for students with hearing loss (Artino & Stephens, 2009; Shen, Tsai, & Marra, 2013), and may have a negative impact on some students'

learning (Brown, 2008; Fichten et al., 2006; Fichten et al., 2009; Seale, Draffan & Wald, 2008; Schmetzke, 2001).

The need to improve communication.

Thomas (2002) noted that improving communication is a way of increasing the quality of instruction. Therefore, effective communication may be used to help students enhance their understanding of concepts, enable them to see divergent points of view, and improve their critical thinking skills, thereby contributing to improved higher-level learning outcomes for students (Thomas, 2002). However, if communication is impaired, higher-level academic outcomes may not be achieved (Antia, Jones, Reed, & Kreimeyer, 2009; Anita, Sabers, & Stinson, 2007; Eriks-Brophy, et al., 2006; Stinson & Liu, 1999). At the micro level, not all students with hearing loss have the same level of impairment or perceived disability. Some may require assistive hearing devices or other adaptive devices, or specialized computer software in order to communicate effectively, access course content, or participate in class activities that have an audio component (Opitz, 2002). Conversely, those experiencing mild hearing loss may not require assistive devices or may choose not to use them if they are available. As a result, breakdowns in communication may occur without learners' or instructors' knowledge.

The use of online asynchronous text-based discussion forums can help reduce the communication barriers students with hearing loss often find in traditional classrooms (Richardson & Long, 2003). However, despite the ready availability of synchronous and asynchronous communication methods used in distance education, many students may not actively participate in discussion forums or computer conferences for a variety of reasons. It has been suggested that a lack of nonverbal cues and lack of response to forum postings, and fear or reluctance to speak in public forums are reasons for non-participation (Taylor, 1998). In addition,

Vonderwell (2003) suggests that some students "may not feel morally obligated or pressured to participate in online communication" (p. 87). Hearing loss may be a contributing factor for non-participation in activities that include an audio component.

Because hearing loss may contribute to a distortion in communication, students with hearing impairment may need to concentrate more on what is being said than those with normal hearing when participating in audio or video conferences. This extra concentration may contribute to fatigue (Arlinger, 2003) or frustration. It has been suggested that even a mild hearing loss may contribute to a 50% to 60% loss in communication (Niagara College, n.d.). Students experiencing frustration with their hearing impairment may subsequently withdraw from participating in synchronous class conferences as a means of avoiding having to ask others to repeat what was said, avoiding possible misunderstandings (Arlinger, 2003), and avoiding making potentially embarrassing or inappropriate responses. The abovementioned factors, coupled with the psychosocial effects hearing loss has on everyday life, may contribute to perceptions of exclusion or isolation (Arlinger, 2003), symptoms of anxiety or depression, lower self-esteem, or reduced overall well-being in students with hearing impairment (Arlinger, 2003; Tambs, 2004).

To support inclusion, course discussion forums, computer-conferencing, and other types of computer-mediated communication provide distance learners with many opportunities to interact with each other and with their instructors. Interaction between learners and educators, and among learners is considered an integral element of the learning experience. In particular, peer interaction provides opportunities for discussion, collaboration, self-reflection, and knowledge construction (Anderson, 2003a; Anderson, 2003b; Garrison, Anderson, & Archer, 2001; Opitz, 2002; Pena-Shaff & Nicholls, 2004; Sims & Bovard, 2004).

Implementing strategies to improve communication, support inclusion, and promote interaction may reduce perceptions of isolation and anxiety. Taking such steps may help students achieve their academic goals (Scadden, as cited in Brown, 2008).

Using assistive technologies to overcome barriers.

Assistive technologies may provide Dd/HH students with the ability to remove barriers and experience educational opportunities that were not possible in the past (Fichten et al., 2009; Fichten et al., 2012; Opitz, 2002; Seale, Draffan & Wald, 2008; Sharpe, Johnson, Izzo, & Murray, 2005). Fichten et al. (2009) found that students who access and use adaptive hardware and software have better access to course materials, and are better able to communicate with faculty and peers. Dd/HH students who take advantage of available technologies are more autonomous, more organized, more confident in their abilities, and are less stressed (Fichten et al., 2009). However, the benefits associated with distance education may be limited if the courses and programs offered are not fully accessible to all students who enrol in them (Burgstahler, 2006; Burgstahler, Corrigan, & McCarter, 2005; Fichten et al, 2009; Schmetzke, 2001).

Online Instructional Design and D/deaf or Hard-of-Hearing Students

Smith and Ragan (2005) describe instructional design as the "systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation" (p. 4). Similarly, Chaudry and Rahman (2010) state that instructional design is a systematic process that "applies learning principles to decisions about information content, instructional method, use of media and delivery systems" (p. 194). Designing instruction, therefore, includes analyzing learners' and instructional needs, defining objectives, identifying or developing appropriate course material, determining instructional strategies and how the course material will be presented, and determining how

learning will be assessed. Smith and Ragan (2005) suggest that instructional design should be learner-centered (i.e., the student is the focal point of all instructional elements).

As noted, despite the many advantages of distance education, some students may still find their learning experiences impeded by a form of digital exclusion caused by course designs that do not adequately satisfy their needs (Burgstahler, 2002; Di Iorio et al., 2006; Fichten, 2009; Mercado, 2013). Therefore, instructional designers play a pivotal role in developing accessible course material so that students with hearing loss have an equitable opportunity to achieve academic success.

The percentage of students with reported disabilities enrolled in post-secondary distance education programs is relatively low when compared to the percentage of students without disabilities (Snyder & Dillow, 2015). However, it is reasonable to suggest that the number of Dd/HH students who enroll in distance education programs will continue to grow in the future. Making modifications to course design and delivery in order to accommodate those with hearing loss may make learning experiences more equitable (Fichten et al., 2009; Mercado, 2013; Sharpe, Johnson, Izzo & Murray, 2005). As a result, research has been conducted investigating deficiencies in course design and delivery, and developing and implementing instructional design strategies to support learners with physical, sensory, psychosocial, and learning disabilities (Bissonnette, 2006; Fichten et al., 2009; Mercado, 2013). However, it has been suggested that accommodating students with accessibility needs is frequently not considered when designing online courses (Kinash, Crichton, & Kim-Rupnow, 2004) or developing e-learning materials (Bissonnette, 2006). Explanations offered for this oversight include inadequate training of course designers, insufficient time available to develop course materials, prohibitive cost and inadequate funding, lack of infrastructure and administrative support, and a lack of buy-in from institution

administrators and faculty (Bissonnette, 2006). Further, Fichten et al. (2009), suggest that in the rush to incorporate newly developed or purchased academic software, course designers may fail to determine if such software is compatible with adaptive technologies. Table 2 outlines potential accessibility barriers and possible solutions.

Table 2

Access Challenges and Solutions for Students with Hearing Loss

Challenge	Possible Solution
Inability to access content from media or educational materials that include an audio component.	Ensure that any educational audio or video clips, or recorded lectures, etc. include closed captioning
Inflexible time limits for online examinations and other assessments.	Provide additional time for assessments that involve an audio component.
Inability to fully participate in webcasts or audioconferencing, etc.	Provide transcription of discussions, text scripts or other text benefits that students can refer to at a later date.

Additional recommendations.

In addition to the solutions described in Table 2, further recommendations have been made. For example, course designers and educators receive further training on ways to integrate students with disabilities (Bissonnette, 2006; Fichten et al., 2009; Hull, Sitlington, & Alper, 2001), postsecondary institutions increase visibility of disability related services (Fichten et al., 2006) and develop and adopt accessibility guidelines (Fichten et al., 2009), and students be invited to pilot test design elements (Fichten et al, 2009; Mercado, 2013).

As noted above, some Canadian universities that focus on distance learning have policies to help support students with disabilities. However, the percentage of students who self-identified as experiencing hearing loss is relatively small when compared to the general student population (Brown; 2008; Fichten et al., 2009; Moisey, 2004; Sharpe, Johnson, Izzo & Murray,

2005; Richardson, 2001; Richardson, Long & Woodley, 2004). For example, in a case study investigating the experiences of students with disabilities enrolled at Athabasca University between 1998 and 2001, the author found that approximately 3% of students reported hearing impairment (Moisey, 2004). Identifying and addressing accessibility barriers for such a relatively small population of students may pose challenges (Moisey, 2004; University of Ottawa, 2011), and questions have arisen as to whether the support services available to students with disabilities are sufficient to meet their needs (Fichten, Asuncion, Barile, Robillar, & Lamb, 2003). The availability of support mechanisms and accommodations, coupled with the flexibility inherent in the delivery of distance education programs, may provide Dd/HH students with advantages that may not be available with conventional face-to-face classrooms (Abrami et al., 2006; Di Iorio et al., 2006; Fichten et al., 2009; Moisey, 2004; Seale, Draffan & Wald, 2008). For example, Moisey (2004) found that students who received accommodations for their disability experienced a positive outcome related to course completion. However, as noted by the author, caution should be taken in drawing any conclusions from these findings, because the results were not significant and the number of students in the sample was small (n=18).

Conclusions

In North America, increasing numbers of students with disabilities are pursuing higher education (Eckes & Ochoa, 2005; Snyder & Dillow, 2015). Current technological, social, and academic realities suggest that program administrators and instructional designers have an inherent responsibility to ensure that online programs and courses are accessible for all students (Burgstahler, Corrigan, & McCarter, 2005; Mercado, 2013). Furthermore, legislative demands have been established to hold universities accountable for ensuring that mechanisms are in place to support qualified students with disabilities, and for ensuring they have fair and equitable

access to higher education, regardless of the type or extent of disability (Robert, 2013). However, despite these expectations and despite efforts to promote equal access, accommodation and accessibility issues continue to arise, including those related to technology issues; poor course design; student, faculty, and administrator attitudes; and limited support (Brown, 2008; Muilenburg & Berge, 2005; Valentine, 2002). In distance education, ready access to assistive devices, and computer hardware and software used for educational applications may improve education outcomes. However, the inability to access course materials, obtain supportive technology. and other barriers stemming from hearing loss may hinder some students' ability to participate fully and equitably in online learning activities (Fichten et al., 2006; Fichten et al., 2009; Seale, Draffan & Wald, 2008; Schmetzke, 2001; Tallent-Runnels et al., 2006). Therefore, hearing loss may adversely affect some students' academic success (Brennan, Gombac, & Sleightholm, 2009; Emmett & Francis, 2015). As a consequence, lower educational attainment may, in turn, contribute to economic hardship, lower socioeconomic position, and reduced overall quality of life (Galarneau & Radulescu, 2009; Emmett & Francis, 2015; Turcotte, 2014).

However, despite the acknowledgement that challenges do exist, the perspectives of what constitute accessibility barriers and strategies to overcome those barriers may differ among administrators, faculty, students, and service providers (Bissonnette, 2006; Fichten et al., 2009), making it difficult to find a common ground. Research has shown that a number of common barriers have been identified and strategies designed to help equalize access for students with hearing loss have been suggested (Burgstahler, 2002; Burgstahler, 2006; Burgstahler, Corrigan, & McCarter, 2005; Fichten et al., 2009; Mercado, 2013; Moisey, 2004; Opitz, 2002; Seale, Draffan & Wald, 2008).

A review of the literature revealed that research related to promoting accessibility for students with disabilities has been a topic of discussion for several years (Burgstahler, 2002; Fichten, et al., 2000; Fichten, Asuncion, & Scapin, 2014; Richardson, 2015). However, despite the ongoing discourse, the fact remains that if universities do not decisively incorporate tangible mechanisms to ensure distance education courses are universally accessible, the overall negative societal impact stemming from inaccessibility will continue. As technology advances, the distance learning environment must adapt to reflect those advances to remain competitive and to support learners. In addition, all learners' needs are not the same; therefore, if the idea of *accessibility* is reconceptualized and accepted to truly mean *universal accessibility* (Burgstahler, 2002; Di Iorio et al., 2006), online learning environments may be further adapted to improve the focus on teaching and learning processes, rather than attending specifically to the unique needs and abilities of individual students or groups of students (Cavanagh, 2004). Having an understanding of learners' perceptions, seeking their input, and employing their recommendations may further enhance instructional design processes and outcomes (Mercado, 2013; Fichten, 2009; Long, Vignare, Rappold & Mallory, 2007; Seale, Draffan & Wald, 2008).

This aim of this research is not simply to add substance to the academic discourse related to the topic; it is to determine if concrete, doable strategies to foster universal accessibility of distance education courses can be uncovered. Routinely including strategies to support inclusion may become the norm, rather than the exception, when a holistic view of universal accessibility is accepted. Decisively attending to accessibility needs may level the playing field by making learning experiences more equitable, enhancing learning outcomes, and promoting success for all learners (Brown, 2008; Burgstahler, 2006; Coombs & Banks, 2000; Fichten et al., 2009; Mercado, 2013; Opitz, 2002; Tallent-Runnels et al., 2006; University of Ottawa, 2011).

Chapter III - METHODOLOGY

This chapter outlines the research design used for this study. It includes a description of the sampling strategy, data collection methods, and data analysis procedures, and a discussion of ethical considerations as they pertain to the protection of participants' privacy and confidentiality, and the safeguarding of data.

Role of the Researcher

According to Yin (2009), case study researchers need to develop a number of skills in order to conduct effective, good quality case studies. For example, a good case study investigator:

- Will be able to ask good questions – and interpret the answers.
- Will be a good "listener" and not be trapped by their own ideologies or preconceptions.
- Should be adaptive and flexible, so that newly encountered situations can be seen as opportunities, not threats.
- Must have a firm grasp of the issues being studied, even if in an exploratory mode.
- Should be unbiased by preconceived notions, including those derived from theory, [and] should be sensitive and responsive to contradictory evidence (Chapter 3, Section 2, para. 5).

Qualitative inquiry often stems from a desire to learn more about a phenomenon that seriously interests or concerns the researcher. Moustakas (as cited in Creswell, 2013) and Chenail (2011) suggest that if investigators have lived the phenomenon under examination, their personal values, beliefs, and views may influence the research process. Because investigator bias may, therefore, limit the perceived trustworthiness of the research, investigators should acknowledge the possibility of subjective bias and attempt to bracket (i.e., set aside) their previous understandings and biases about the phenomenon of interest (Moustakas, as cited in

Creswell, 2013, p. 80). Therefore, in an attempt minimize bias and ensure research processes are trustworthy, it is necessary that my personal interest and connection to the topic of interest be acknowledged and addressed.

Personal Connection to the Research

In this study, I am the sole researcher. As such, I was responsible for designing the study, collecting, analyzing and interpreting the data, and presenting the findings. I am currently enrolled in a Master of Education program at Athabasca University in Alberta, Canada, where all courses in the program are delivered via distance education. Furthermore, a significant amount of my postsecondary formal education has been achieved via distance education. I also have moderate bilateral hearing loss and often wear hearing aids when engaged in daily activities to reduce the impact of my impairment, but do not use any other type of specialized assistive technology or computer software to improve access to course materials or assist in completing course work. I have not formally disclosed my hearing loss to university administrators, nor requested any academic accommodations related my disability. I have, however, experienced barriers to learning stemming from my hearing loss.

As a result, I recognize that I have preconceived notions about the phenomenon of interest. In addition, I acknowledge that I have an intrinsic interest in this research that stems from my affinity to the research population and my personal experiences. Having this awareness provided me with the insight that my personal bias may influence outcomes of the study. Therefore, with an aim to remaining open to exploring the personal lived experiences of the participants, and truthfully recording and describing those experiences, I attempted to set aside my own presuppositions as much as possible throughout the research process. Doing so helped me view others' experiences through a more objective lens, reduced the risk of inadvertently

biasing the results by imposing my experiences during the data collection, analysis, and reporting phases, and permitted the construction of new knowledge (Creswell, 2013; Finlay, 2009; Patton, 2015; Tufford & Newman, 2012).

Study Design

Exploratory Case Study Approach

There are numerous approaches that investigators may take when conducting qualitative research (Creswell, 2013; Spencer, Ritchie, Lewis & Dillon, 2003). Each approach is rooted in fundamental epistemological or ontological ideologies (Neuman, 2006; Spencer, Ritchie, Lewis & Dillon, 2003). Underlying assumptions of what constitutes knowledge and "truth", therefore, will influence the overall direction of the research; impact all elements of the study design, including the ways data are collected and analyzed, and findings are reported; and influence what conclusions are drawn.

Case studies are qualitative inquiries that investigate contemporary and complex real-life phenomena within a "bounded system" or "case" (Creswell, 2013; Yin, 2009). Further, Cavaye (1996) suggests that "case research can be carried out taking a positivist or an interpretive stance, can take a deductive or an inductive approach, can use qualitative and quantitative methods, can investigate one or multiple cases" (p. 227). Interpretivism and constructivism are underpinned by the epistemological philosophy that knowledge, reality, and truth can be uncovered by investigating how individuals or groups construct knowledge or perceive the world in which they live (Neuman, 2006). An inductive, interpretive approach was taken to seek relevance in the data in order to gain insight into the phenomenon of interest from the points of view of the participants.

However, although assumptions about the nature and purpose of research, and what constitutes knowledge and truth may influence the direction of research, the chief criterion for determining which approach is taken is the research question, rather than on any underlying philosophy (Borrego, Douglas & Amelink, 2009; Neuman, 2006; Englander, 2012). As a consequence, this research used an exploratory case study design to explore the experiences and perceptions of a group of individuals who share some common characteristics in order to gain a deeper understanding of a "complex social phenomenon" (Yin, 2009, Chapter 1, Section 1, para. 5). What can be learned from how Dd/HH students enrolled in, or have recently completed, a university level program or course delivered via distance education perceive and overcome accessibility barriers related to instructional design is a specific, complex, and contemporary real-life phenomenon that is bounded by time and context. Therefore, in this case, using an exploratory case study design and taking an interpretive approach as a means of investigating ways learning could be supported for those with hearing loss is appropriate.

Assumptions

When conducting the research, a number of underlying assumptions were made.

Because the participants are or were enrolled in university level courses, they have been able to participate in school-related activities in a meaningful way and successfully overcome barriers related to their hearing loss with or without the use of assistive technologies, the provision of support services, or the granting of academic accommodations.

Email correspondence with participants and the collection of background data would entail the use of a computer and access to the Internet. Because participants are involved in distance education, it was assumed that they have access to these elements and are proficient in their use.

Data would be collected via interview, either face-to-face, via telephone, or via voice over internet protocol (VoIP) technology. Therefore, it was also assumed that participants have access to any assistive technology they need to engage in the interview process.

Lastly, it was assumed that the data collected would yield the type of substantive and illuminative information required to help answer the research question.

Participants

Inclusion criteria.

The inclusion criteria for this case study were: 1) participants had to be undergraduate or graduate students who are enrolled in, or have recently completed, a course or program that is delivered via distance education, and 2) they also had to have some degree of hearing loss.

Recruitment.

A purposive sample was used to help focus the investigation and answer the research question by reducing variation among participants. The initial call for participants was done through a broadcast email sent in July 2015 by a member of Athabasca University's Centre for Distance Education administrative staff to students currently enrolled in Centre for Distance Education programs. See Appendix A for the recruitment email and letter. In addition, an email invitation was sent to recent graduate of the University who had previously indicated a willingness to participate in the research.

Data Collection Procedures

To support methodological triangulation, both quantitative and qualitative data were collected for this case study (Creswell, 2013; Patton, 2015; Yin, 2009). Data were collected in two phases and were obtained via online questionnaire, interviews, follow-up e-communications, and review of appropriate documents and webpages.

Phase 1: Online Questionnaire

In the first phase of the study, potential participants were asked to complete an online questionnaire using LimeSurvey to collect quantitative background data. The questionnaire was also used to collect qualitative data regarding their educational experiences and their experiences with hearing loss. The LimeSurvey platform was used because it has privacy and data security features in place to safeguard research data. For example, it supports encrypted *https* connections and has IP address masking capabilities. It also has an *electronic consent* option whereby participants may only proceed to the survey after clicking a "Yes" radio button. In following this protocol, participants indicated their voluntary informed consent to access the questionnaire and participate in the study. Not completing the survey after providing consent was considered voluntary withdrawal. Appendix B shows the LimeSurvey informed consent page and Appendix C shows the questions included in the questionnaire.

Using the online questionnaire, potential participants were screened for suitability (Yin, 2009). Those who met the inclusion criteria and indicated a willingness to be interviewed were contacted via email to arrange a time for the interview to take place.

Phase 2: Semi-Structured Interviews

The second phase of the study consisted of follow-up discussions via voice-over-Internet protocol (i.e., Skype) or via telephone with each those who agreed to participate in interviews. After obtaining informed consent to audiotape the interview, each interview was recorded using a digital recording device. Interviews for qualitative research vary in the degree of structure imposed. The interviews for this study were conducted using a somewhat loose semi-structured format that allowed the interviewer-researcher the flexibility to follow the participants' lead. Some questions were designed to elicit specific types of information. However, rather than

inadvertently following some preconceived personal agenda, follow-up questions were spontaneously asked as a natural consequence of the direction of the dialogue and the information that emerged. Open-ended questions were generally used to yield more depth and detailed information about participants' areas of interest and their "real-life" experiences (Patton, 2015; Turner, 2010; Yin, 2009) related to:

- the types of assistive technologies they have accessed or currently use;
- their perceptions of how hearing loss affected, and currently influences, their everyday lives;
- their perceptions of whether their hearing loss affected the quality of their academic integration and social interactions while participating in conventional face-to-face schooling or distance education courses, and if so, how;
- their perception of any barriers to their learning related to their hearing loss;
- how they regard the quality of accessibility of course materials or activities (particularly related to course design and support services); and
- any specific suggestions they have for reducing accessibility barriers.

Each interview was scheduled to last approximately 20 to 30 minutes in duration; none of them exceeded that timeframe. See Appendix D for a list of questions that were used to guide the interviews.

After each interview, initial impressions and key themes were immediately noted. The interviews were then transcribed using Dragon NaturallySpeaking (DNS) software (version 12.0). DNS is a software program that uses voice recognition technology to transcribe voice recordings. However, the sound quality of the recordings was sometimes mediocre, so the resulting DNS transcriptions were generally of poor quality; they frequently included words and entire segments that were not accurate, making them hard to read and of very limited use.

Therefore, none of the DNS transcriptions were used. Instead, the interviews were transcribed verbatim by the researcher, and subsequently checked for accuracy and validity.

Strategies for Ensuring Validity and Trustworthiness

Issues of construct and internal validity, and the consequent trustworthiness of the data were addressed in a number of ways. Frequent member checks were conducted during each interview to ensure that what the researcher heard or what the participant was trying to convey was accurate. In addition, the transcripts were verified by a third party who had no link to the research, and then submitted to the participants for further verification and /or correction. One of the participants responded with clarification and corrections. The other two verified the transcripts submitted were accurate. Lastly, all three participants were contacted to gain further approval for using their information and personal quotes in this report. Using member checks, third-party verification of transcripts, and respondent validation of transcripts helped ensure accuracy, and thus validity, of the data collected (Creswell, 2013; Díaz Adrade, 2009; Koelsch, 2013; Patton, 2015; Yin, 2009).

Data Analysis

According to Patton (2015), qualitative data analysis involves the process of transforming raw information into findings. Using analytic methods such as coding and categorizing, relevant and significant data are separated, then grouped into categories with similar characteristics. In this way, order and structure are brought to the data collected; significant themes and patterns are identified; emergent understandings become apparent, are extracted and interpreted; and a framework for communicating the essential substance of the data is developed (Creswell, 2013; Patton, 2015; Saldana, 2009; Yin, 2009). Results of the data analysis will be discussed in Chapter IV. However, in qualitative research, the researcher often has a particular interest in the

phenomenon being explored; therefore, before a proper analysis can take place, any presuppositions should be set aside.

Bracketing Presuppositions

As previously noted, because I have hearing loss and am currently enrolled in a university-level distance education program, I have a personal interest in the research. Because I have first-hand knowledge of the phenomenon of interest, there is the possibility that my own values, beliefs, and preconceived notions may influence the way the data were collected, interpreted, and reported, thereby tainting the research process (Creswell, 2013; Finlay, 2009; Patton, 2015; Tufford & Newman, 2012). However, reflecting on personal experiences may also have a positive effect. Tufford and Newman (2012) also suggest that,

> While bracketing can mitigate adverse effects of the research endeavor, importantly it also facilitates the researcher reaching deeper levels of reflection … The opportunity for sustained in-depth reflection may enhance the acuity of the research and facilitate more profound and multifaceted analysis and results (p. 81).

Nevertheless, to support validity and strengthen rigour, I put aside presuppositions about what types of themes would be revealed during the interviews; therefore, I did not set any codes based on *a priori* knowledge. Instead, I began coding immediately after interviews concluded.

Analysis of Quantitative Data

Data obtained from the questionnaire were exported from LimeSurvey, and were imported to a Microsoft Excel spreadsheet and to a Microsoft Word document. LimeSurvey functions computed the descriptive statistics derived from the quantitative data.

Analysis of Qualitative Data

The analysis of narrative content (both verbal and written) is a multi-step and fluid process (Taylor-Powell, 2003). The data were analyzed using approaches described by Creswell

(2013, Ryan and Bernard (2003), Saldana (2009), and Taylor-Powell and Renner (2003). Steps occurred separately or concurrently, and included:

- Revisiting my perceptions of my personal experiences related to the phenomenon as a means of understanding how these perceptions could influence the data analysis. This was done in a conscious effort to ensure I viewed the data through "fresh eyes" and focused on the participants' experiences.

- Familiarizing myself with the data by "pawing" though the comments at the conclusion of each interview and by revisiting the data on several occasions to help me identify important information.

- Writing informal analytic memos to help identify significant statements and information related to the phenomenon, and to make connections between and among data.

- Coding significant or repeated words or phrases and grouping them into larger units. Coding was done using abbreviations, changing the font colour, highlighting or underlining text, or a combination of methods.

- Organizing information into coherent categories to help identify patterns and themes.

- Identifying patterns and themes across participants, and within and between categories was done to help recognise any relationships that emerge from the data.

- Ascribing meaning to significant statements.

- Validating the data by performing member checks to reduce the risk of my personal bias contaminating the analysis.

- Describing the emergent themes to help attach meaning to the participant's experiences and support understanding of the phenomenon.

Coding strategies and categorization of data.

Due to the scope of the study and the novice status of the researcher, coding strategies were less exhaustive than those used in the comprehensive case studies conducted for doctoral dissertations or institutional research. Coding the data for this study involved making several passes. That is, the data were examined in several stages that loosely followed the "cycle" coding methods described by Saldana (2009).

First pass.

Immediately following each interview, the recording was revisited and preliminary notes of initial impressions were made, and a series of first pass codes were assigned (e.g., barriers, technology use, early life, home life, education, etc.). The notes were then put aside for later review and comparison to subsequent analyses.

Second pass.

A more formal approach was taken when coding during the second pass. Coding was done line-by-line using an open strategy, whereby significant words or phrases were identified. At the same time, process codes (i.e., labels and gerunds) or subcodes, or both, were also applied (Saldana, 2009). Various colour codes were used as the primary method of coding during the initial pass. For instance, words highlighted in yellow referred to words or statements that suggested ways barriers were overcome. The font for those same words could be blue to indicate a reference to assistive technology. For example, we had CART in remotely means that the assistive technology, Communication Access Realtime Translation (CART), was used as a way to overcome a perceived barrier. Using colour to code not only presents a new way of looking at data, it helps preserve the data by showing sequencing of events and the variability of participants' experiences. Although it could not be discerned at the onset if all the information coded would be categorized or evolve into themes, colour-coding during the second pass made it readily evident that there were some commonalities in the data. In this way, some similarities and differences in the experiences and perceptions of the participants began to emerge. Figure 1 illustrates an example of the initial coding.

…he wanted to do a live video conference thing with the entire class and I knew I wasn't going to be able to keep up with that, so we met face-to-face and we discussed it. So what we ended up doing is we had CART in remotely. And CART provided captioning for me, so that was resolved, but the entire process of getting CART really made me angry because at… I asked for support services and it was always a case of "Yeah, sure, no problem" and they would provide it – no questions asked. I went through Athabasca University; they wanted me to fill out all this paperwork. And what made me really angry was they were asking about my income and my husband's income. And I'm thinking that's really intrusive and what's that got to do with anything? It's that it's coming out of my money and what right do you have to ask these kinds of questions. Well, I'm very very angry with Athabasca University for that and I felt like: Well I need these services – I need CART services – for this particular course, so you have no choice but to provide it. But I remember ranting and raving…	Colour codes: • communication methods • instructional design • barrier • overcoming a barrier • assistive technology • negative emotion • processes Process codes (gerunds): • communicating needs • asking for help • using CART • overcoming barriers • struggling to understand • perceiving injustices • expressing anger

Figure 1: Example of Initial Coding using Colour and Process Codes

Third pass.

After conducting the second pass coding, identical or similar codes from each participant's data were grouped together to form categories and sub-categories. For example, all comments related types of assistive technologies used were grouped together and then further delineated into subcategories that related to specialized technologies and mainstream technologies.

Subsequent passes.

Following that, similar codes from different participants were grouped together to help identify common themes within and between categories. Common themes found included understanding self, identifying barriers, expressing frustration, advocating for self, perceiving injustices, overcoming obstacles, and identifying solutions. By categorizing the data to identify interconnections, describing emergent themes, and incorporating participant feedback into the descriptions, an overall picture of the lived experiences of the participants was revealed.

Ethical Considerations

This case study is designed to contribute to the body of knowledge related to Dd/HH students in postsecondary distance education. Because the inquiry involved interaction with humans, approval from Athabasca University's Ethics Review Board (REB) was sought to ensure the research was ethically sound (Athabasca University, 2009, 1.0 c). The following procedures were followed, or will be followed, to protect the rights of participants:

- Recruiting procedures were free from explicit or implicit coercion. This was accomplished by sending an invitation to potential candidates to participate in the study. Only those who respond to the invitation were recruited as participants.

- Voluntary consent was gained by disclosing the purpose of the research and its processes (including data collection and recording methods), by assuring participants that the data collected would be used only to fulfil the research objectives, by protecting privacy, and by respecting anonymity and confidentiality.

- Participants were advised that they could withdraw consent without fear of reprisal.

- Reporting accuracy was supported by conducting member-checks and by making transcripts of interviews available to participants.

- Participants' anonymity will be respected through the use of pseudonyms. Participants were advised that that no information that would readily identify them would be included in the report. However, they also acknowledged that they understood they may be identified through deductive investigation by others, and provided express consent for the use of their information, including descriptions and direct quotes.

- Confidentially will be maintained by storing digital data on a password-protected computer hard drive and an external hard drive.

Potential risks were mitigated by attending to ethical considerations outlined above. Appendix E includes the initial Certification of Ethics Approval and the extension issued by Athabasca University's Research Ethics Board.

Chapter IV - RESULTS AND DISCUSSION

The purposes of this study were to explore the experiences of D/deaf and hard of hearing students in university-level distance education, and to develop specific recommendations for course designers for enhancing the accessibility of course material for learners with hearing loss. In particular, the research looked at students attending, or who had recently graduated from, Athabasca University (AU), a midwestern Canadian institution that offers university-level courses and programs via distance education. In this chapter, the research study findings are presented in two broad sections. Part 1 includes a presentation and review of demographic and background information obtained from the online questionnaire. Answers to questions related to demographics and education were required to determine if participants met the study inclusion criteria. In addition, to complement and enrich the presentation of the data (Patton, 2015; Yin, 2009), and to provide contextual support, a brief description of each participant is included. Part 2 includes a presentation and review of findings related to participants' experiences, as described in the online questionnaire and in interviews.

Part 1: Online Questionnaire Findings

When analyzing quantitative data, small sample sizes are problematic. Even though a limited amount of quantitative data were gathered in the online questionnaire, because the sample size is so small (n = 4), no assumptions of normality were tested, and no inferential statistics were generated; therefore, no generalizations were made to larger populations beyond the sample (Norman & Streiner, 2008; Urbano Blackford, 2007). The only descriptive statistics used to describe quantitative data included in the questionnaire data are frequencies (i.e., counts and percentages).

Response Rates

In July, 2015, invitations to participate in the research project were sent via email to 519 students enrolled in post-baccalaureate, masters, and doctoral programs in the Centre for Distance Education (CDE) at Athabasca University. In addition, a recent graduate of AU was invited to participate. Of those invited to participate in the research, nine responded (1.73% of the initial response rate). Of those nine, six completed the online questionnaire. (Three respondents did not answer any questions beyond the initial consent form.) In addition, two questionnaires were completed and submitted by individuals who reported that they did not have hearing loss. Because hearing loss was one of the criteria for inclusion in the study, the two aforementioned submissions were also discarded and the responses were excluded from the analysis. In total, the online questionnaire yielded four valid responses (0.77%). That is, four individuals had hearing loss and were either undergraduate or graduate students enrolled in a distance education program or course or had recently completed online courses and, therefore, met the inclusion criteria.

From July 1, 2014 to June 30, 2015, a total of 39,585 students were enrolled and active at Athabasca University (S. Houry, personal communication, October 23, 2015), and 38 active students registered with AU's Access to Students with Disabilities office had indicated that hearing loss was their primary (n = 34) or secondary (n = 4) disabling condition (M. Reaney, personal communication, October 14, 2015). Therefore, approximately 1% of students disclosed their hearing loss to the University. Of the 520 students invited to participate, only one agreed to participate in the study and declared her hearing loss to AU, resulting in a 0.19% response rate. Although this statistic does not appear to be in line with the institution's disclosure rate, it is not

known how many hearing impaired students registered with the ASD office were also enrolled in CDE programs.

In addition, it is not known how many of the 520 invited to participate had hearing loss. One explanation for the low response rate for the online questionnaire (i.e., 0.77%) is that some adult learners with mild or moderate hearing loss may not even be aware that they have impaired hearing function (Feder et al., 2015). Therefore, it is possible that some students may not have self-identified as being potential study participants and, therefore, did not even consider responding to the invitation.

Demographic Characteristics and Education Data

Section 1 of the questionnaire asked respondents to provide demographic information related to gender, age, marital status, place of residence, and employment status. Section 2 asked for information related to their education. Summaries of these data are presented in Table 3 and Table 4. Because the sample consists of only four participants, and because the research concentrates on describing the experiences of participants and making meaning from those experiences, these data are presented and discussed to simply provide a snapshot of the sample.

Half of eligible respondents are female (n=2) and half are male (n=2). All respondents reside in Canada: 50% (n=2) in Alberta and 50% (n=2) in Ontario. Three of the four respondents are currently enrolled in a Masters program, and one graduated with a Master's degree from a program delivered at a distance within the previous six months.

Interestingly, all four respondents fall in the 40 to 49 age bracket, which is slightly higher than the average age of graduate student enrolled at Athabasca University during the 2010 to 2011 academic year, which was 38.2 (Athabasca University, 2013). Two of the respondents reported being employed full-time and two reported being employed part-time. The recent

graduate confirmed that he was working while he was enrolled at AU. Athabasca University (2013) reported that in 2010 to 2011, 83% of students worked while they studied, but did not differentiate between undergraduate and graduate level students. Two of the respondents completed 6 to 10 distance education courses; two reported completing 11 or more courses.

Table 3

Demographic Information

Item	n	%
Gender		
Female	2	50
Male	2	50
Age		
Younger than 30 years of age	0	0
30 - 39	0	0
40 - 49	4	100
50 - 59	0	0
60 years of age or older	0	0
Marital Status		
Single	0	0
Married or Common Law	4	100
Divorced	0	0
Widowed	0	0
Location of Residence		
In Canada	4	100
Other	0	0
Province or Territory of Residence		
Alberta	2	50
British Columbia	0	0
Manitoba	0	0
New Brunswick	0	0
Newfoundland and Labrador	0	0
Northwest Territories	0	0
Nova Scotia	0	0
Nunavut	0	0
Ontario	2	50
Prince Edward Island	0	0
Quebec	0	0
Saskatchewan	0	0
Yukon	0	0
Employment		
Employed full time	2	50
Employed part time	2	50
Not currently employed	0	0

Table 4

Education

Item	n	%
Highest Credential Received		
High school diploma	0	0
Certificate	0	0
College diploma	0	0
Bachelor's degree	2	50
Master's degree	1	25
PhD / EdD	0	0
Other*	1	25
*2 different Bachelor's degrees		
Currently Enrolled in Undergraduate or Graduate DE Course and /or Program		
Yes	3	75
No	1	25
If Not Currently Enrolled, Length of Time Since Enrollment		
Never enrolled	0	0
Less than 6 months ago	1	100
6 - 12 months ago	0	0
More than 12 months ago	0	0
Number of DE Courses		
0	0	0
1	0	0
2 - 5	0	0
6 - 10	2	50
11+	2	50

Hearing Loss

Four of the original six respondents who completed the online questionnaire indicated they had hearing loss, thereby meeting one of the inclusion criteria. A summary of the data related to hearing loss is presented in Table 5. Respondents were asked if their hearing loss was congenital (i.e., present at birth), acquired (i.e., acquired after birth), or a combination of both. One (25%) indicated her hearing loss was congenital, two (50%) indicated their hearing loss was

acquired, and one (25%) indicated that his hearing loss was a combination of congenital and acquired (i.e., was present at birth and got progressively worse over time). Two (50%) respondents reported their hearing loss was moderate and one (25%) reported it was severe; one (25%) reported she was D/deaf. Statistics Canada categorizes hearing loss into three groupings: i) normal, ii) mild, and iii) moderate or worse (Feder et al., 2015). Based on this classification, 100% of eligible respondents self-identified as having moderate or worse hearing loss.

Table 5

Hearing Loss

Item	n	%
Hearing Loss		
Yes	4	100
No	0	0
Type of Hearing Loss		
Congenital	1	25
Acquired	2	50
Combination (congenial and acquired)	1	25
Unsure	0	0
Degree of Hearing Loss		
Mild	0	0
Moderate	2	50
Severe	1	25
Deaf	1	25

Academic Accommodations and Support Services

Of the four respondents, only one (25%) officially disclosed her hearing loss to the university and accessed academic accommodation and support from the institution. Two respondents (50%) indicated they had received support from outside sources. Data related to academic accommodations and any support services received are presented in Table 6.

Table 6

Academic Accommodations and Support Services

Item	n	%
Official Disclosure of Hearing Loss to University		
Yes	1	25
No	3	75
Academic Accommodation or Support Services Related to Hearing Loss		
Yes	1	25
No	3	75
Financial or Other Support for Assistive Technology (from source other than university)		
Yes	2	50
No	2	50

Disclosure of hearing loss to the university.

One of the four eligible respondents officially disclosed her hearing loss to the university where she was /is enrolled in distance education courses. Richardson, Long and Woodley (2004), citing Gordon and Keiser, astutely note that:

> it is assumed that educational institutions cannot be expected to make adjustments for students who have not disclosed any disabilities; instead, students who have disabilities must expect to provide formal documentation of the nature and the extent of those disabilities (pp. 427-8).

Because students must disclose any physical, sensory, or developmental disability to the university in order to obtain academic accommodation or support services (Athabasca University, 2014; Barnard-Brak & Sukak, 2010; Richardson et al., 2004), a 25% disclosure rate initially appeared low. However, even though only four individuals responded to the questionnaire and so the findings cannot be generalized beyond this case study, this rate is similar to the results of other research involving the disclosure of disabilities in university-level distance learning environments. For example, in a study investigating students with undisclosed

hearing loss, Richardson, Long and Woodley (2004) found that 21.6% of those surveyed (n = 509) did not disclose their hearing loss to the educational institution. However, in a much larger study that looked at 175,924 undergraduate students, Richardson (2015) found that only 0.08% (n = 1323) declared their hearing loss to university. Brown (2008) found that of the 14 respondents who self-identified as having a disability, 28.6% (n = 4) disclosed their disability to the university, and one of those four (25%) self-identified as having hearing loss. This is important because students with hearing loss may not identify themselves as disabled. Therefore, they may not disclose a disability, either officially or unofficially, so members of the university, including administrators, course designers, instructors, and peers may not be fully aware of their presence in the online classroom.

The other three respondents managed any challenges associated with their hearing loss without accommodation or other forms of support from the university. Comments related to disclosure are further discussed in Part 2 of this chapter.

Accommodations and support acquired from the university.

As previously noted, one of the four respondents disclosed her hearing loss to AU. After meeting other institutional eligibility requirements (Athabasca University, 2014), she received support services related to her hearing loss. The other three respondents (75%) did not receive any academic accommodation or support services from the university. This response rate contrasts sharply with results from a study conducted by Brown (2008), in which 21.5% of respondents reported not accessing accommodations or services through the university. Moisey (2004) found that only 7% of students who had one or more disabilities and were studying in an online learning environment did not receive support. The marked difference in these outcomes can be attributed to the difference in the initial sample population. In this study, the three

individuals who did not receive support also did not report their disability to the university; conversely, Moisey (2004) investigated students who were registered with Athabasca University's newly formed Access to Students with Disabilities office.

If respondents indicated they did not receive support from the university, they were asked a follow-up question designed to elicit more information about why they did not receive accommodation. Three respondents (75%) indicated they chose not to disclose their disability, two (50%) did not think to ask for support, and two (50%) indicated they did not need additional support. None of the respondents thought receiving accommodation or additional support was "not fair" and none offered any other reason for not seeking support from the university. Two of the respondents (50%) reported receiving support from sources other than the university; that is, they received financial support for hearing aids through government assistance or workplace benefits. Given the characteristics of the respondents, such as levels of hearing loss (i.e., moderate, severe, and deaf), their ages (all are 40 - 49 years of age), and their level of education (all are currently enrolled in, or have graduated from, a Masters program), it is reasonable to suggest that they all will take necessary steps to manage their hearing loss – including seeking academic accommodation and support from various sources, if required.

Description of Participants

To help provide a contextual foundation, as well as to support the analysis of the data and the development of meaning derived from the data (Patton, 2015; Yin, 2009), a brief description of each of the three participants who agreed to participate in a follow-up interview is provided below. To support anonymity, each participant has been assigned a pseudonym and each gave express consent for the use of the pseudonym.

Larry

Larry recently completed a Masters degree via distance education. He was born with some hearing loss, but it got progressively worse over time and is now considered severe to profound. He wears in-the-canal hearing aids to assist him in his everyday life. He has taken more than eleven DE courses, and while attending university, he participated in class discussions using synchronous audio media. Larry did not experience any barriers to fully participating in any of his courses, but he notes that there were instances when he would have preferred different modes of communication.

Kris

Kris previously earned two different Bachelors degrees and is currently enrolled in a distance delivered Masters program. During her studies, she completed 6 to 10 online courses. Kris lost her hearing when she was a child and it progressed over time. She is now profoundly deaf, and received a cochlear implant at age 30 to improve her hearing. She disclosed her hearing loss to the universities she attended and received various types of assistance to support her studies. Kris reports that her ability to fully participate in class discussions and other course- or program-related activities was impeded not only by her hearing loss, but by course design elements and institutional /administrative factors as well.

Adam

Adam is currently enrolled in a Masters level distance education program and has completed 6 to 10 online courses. He self-identifies as having a moderate degree of congenital hearing loss, including a hearing loss of >95% in one ear. He has a bone anchored hearing aid, but continues to experience challenges. Adam has not disclosed his hearing loss to the university, nor has he requested any academic accommodation or support. He manages audio conferences

by using computer technology and has not experienced any barriers to his learning related to hearing impairment.

As noted, three of the questionnaire respondents agreed to participate in a follow-up interview to learn more about their experiences. The subsequent data were analyzed and the findings are presented and discussed in the next section.

Part 2: Interviews

Once all the interviews had been conducted, transcribed, and validated, and the transcripts and questionnaire data were coded using procedures primarily described by Saldana (2009), significant statements, emergent themes, and relationships were identified. As a result of the analysis, not all ideas expressed in the questionnaires and interviews are described to the same extent, and because of the variability in participant experiences, some unique yet significant ideas may be recounted.

Findings

Analysis of the data revealed three focal themes related to: (1) students' use of assistive technologies and support services, (2) challenges associated with hearing loss, and (3) recommendations. The themes were underscored by various subthemes. The findings were organized, and are represented graphically in Figure 2 and summarized in Table 7.

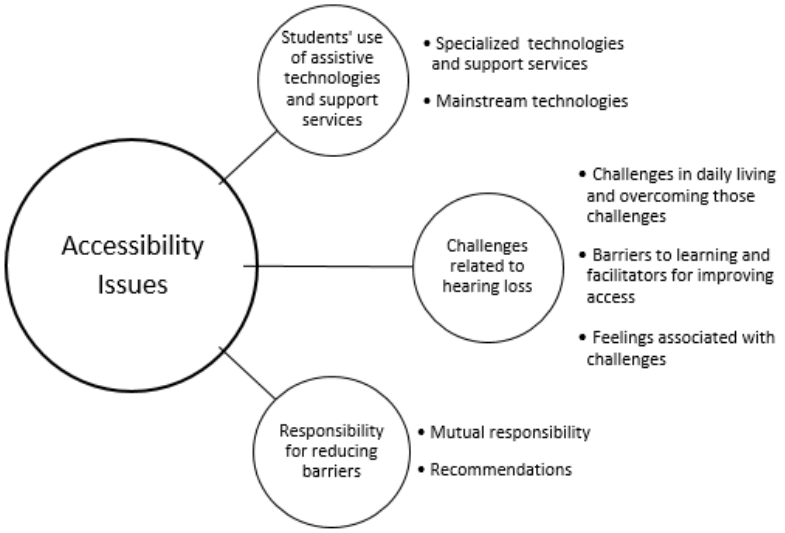

Figure 2: Thematic Relationships

Table 7

Focal Themes and Supporting Sub-Themes

Focal Themes	Sub-Themes

Students' use of assistive technology (AT) and support services	• Specialized technologies and support services
	  ○ Specialized personal assistive devices
	  ○ Specialized computer-based technology and support services
	• Mainstream technologies

Challenges associated with hearing loss	• Challenges in daily living and overcoming those challenges
	  ○ Telephone use
	  ○ Background noise and lack of visual cues
	• Barriers to learning and facilitators for improving access
	  ○ Early educational experiences
	  ○ Lack of universally accessible material or activities in university distance education
	• Feelings associated with challenges

Responsibility for reducing barriers	• Mutual responsibility • Recommendations

Theme 1: Students' use of assistive technologies and support services.

Participants spoke about the many forms of assistive technologies (AT) and support services they personally used, including some of the benefits and challenges associated with them. Benefits and challenges will be discussed later. As described by Fichten et al. (2014), technologies used to support hearing can be grouped into two broad categories: specialized assistive technology and mainstream technologies. See Appendix F for summary of assistive technologies and support services used by participants.

Specialized technologies and support services.

Technology related specifically to hearing loss can be further sub-grouped into two categories: 1) personal assistive devices and 2) computer-assistive technology.

Specialized personal assistive devices.

Participants identified several types of devices used to help them overcome their hearing loss and facilitate communication, including hearing aids, cochlear implants, or assistive listening devices (ALDs). Hearing aids may use analog or digital processing, or be a hybrid of the two types, and they may be fitted behind-the-ear, in-the-ear, in the canal, completely in the canal, or bone implanted. A cochlear implant is an electronic "bionic ear" that is surgically implanted in those who have severe hearing loss or who are profoundly deaf (Hearing Loss Association of North Carolina, n.d.). Personal ALDs are used to support hearing by bringing sound directly to the ears or by eliminating or reducing background noise. ALDs identified by participants include receivers, amplifiers, headphones, and FM systems. Although ALDs are designed to support hearing in those with hearing loss, they are also sometimes used by those who do not have hearing impairment to improve how sounds are received. Therefore, it could be argued that some ALDs are now considered more mainstream than specialized. However, for

those wearing hearing aids, the use of some personal ALDs is not a simple matter because they must consider how the devices will interface with their hearing aids (Hearing Loss Association of North Carolina, n.d.).

Specialized computer-based technology and support services.

A form of specialized computer-based technology used by one participant was a TTY machine. A TTY machine can be used by those with hearing loss to converse with others by sending text messages directly over a telephone line. If the person receiving the call does not have a TTY machine or a computer equipped with an encoding system (such as ASCII [American Standard Code for Information Exchange]), a relay service employing intermediaries who relay conversation by voicing what is typed and typing what is voiced (Hearing Loss Association of North Carolina, n.d.).

One participant, Kris, described using CART and note-taking for additional support. Communication Access Realtime Translation (CART) uses a computer and a stenographic machine to transcribe verbatim and provide captioning to display in real time, either on-site or remotely, what is said by the operator. Computer Aided Note Taking (CAN) is similar to CART except it uses a standard QWERTY keyboard, rather than a stenographic machine used with CART (Hearing Loss Association of North Carolina, n.d.).

Other types of computer technologies used by participants are also commonly used by those without hearing loss, so they are discussed in the section related to mainstream technology.

In addition to using personal specialized technologies and mainstream technologies, Kris also indicated having access to American Sign Language (ASL) interpreters. ASL is not simply a translation of English. Instead, it is a unique language used by those who are D/deaf and hard-of-hearing to understand spoken language. According to the Hearing Loss Association of North

Carolina, “ASL uses hand shapes, positions, movements, facial expressions, and body movements to convey meaning. ASL uses an alphabet (finger spelling), signs representing ideas, and gestures” (n.d.). Kris’ use of ASL enabled her to participate more fully in her learning activities.

Mainstream technologies.

Participants also indicated they relied on various information and communication technologies (ICTs) that are generally considered mainstream. For example, they used desktop computers, tablets, and smartphones to access voice over internet protocol (VoIP) or instant messaging (IM) or chat media (e.g., Skype, etc.), and videoconferencing (e.g., FaceTime, etc.), etc. as ways to overcome barriers and improve communication. In addition, participants reported using headphones and speakers to augment sound.

Although many types of ATs were identified, their use was not consistent among participants, suggesting that users are more comfortable employing some types of technology than others, or that some technologies function better in different circumstances. Other research related to ATs used by those with hearing loss revealed the same finding (Fichten et al., 2014; Lartz, Stoner, & Stout, 2008). In addition, because participants appear to use conventional technology to compensate for hearing impairment, it appears that sometimes there is a blurring of the line between what is considered specialized technology and what are accepted as mainstream. This idea is consistent with the findings of a three-part investigation conducted by Fichten et al. (2000) more than fifteen years ago related to the use of various technologies by postsecondary students with physical, sensory, and learning disabilities and revisited in a follow-up review article (Fichten, Asuncion, & Scapin, 2014). With ongoing technological development, especially with digital and wireless capabilities, those with hearing loss have access to

increasingly more choices to help them communicate in a more meaningful manner. Consequently, it appears that the everyday needs of participants are being reasonably well met. However, despite the advancements in technology, challenges associated with hearing loss continue to arise for participants.

Theme 2: Challenges associated with hearing loss.

A discussion about participants' challenges in their everyday lives is included because obstacles that directly impact their daily activities can also impact their school-related activities and, indirectly, their learning. Appendix G provides a summary of key terms and derived meanings associated with challenges related to hearing loss.

Challenges in daily living and overcoming those challenges.

Participants identified various challenges in their everyday lives associated with their hearing loss, particularly those associated with telephone use, and the inability to "see" what is being said.

Telephone use.

Participants use various forms of technology to overcome barriers associated with telephone use, including specialized and mainstream assistive technologies as described above. Kris describes her experiences with telephone use, as well as a solution to her overcoming the obstacle:

> It used to be when you made a phone call, you used a special machine called a "TTY". Then you phoned the relay service and you used the relay service person as a sort of intermediary person who would type things out for you and speak for you. I still do that. I mean I do hear to a certain extent on the phone but that's…just with family and friends. To phone strangers is just not feasible for me, and so I used IP relay service.

Kris noted that she and her instructors found it mutually acceptable to communicate using FaceTime or other forms of videoconferencing. If that was not feasible, she was able to meet with some instructors and supervisors face-to-face.

Occasionally students and faculty will have differences in their preferred methods of communicating, which may cause barriers to communication. Larry recounts his experience using the telephone with one professor:

> [He] was very hard to keep track of on the phone, I will admit. I had a very hard time, and that was his preferred medium. … I will agree that audio is much faster, instead of exchanging files or anything, but it's kind of a problem if you can't hear, right? It's kind of a conundrum here.

Larry further discusses his thoughts on telephone use:

> Telephone conversations aren't exactly fun. I tend to defer to my wife for telephone conversations. I would just let her do the phone most of the time. However, I am better on my cell phone. For whatever reason, the cell phone seems to work much better with my hearing aids, so cell phone calls are not a problem.

In some circumstances, use of a telephone may avoided completely – at home, at work, and at school. In a distance education environment, individual students have the responsibility of advising course instructors and classmates if there is any impediment to using the telephone as a means of communication.

Larry: …There's not a lot of call for using your telephone. And in situations where we did have to do that, I would just be very up front and tell them that that's not my medium, so I would participate as best I could, but there were circumstances where I'm aware of it - that I might not be able to be fully engaged. Or I would expect – I'd post that I expect them to repeat themselves – often. I'd post in the forum.

He also suggests the use of assistive listening devices to improve hearing when using the telephone, including a "behind-the-ear receiver" that "acts like a hearing aid." However, even when using supportive devices, those with hearing loss may encounter other challenges related to background noise or the inability to see the other person speaking.

Background noise and lack of visual cues

Those with hearing loss receive little or no information auditorily, so background noise and other distractions, especially in noisy, loud, or group situations, can interfere with a person's ability to understand spoken dialogue.

Adam's situation involves a significant hearing loss in one ear (>95%). He states:

> My challenges are sound localization, hearing discussion on my deaf side and, hearing over background noise in crowded situations.

Larry tells of similar experiences:

> …if we're at loud, noisy situations, like bars or parties,…I tend to be more uncomfortable because I can't hear what people are saying. So I'm just in that mode where you're watching TV. You're watching [TV in a bar] instead of really engaged where you're at because you can't really hear what's going on.

Occasionally, people may have to repeat themselves so that the non-hearing person can remain engaged. However, some may find it embarrassing to ask others to repeat what they said and may remain silent as a way of saving face. If people have difficulty with verbal interaction, they may, consequently, become disengaged and withdraw from the conversation (Jaworski & Stephens, 1998). This may be particularly true if the hearing individual shows frustration at having to repeat statements. Despite these challenges, Larry states that:

> It's not the end of the world. […] after you live with them for forty years, the issues don't really become issues any more. Or you don't really realize it any more.

In addition, those unable to hear dialogue have an increased reliance on visual cues, including facial expression and lip reading to facilitate understanding, so participants who are not able to "see" those speaking may not be able to participate fully in conversation – both in daily life and while engaging in course activities. The following statements illustrate this idea.

Adam: One thing that I do is I do tend to lip-read when I'm in a conversation. Even though my hearing loss is fairly moderate, I still do that. So having a face is nice.

Larry: If there's any meeting that's dark, well, forget it. You know, I can't really read your lips if you're talking to the page when reading - and not the person while reading - well that doesn't necessarily work very well.

Being able to see those speaking can help D-d/HH individuals absorb the information needed to support understanding and facilitate communication.

Overall, participants described many strategies for overcoming any obstacles they experience in their daily lives related to their hearing loss. The following comment sums up the idea that many supplemental technologies are generally readily available to help reduce barriers:

Larry: Not everyone is going to have a really expensive pair of six-channel aids to get Bluetooth connectivity, right? So if you're stuck with a thousand-dollar pair of hearing aids [that] really aren't in any great shape, you can get some supplemental things that'll help you.

Barriers to learning and facilitators for improving access.

Participants' perceptions of whether – and how – their hearing loss either directly or indirectly affected the quality of their experiences while at school was also explored.

Early educational experiences.

Although this study focuses primarily on participants' experiences in postsecondary distance education, a brief discussion of their early experiences in school provides a snapshot of some of the struggles they had to overcome in their formative years. Such information further provides some insight into how participants were able use those experiences to help mitigate some of the barriers they would face during their postsecondary education.

Kris: I didn't start losing my hearing until I was about five and it was noticed in kindergarten, so I got my first hearing aids then. And my hearing loss was progressive over time, so by the time I was about ten or eleven, I was profoundly deaf. And by junior high school I was struggling in school because I was mainstreamed. And so for a high school, I went to a school for the deaf…Did really well there.

Adam: […] even listening to a lecture […] it's been challenging to me throughout my entire life. So, when I didn't have my hearing corrected, I had to sit at the front of the class, so I could be sure that I could hear. And for a long time before I had been diagnosed, I didn't

know I needed to sit close to the class, so I had a lot of learning disabilities as a younger child just because I wasn't actually hearing. Early on.

Larry: I was not a particularly good student and part of this can probably be attributed to my "tuning out" when I couldn't hear. […] I pretty much scraped by in both elementary and high school. Whether because of my hearing loss or other factors, I just don't know. […] But I can't say hearing loss presented any particular challenges that I wouldn't have faced anyway.

It is apparent that participants experienced challenges related to their hearing loss during their early general education. Research suggests that students with hearing loss may have difficulty with receptive or expressive communication, or both, which can affect their level of participation and integration in the classroom, and subsequently, their educational outcomes (Antia, Jones, Reed, & Kreimeyer, 2009; Anita, Sabers, & Stinson, 2007; Eriks-Brophy, et al., 2006; Stinson & Liu, 1999). Studies have shown that there are achievement gaps between students who are D/deaf or hard-of-hearing their hearing peers, and that hearing loss can put students at risk for depressed academic achievement (Antia, Jones, Reed, & Kreimeyer, 2009; Eriks-Brophy, et al., 2006; Qi & Mitchell, 2012) even with mild or unilateral hearing loss (Most, 2004; Most, 2006). However, this does not mean than that hearing loss directly depresses academic achievement. As Larry suggests, other factors can also contribute to lower than average success rates.

How students' hearing loss was mitigated could influence their ability to achieve academic successes in both general education and higher education. The following comments illustrate this concept.

Adam: In comparison to traditional classes, I've found there are less barriers for me with distance education. … I find it much easier with distance education because I can control the nose level and the background, and I can control my environment a lot more.

Larry: In high school things were a bit different. I went to a private school (partially because my parents figured I'd benefit from some additional attention and discipline), so class sizes

> were smaller and the teachers really motivated. I also used an FM system which was helpful.

However, even though D-d/HH students often find ways to reduce burdens associated with their hearing loss does not alter the reality that course and program-related material and activities are not universally accessible. Inaccessibility, then, can unnecessarily burden students.

Lack of universally accessible material or activities in university distance education.

Distance education has improved access to higher education for students with various disabilities; however, some students may still find their learning experiences impeded by a form of digital divide caused by the implementation of instructional designs, and the integration of technology and learning objects that do not adequately satisfy their needs (Bissonnette, 2006; Brown, 2009; Di Iorio, Feliziani, Mirri, Salomoni, & Vitali, 2006; Fichten, Asuncion, & Scapin, 2014; Fichten, et al., 2012; Mercado, 2013). The majority of distance education course content is delivered visually; therefore, those who are D-d/HH may not require much assistive support to access course information or participate in course-related activities. However, prevalent topic in the interviews centered on the inaccessibility of course related materials. Two of the participants, Adam and Larry, found that the accessibility barriers they encountered had minimal impact on their social interactions, academic integration and, learning, and /or academic achievement. However, Kris found that some of the obstacles she experienced significantly limited her participation in various activities. The emotional impact of her experiences will be discussed in more detail later.

The inability to adequately hear dialogue either during interactive online synchronous or asynchronous activities was a prevailing barrier among participants.

Discussion by participants suggesting that audio-video recordings provided by course designers or instructors, or by students are often inaccessible is highlighted in the following excerpts.

Adam: I've experienced before where I've gone onto some sort of pre-recorded thing that I'm supposed to listen to and I can barely hear anything. I think that's not just me. I think that probably affects everybody. […] just to make sure to that your volume is adequate before you post it.

> […] having closed captions is nice as well…It's all about accessibility. You know, you should be doing that kind of stuff. [...] I think that should be a standard of practice.

Larry: Some of the videos we were provided with have no closed captioning, so you're kind of stuck. I mean you can probably wade your way through, but you may not get everything you should out of it. So if they could somehow – I mean it's probably not possible, but maybe using any public domain resources – but if there's a way to have some sort of captioning or transcript service available for any kind of video reference material that we use, would be very helpful.

Kris: […] it's a pet peeve of mine that my classmates will have a discussion and will point to this great video in YouTube. And I would say 90 percent of the time, I can't follow it. So the YouTube videos in discussion were not accessible to me. I look at them and I kind of get what they were talking about – and that would be about it.

> A lot of people think that closed captioning or subtitles – that's for deaf or hard of hearing people, but they forget that a lot of English as a second language users also benefit from subtitles or captioning. There's research that proves that. So it's just not for deaf or hard of hearing people. We've got people from overseas taking these courses. Well, they can benefit from it, too.

Discourse related to the idea that uncaptioned digital audio and video recordings are not universally accessible has been included the literature for over twenty years (Paist, 1995) and still continues to be discussed (Fichten , et al., 2012; Fichten, Asuncion, & Scapin, 2014; Roberts, 2013; Wooten, 2014). However, despite the fact that uncaptioned recordings have been identified as a barrier, it is evident that this obstacle has not been addressed in a substantive manner. Some may argue that routinely providing captioning may be prohibitively costly from a financial standpoint or too time-consuming from a human resources perspective (Deshpande,

Tuna, Subhlok, & Barker, 2014). However, a simple Internet search revealed the availability of free software or services for captioning video files (e.g., www.amara.org), so from a technical standpoint, captioning course or student submitted videos may not be difficult nor costly. On the other hand, if course videos include highly technical information, professional captioning may be required. Nevertheless, regardless of perceived constraints related to the time or cost involved in captioning, if a distance education program is committed to providing universally accessible course-related media, providing some form of text alternative to accompany video files – including those submitted by students as part of their assessments – should be considered mandatory.

The inability to fully participate in synchronous audio or video conferences was also strongly present in every interview and in the comments received from the online questionnaire. The following excerpts suggest that although participants found taking part synchronous activities with an audio component challenging, they usually suggested ways to reduce accessibility barriers.

Kris: […] He [the instructor] wanted to do a live video conference thing with the entire class and I knew I wasn't going to be able to keep up with that, so we met face-to-face and we discussed it. So what we ended up doing is we had CART come in remotely. And CART provided captioning for me, so that was resolved.

Larry: If there's a video conference instead of a simple conference call. A video conference [can] be helpful. Just having the visual. To have someone there to be able to read their lips would be very very helpful. It's gravy. But, of course, you're stuck with production speed [that] might not be great or the video feed might not be that great, either. But, just having video over audio alone is much better. But just having communication over emails or over the forums are a real advantage. You know, they eliminate any kind of weakness in audio.

Adam: When I do have to rely on sound (in a synchronous web meeting, for example) the setup of a desktop computer actually makes it easier to manage than in a face to face situation.

Students who cannot actively participate in a discussion may not be fully engaged, thereby contributing to a potential barrier to learning, even if it is not perceived as such. When planning group discussions, group members often have the opportunity to provide input regarding what media the group will use to communicate. Asynchronous online class discussion forums not only provide a medium for motivated students to actively engage in meaningful discourse related to course content (Balaji & Chakrabarti, 2010), such forums can be used to convey commununication preferences. In this case, the responsibility for advising the class or group of one's limitations or preferences rests with the individual student, as the following comment suggests.

Larry: […] we're going to use Skype or we're going to use something else. And the group, well, internally we'll work this. …Really, the onus is more on the person with the disability at that point to come forward and say, "I've got a problem, and I'd prefer not to use this medium."

In addition to the challenges associated with class discussions, Kris states that she has never participated in any of the Canadian Institute of Distance Education Research (CIDER) conferences offered by Athabasca University's Centre for Distance Education, and provides the following rationale for that decision:

Kris: For me, they never give me enough advance notice. It takes weeks to arrange for CART – like two to three weeks to make those kinds of arrangements like that. And I'm thinking, well, they should just offer it. And say that CART or ASL interpreters will be provided upon request. And just have them booked – just in case. But if they have them, they can always cancel, right? But they should at least offer it.

For Kris, and others requiring CART to improve accessibility, the processes involved in securing the support service may make the service itself inaccessible, perhaps leading to undue frustration and other negative emotions.

Feelings associated with challenges related to hearing loss.

The predominant feeling associated with challenges related to hearing loss was frustration. In particular, participants experienced frustration associated with the inability to hear certain things their daily lives, such as using the telephone or trying to hear in environments with extraneous background noise. They also expressed frustration stemming from a lack of universally accessible course-related materials or activities, such as uncaptioned videos or synchronous audio-video conferences. Only one participant, Kris, expressed feeling significant emotions stemming from frustration, and even though her experiences were not shared by the other participants, they provide greater insight into the negative consequences administrative and instructional design limitations can have on students' wellbeing. As previously mentioned, the use of CART enabled Kris to participate in a class video conference; however, she perceives that processes involved in securing the service were unjust.

Kris: […] but the entire process of getting CART really made me angry because at […] the U of A [University of Alberta] and Grant MacEwan, I asked for support services and it was always a case of "Yeah, sure, no problem" and they would provide it – no questions asked. I went through Athabasca University; they wanted me to fill out all this paperwork. And what made me really angry was they were asking about my income and my husband's income. And I'm thinking that's really intrusive and what's that got to do with anything? It's that it's coming out of my money and what right do you have to ask these kinds of questions. Well, I'm very very angry with Athabasca University for that and I felt like: Well I need these services – I need CART services – for this particular course, so you (AU) have no choice but to provide it. But I remember ranting and raving to my supervisor at the U of A because she's big in D/deaf rights – that's what we do – D/deaf rights. But that – it was wrong. It was wrong. They didn't have the right to ask these kinds of questions. They should just provide it. I mean – this is my right.

It is clear that Kris experienced aggravation when trying to obtain the accommodation she needed so she could participate in the class activity in a fair and equitable manner, and that she still harbours significant feelings of anger related to the encounter. In addition, the way Kris

describes her experiences suggests she may have perceived that AU's processes were somewhat discriminatory. This observation stemmed from another comment made during the interview:

> Kris: I graduated from there [University of Alberta] and then tried to find work after graduation. And it was a real struggle because a lot of people looked at a deaf person and think, "Well, you can't. You can't do this or you can't do that."

Kris validated this perception in a subsequent email and provided more detail to substantiate her feelings. She further stated that she believes that Athabasca University's ASD office "threw up barriers" because even though the other two Alberta-based universities she attended were also government funded, she was not required to provide "extensive and intrusive paperwork" in order to obtain appropriate support services. According to Russell and Demko (2005), "accessing funding can become a bureaucratic nightmare for learners with disabilities" and "Many learners with disabilities have stated that the amount of paperwork they are expected to fill out and the hoops they are expected to jump through to access funding is excessive" (p. 37). Kris' frustration is reiterated in the following excerpt.

> Kris: It was the first time I had experienced first-hand the funding "hoops" students with disabilities often have to jump through. […] I told [a representative of the ADS] exactly how I felt about the entire process. However, I don't think he really understood my perspective on how disrespectful the process was of my basic human rights to have full access to my education.

When seen through the lens of Kris' experience with securing accommodations, a glimpse of her worldview and some of the barriers she, and perhaps others in similar situations, may have to overcome is provided.

Feelings associated with overcoming challenges related to hearing loss.

None of the participants directly voiced positive feelings associated with overcoming challenges related to their hearing loss. However, some of the comments Kris made during her

interview, coupled with her voice tone, suggested that she sometimes felt satisfaction and a sense of accomplishment in overcoming obstacles.

> Kris: […] for a high school, I went to a school for the deaf …Did really well there. […] I got a cochlear implant and my hearing improved considerably. It allowed me to use the phone. It increased my employability actually. My speech actually improved. […] CART provided captioning for me, so that was resolved.

In addition, Larry expressed satisfaction with the use of cell phones as a means of alleviating barriers associated with telephone use and indicated that his hearing loss has not resulted in any barriers to his learning. Lastly, Adam indicated that he has been able to use technology to the point where he perceives his hearing loss is essentially a "non-issue." Like Larry, he indicated that hearing loss has not impeded his learning in any substantive way.

Theme 3: Responsibility for reducing barriers

The responsibility for ensuring the successful removal of accessibility barriers in distance education is a shared responsibility among policy-makers, administrators, course developers, instructors, and students. Appendix H includes a summary of key terms and derived meanings associated with responsibility for reducing barriers.

Mutual responsibility.

When faced with real or perceived potential barriers to learning, adult learners have a responsibility for mitigating those barriers. In the situation described above, Kris was able to set aside her anger and complete the administrative requirements for obtaining the support she needed. In addition, it is well known that educational institutions have a legal and ethical responsibility for providing appropriate accommodations unless the provision of additional support results in an "undue hardship" for the institution (Alberta Human Rights Commission, 2010). As illustrated in the following comments, participants recognize this shared responsibility.

Brian: […] on the student side of things, there's a lot of responsibility that we have too. And to make sure that our systems work for us and not just to pin it all on the instructor or the school, but to make sure that things are working for us. And if they're not, then to ask for some sort of accommodation or some sort of help.

Larry: Mostly there's a bit of a - it's a fuzzy area on how much the student should be taking on in seeking out appropriate tools and how far the university help should be going to make it work for students who are hard of hearing.

When asked about accessing support services, Kris replied, "Yeah, you always have to ask."

Participants also reflected that their high levels of literacy and function, and their previous experiences contributed to their ability to successfully navigate their distance education courses despite their physical limitations. Furthermore, their experiences allowed them to come up with some recommendations for students, faculty, and administrators to help improve accessibility.

Recommendations.

When asked if they had any thoughts about ways they saw ways to improve accessibility, all three participants had some suggestions. For example, because distance education inherently requires the use of a computer, students enrolled in DE courses to ensure that their systems are functioning properly. In addition, if D-d/HH students are not sure about what types of hardware and software are available to facilitate accessibility, they should ask the ADS office for guidance.

Larry: Supportive technologies can be helpful, but I'm fairly certain that at least a portion of the hard of hearing population aren't aware that they exist… A list of options that are available - not just for deaf or hard of hearing, but for anything. They just have to figure out which options to use.

As previously discussed, at the course and institution level, all participants suggested automatically providing text alternatives to improve accessibility of videos, such as embedded closed captions, subtitles, or transcripts. According to Di Iorio, Feliziani, Mirri, Salamoni and Vitali (2006), "producing fully barrier-free learning contents is one of the key issues to meet the

goal of an inclusive ‘knowledge society’.”(p. 3). In order to promote self-advocacy, and perhaps foster change, students should let the instructor know if they find that any course materials or learning objects are not accessible.

Participants also made suggestions for some simple strategies that course instructors could employ to improve accessibility and promote inclusion.

Kris: […] when [the instructor] introduces herself at the beginning of the course, she does a video. You know – there’s captioning. “Hi, my name is Dr. Blah Blah Blah.” I think that’s more personable than receiving a letter. It kind of gives you a stronger connection to the instructor because you’ve seen them in person; you’ve heard them speak.

Larry: […] I know they have these things available. It’s just not that obvious at the course level what’s available and that’s what I’m getting at. That a sort of a main restriction. […] there may be people with disabilities their class, whether it’s hearing or anything else. So it would help – […] I mean I don’t want to put all the work on the professor, but just to make everyone aware that if anybody has any course level discussions, just to introduce yourself. You know, a simple sentence like, “If you have any limitations, understand that Athabasca has resources available” or that the professor is willing to work with you. Just to open the door, because a lot of people who have disabilities tend not to mention it. Basically, they don’t want people to know, or they don’t…think it’s relevant, or that nobody can accommodate them. So they just be quiet. But I think that if people are updated about what’s available to them or that the professor will be accommodating them, people might be more willing to self-identify in that situation.

Kris suggests that making course content less text-based and including more mixed-media would be beneficial. However, she also suggests that to ensure the benefits of distance education (e.g., increased flexibility) are preserved, making changes to course designs takes careful planning.

Kris: […] you have to always stop and think about: Where should it be done? How should it be done? Where’s the appropriate fit within the course, right? It’s not something that you should do blindly and say, “Throw it in there because I think it will be all exciting.” I mean that’s not good instructional design.

Larry also suggests that universities offering distance education courses or programs need to take steps to ensure the learning management system and any repositories used are universally accessible.

Whenever feasible, course designers could enhance instructional design elements by implementing some of the myriad of innovative technologies available (Fichten, Asuncion, & Scapin, 2014). The comments made by the participants in this case study serve as a reminder that despite the advantages of distance education, some elements are still not fully accessible to all learners. As a result, the dialogue related to improving accessibility is ongoing and should remain a priority until it can be said that universal accessibility is truly universal.

Chapter V - CONCLUSIONS AND RECOMMENDATIONS

As discussed in previous chapters, D/deaf and hard-of-hearing students enrolled in distance education courses continue to experience academic barriers directly and indirectly associated with their hearing loss despite the fact that strategies to improve accessibility and learning outcomes have been discussed in the literature for years (Burgstahler, 2002; Fichten, et al., 2000; Fichten, Asuncion, & Scapin, 2014; Richardson, 2015). An exploration of the viewpoints of Dd/HH students enrolled in a Master of Education in Distance Education at Athabasca University provided an insider's look of some of the benefits and limitations associated with distance learning. Although some of the findings confirmed my own pre-supposition, new and valuable insight was also gained. Based on the findings of this exploratory case study, it appears that, while the access needs of participants are being reasonably well met, there are some strategies that could be employed that would significantly improve the accessibility of course materials and course- or school-related activities. Findings may help students better understand their responsibilities in promoting accessibility for themselves, as well as for other learners, and they may assist university administrators, and course designers and instructors in finding solutions for reducing barriers to learning.

An Intrinsic and Interpretivist View

As discussed earlier, I have moderate hearing loss and am currently enrolled in a university-level distance education program; therefore, I have an affinity with the study case and an intrinsic interest in the research. I understand that I cannot completely separate myself from the case, and I acknowledged the possibility that my own values, beliefs, and first-hand knowledge of the phenomenon of interest may influence the way the data were collected and interpreted, and how the findings were reported. However, a deeper understanding of the case

was achieved and new knowledge was constructed when I reflected on the meanings underpinning participants' comments, coupled with my own *a priori* constructs.

Although the research confirmed the majority of my own suppositions, it did provide greater insight into some of the barriers that Dd/HH students may experience and the strong emotion that may accompany attempts to overcome obstacles.

Confirmed Suppositions and New Insight

Pre-conceived ideas that were confirmed from the research include the fact that university students with hearing loss have a high degree of autonomy, self-efficacy, and motivation. They are flexible and resourceful, and will seek, self-advocate for, and acquire the support they need to attain their academic goals. New insight gained stemmed from the idea that the processes involved in assessing students' need for accommodation and other forms of support could be viewed by some as invasive and discriminatory. Such ideas could call into question both the criteria for judging eligibility for accommodation and the how the criteria are communicated.

However, the greatest insight I gained from conducting the research did not stem directly participants' experiences with hearing loss. Henry Ford, Albert Einstein, and Tony Robbins have all been attributed with suggesting that if nothing changes, nothing will change. Because I committed to setting aside my own ideas in order to remain open to new ideas, I was able to conceive of a novel idea related to the use of rubrics. If implemented, this idea will represent a paradigm shift - not only in the way assignments are evaluated and graded, but in the way educators think of achieving universal accessibility.

Recommendations

The central research question for this investigation was: What specific recommendations can be made for enhancing the accessibility of course material for distance learners with hearing

loss? As a result of the research, two distinct recommendations are discussed below. If implemented, they should serve to help overcome some accessibility barriers.

In distance education, the majority of program and course content is text-based, so students who are D-d/HH are not likely to be over-burdened by inaccessible materials. This does not suggest that the needs of students with hearing loss should be pushed to the side in favour of meeting the needs of students with other disabilities. Numerous recommendations for improving accessibility for those with disabilities have been made in the past. However, they have often been quite broad in scope. For example:

- All online courses must be developed from the outset with universal design principles and with every effort to make the course accessible for all learners with disabilities (Russell and Demko, 2005, p. 67);

- Colleges and universities should consider developing and adopting e-learning accessibility guidelines that address both in-house development of e-learning as well as purchases of e-learning products and technology (Fichten, et al., 2009, p. 253);

- Instructional designers, instructors, faculty, administrators, and educational institutions need to select suitable strategies to place into practice a universal design for deaf and hard of hearing learners in a digital multimedia environment of instruction and select appropriate strategies for the type of delivery of instruction intended to use (Mercado, 2013); and

- Educate on universal design principles and provide ongoing support with a view to adopting these. Workshops on pedagogical practices should include offerings on universal design (Fichten, Asuncion, & Scapin, 2014, p. 375).

The examples provided represent a small snapshot of some sweeping recommendations that have been previously disseminated in the literature related to the topic. The inclusion of the above recommendations is not a criticism in any way; instead they are included simply to illustrate that broad suggestions appear to rely on others to determine how to interpret and act on them.

As previously indicated, the primary purpose of the study was to develop very specific recommendations to improve accessibility for students with hearing loss. The recommendations

outlined below stem from the integration of the findings of this case study, coupled with the findings from other research.

Embedding Closed Captions in all Video Files

The evolution of distance education from print-based media to computer-based media has opened the door to significantly more diversity in ways material is delivered. For example, video clips provide a rich opportunity for disseminating information and, in my experience, are used much more frequently now than in the past. As previously noted, providing a text-based alternative format for any audio-video recordings has been extensively discussed in the literature (Burgstahler, 2002; Edmonds, 2004; Fichten , et al., 2012; Fichten, Asuncion, & Scapin, 2014; Paist, 1995; Roberts, 2013; Wooten, 2014). However, participants' experiences with audio-video media suggest that this obstacle has not been adequately addressed. While some might suggest that routinely providing a text-based presentation of information to accompany audio-video recordings may be time-consuming and costly (Deshpande, Tuna, Subhlok, & Barker, 2014), to support inclusivity, providing some form of text alternative to accompany video files should be required. However, an argument can also be made that including any type of text-alternative is not the ideal solution. For example, attempting to view a video and read a transcript simultaneously is time-consuming and unnecessarily distracting. It takes time to repetitively pause the video, refer to the transcript, return to the video and continue playing it. Therefore, it is strongly recommended that captions be embedded directly in any video recordings, rather than providing a supplementary transcript. For the most part, including embedded captions can easily be achieved by using readily available captioning software or services such as Amara (www.amara.org). However, if captioning is absolutely not an option, a transcript of audio-video recordings should be a minimum requirement.

Assessing Accessibility Using Rubrics

It is one thing to suggest that captions be embedded in all video files used in distance education settings; however, simply making the suggestion without any means of assessing whether or not routine captioning is implemented is still not sufficient. The routine use of rubrics has been used in higher education to assess the quality of accessibility for online course and program materials, including the use of captioning (Bastedo, Sugar, Swenson, & Vargas, 2013). However, I would argue that assessing instructional material and other course content still does not sufficiently address the problem. To further foster an institutional culture of universal accessibility, another solution involves ensuring students' work is also accessible. If YouTube or other audio-video file sharing sources are used to create and share course assignments, students should be required to make them universally accessible. Including a component related to accessibility in the rubric for any assignments with an audio or video element, would outline expectations and draw students' attention to the need to produce material that is universally accessible. Implementation of this novel idea would represent a paradigm shift in thinking – one that makes the leap from maintaining arguably outdated practices to looking toward future generations of educators and learners.

Implications for Practice and Looking to the Future

Universal instructional design is not really universal if it ignores, or does not adequately attend to, the accessibility needs of students with hearing loss. The above-noted recommendations were designed as simple, straight-forward ways to foster a more inclusive environment and to support the learning of D-d/HH students. These recommendations can easily be applied to all courses offered at Athabasca University, as well as to other educational institutions offering distance learning.

Although identifying and addressing potential barriers for a relatively small population of students may prove challenging (Moisey, 2004; University of Ottawa, 2011), it is important to remember that hearing impairment is quite prevalent among the general population (Feder, Michaud, Ramage-Morin, McNamee, & Beauregard, 2015) and not all students with hearing loss will disclose their disability (Brown, 2008; Richardson, Long & Woodley, 2004). Current social, academic, technological, and legislative realities demand that program administrators and instructional designers ensure that distance education courses are accessible for all students (Burgstahler, Corrigan, & McCarter, 2005; Cavanagh, 2004; Mercado, 2013). Therefore, universities continue to take steps to reduce barriers to learning experienced by students with functional limitations by exploring accessibility issues and discussing the practical application of universal design principles (http://udl.athabascau.ca/). However, despite continued discussion, until concrete steps are taken to ensure course design formulae change so that each method used to deliver course material and evaluate student learning is accessible to students with a variety of disabilities, unnecessary challenges will continue to arise. If universal design principles are fully integrated, students would not need to disclose their disabilities to university officials and no academic accommodations would be required. Instead, students would overcome barriers by accessing integrated learning tools. Consequently, the focus would shift from attending to the unique needs of individual students to improving overall teaching and learning processes (Cavanagh, 2004).

Adding to the knowledge base in this area may encourage policy-makers to adopt – and embrace – accessibility guidelines, and course designers to develop and implement instructional design strategies that are universally inclusive (Burgstahler, 2006; Mercado, 2013; Tallent-Runnels, et al., 2006). Furthermore, doing so will fulfil legislative requirements (Alberta Human

Rights Commission, 2010; Canadian Charter of Rights and Freedoms, 2014) and reduce potential human rights violations (Roberts, 2013).

Successful removal of accessibility limitations attributed to possible deficiencies in instructional design will take cooperation among institution policy-makers, administrators, course designers, instructors, and students. However, attending to accessibility concerns may level the playing field by ensuring instructional design elements are accessible to students with a diverse range of characteristics, thereby making learning experiences more equitable, enhancing learning outcomes, and promoting academic success for all learners (Brown, 2008; Burgstahler, 2006; Fichten, 2009; Mercado, 2013; Opitz, 2002; Tallent-Runnels et al., 2006; University of Ottawa, 2011). Simply put, ensuring truly universal access to course- and program-related material in distance education is the right thing to do.

REFERENCES

Abrami, P. C., Bernard, R. M., Wade, A., Schmid, R. F., Borokhovski, E., Tamim, R., . . . Peretiatkowicz, A. (2006). A review of eLearning in Canada: A rough sketch of the evidence, gaps and promising directions. *Canadian Journal of Learning and Technology, 32*(3).

Alberta Human Rights Commission. (2010, February). *Duty to accommodate*. Retrieved from http://www.albertahumanrights.ab.ca/publications/bulletins_sheets_booklets/bulletins/duty_to_accommodate.asp#whocanrequestaccommodation

American Speech-Language-Hearing Association . (n.d.). *Communication for a lifetime*. Retrieved from http://www.asha.org/public/

Anderson, T. (2003a). Getting the mix right again: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning, 4*(2). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/149/230

Anderson, T. (2003b). Modes of interaction in distance education: Recent developments and research questions. In M. Moore, & G. Anderson (Eds.), *Handbook of Distance Education* (pp. 129-144). Mahwah, NJ: Erlbaum.

Angen, M. J. (2000). Evaluating interpretive inquiry: Reviewing the validity debate and opening the dialogue. *Qualitative Health Research, 10*(3), 378-395.

Anita, S. D., Sabers, D. L., & Stinson, M. S. (2007). Validity and reliability of the Classroom Participation Questionnaire with deaf and hard of hearing students in public schools. *Journal of Deaf Studies and Deaf Education, 12*(2), 158–171.

Antia, S. D., Jones, P. B., Reed, S., & Kreimeyer, K. H. (2009). Academic status and progress of deaf and hard-of-hearing students in general education classrooms. *Journal of Deaf Studies and Deaf Education, 14*(3), 293-311.

Apple Inc. (n.d.). *Accessibility*. Retrieved from http://www.apple.com/ca/accessibility/

Arlinger, S. (2003). Negative consequences of uncorrected hearing loss - A review. *International Journal of Audiology, 42*(2S), 17-20.

Artino, A. R., & Stephens, J. M. (2007). Bored and frustrated with online learning? Understanding achievement emotions from a social cognitive, control-value perspective. Rocky Hill, CT. Retrieved from http://www.sp.uconn.edu/~aja05001/comps/documents/NERA-07_AchEmotions_Artino%2BStephens.pdf

Artino, A. R., & Stephens, J. M. (2009). Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online. *Internet and Higher Education, 12*(3-4), 146-151.

Athabasca University. (2000). *Policy for students with disabilities.* Retrieved from http://ous.athabascau.ca/policy/studentservices/policyforstudentswithdisabilities.pdf

Athabasca University. (2009). Ethical conduct for research involving humans policy. Retrieved from http://ous.athabascau.ca/policy/research/ethicpolicy.pdf

Athabasca University. (2013, May 31). *About AU: Facts and statistics*. Retrieved from Athabasca University: http://www.athabascau.ca/aboutau/media/aufacts.php

Athabasca University. (2014, September 25). *Eligibility for Services*. Retrieved from Access to Students with Disabilities web site: http://asd.athabascau.ca/services/eligibility.php

Athabasca University. (2015, November 3). *Learner Support Services*. Retrieved from Access to Students with Disabilities: http://asd.athabascau.ca/

Balaji, M. S., & Chakrabarti, D. (2010). Student interactions in online discussion forum: Empirical research from 'Media Richness Theory' perspective. *Journal of Interactive Online Learning, 9*(1), 1-22.

Barnard-Brak, L., & Sukak, T. (2010). Online versus face-to-face accommodations among college students with disabilities. *The American Journal of Distance Education, 24*(2), 81-91.

Bastedo, K., Sugar, A., Swenson, N., & Vargas, J. (2013). Programmatic, systematic, automatic: An online course accessibility support model. *Journal of Asynchronous Learning Networks, 17*(3), 87-101.

Bates, A. W., & Poole, G. (2003). A framework for selecting and using technology. In *Effective teaching with technology in higher education* (pp. 75-105). San Francisco: Jossey Bass.

Bernard, R. M., Abrami, P. C., Lou, Y., & Borokhovski, E. (2004). A methodological morass? How we can improve quantitative research in distance education. *Distance Education, 25*(2), 175-198.

Bissonnette, L. A. (2006). *Teaching and learning at Concordia University: Meeting the evolving education needs of faculty in providing access to university students with disabilities.* (Doctoral dissertation, Concordia University). Retrieved from http://spectrum.library.concordia.ca/8741/1/NR16269.pdf

Borrego, M., Douglas, E. P., & Amelink, C. T. (2009). Quantitative, qualitative, and mixed research methods in engineering education. *Journal of Engineering Education, 98*(1), 53-66.

Brennan, S., Gombac, I., & Sleightholm, M. (2009). *Participation and activity limitation survey 2006: Facts on hearing limitations*. Retrieved from Statistics Canada: http://www.statcan.gc.ca/pub/89-628-x/89-628-x2009012-eng.htm

Brinckerhoff, L. C. (1994). Developing effective self-advocacy skills in college-bound students with learning disabilities. *Intervention in School and Clinic, 29* (4), 229-237.

Brown, V. M. (2009). *Experience with support services of graduate students with disabilities studying at a distance: A case study.* (Master's thesis, University of Athabasca, Alberta, Canada). Retrieved from http://auspace.athabascau.ca/handle/2149/3051

Burgstahler, S. (2002). Distance learning: Universal design, universal access. *Association for the Advancement of Computing in Education (AACE) Journal, 10*(1), 32-61.

Burgstahler, S. (2006). The development of accessibility indicators for distance learning programs. *Research in Learning Technology, 14*(1), 79-102.

Burgstahler, S., Corrigan, B., & McCarter, J. (2005). Steps toward making distance learning accessible to students and instructors with disabilities. *Information Technology and Disabilities E-Journal, 11*(1).

Butcher, J., & Rose-Adams, J. (2015). Part-time learners in open and distance learning: Revisiting the critical importance of choice, flexibility and employability. *Open Learning: The Journal of Open, Distance and e-Learning, 30*(2), 127-137. Retrieved from http://dx.doi.org/10.1080/02680513.2015.1055719

Canada, Government of. (2015). *Constitution Acts, 1867 to 1982*. Retrieved from Justice Laws Website: http://laws-lois.justice.gc.ca/eng/Const//page-4.html#docCont

Canadian Academy of Audiology. (n.d.). *Hearing loss in adults and children*. Retrieved from https://canadianaudiology.ca/for-the-public/hearing-loss-in-adults-and-children/

Canadian Charter of Rights and Freedoms. (2014). *Section 15: Equality rights*. Retrieved from http://laws-lois.justice.gc.ca/eng/Const/page-15.html

Canadian Virtual University. (2012). *Online university education in Canada: Challenges and opportunities.* Retrieved from http://www.cvu-uvc.ca/Online%20University%20Education%20%20jan17%202012.pdf

Capdeferro, N., & Romero, M. (2012). Are online learners frustrated with collaborative learning experiences? *The International Review of Research in Open and Distance, 13*(2), 26-44.

Cascio, M. I., Botta, V. C., & Esmeralda, A. V. (2013). The role of self efficacy and internal locus of control in online learning. *Journal of e-Learning and Knowledge Society, 9*(3), 95-106.

Cavanagh, C. (2004). Distance learning success factors in the Resources-Processes-Results Cycle and College of Education Accreditation Standards. *Society for Information Technology and Teacher Education International Conference, 2004*, *1*, pp. 361-366.

Cavaye, A. L. (1996). Case study research: A multi-faceted research approach for IS. *Information Systems Journal, 6*(3), 227-242.

Chaudry, M. A., & Rahman, F. (2010). A critical review of instructional design process of distance learning systems. *Turkish Online Journal of Distance Education, 11*(3), 193-205. Retrieved from http://tojde.anadolu.edu.tr/yonetim/icerik/makaleler/609-published.pdf

Chenail, R. J. (2011). Interviewing the investigator: Strategies for addressing instrumentation and researcher bias concerns in qualitative research. *The Qualitative Report , 16*(1), 255-262. Retrieved from http://nsuworks.nova.edu/tqr/vol16/iss1/16

Concordia University. (2003). *Policy on accessibility for students with disabilities.* Retrieved from http://www.concordia.ca/content/dam/common/docs/policies/official-policies/PRVPAA-14.pdf

Contact North. (2012). *Online learning in Canada: At a tipping point.* Retrieved from http://teachonline.ca/sites/default/files/pdf/innovation-practices/onlinelearningincanadareport_june_12_2012.pdf

Coombs, N., & Banks, R. (2000). Distance learning and students with disabilities: Easy tips for teachers. *Proceedings of the Technology and Persons with Disabilities Conference.*

Cossette, L., & Duclos, E. (2002). *A profile of disability in Canada, 2001.* Ottawa, ON: Statistics Canada. Retrieved from http://www.statcan.gc.ca/pub/89-577-x/pdf/4228016-eng.pdf

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, California: Sage Publications, Inc.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing from five approaches.* Thousand Oaks, CA: Sage Publications, Inc.

Deshpande, R., Tuna, T., Subhlok, J., & Barker, L. (22-25 Oct. 2014). A crowdsourcing caption editor for educational videos. [Abstract]. *Frontiers in Education Conference (FIE), 2014 IEEE*, (pp. 1-8).

Di Iorio, A., Feliziani, A. A., Mirri, S., Salomoni, P., & Vitali, F. (2006). Automatically producing accessible learning objects. *Educational Technology & Society, 9*(4), 3-16.

Díaz Adrade, A. (2009). Interpretive research aiming at theory building: Adopting and adapting the case study design. *The Qualitative Report, 14*(1), 42-60. Retrieved from http://www.nova.edu/ssss/QR/QR14-1/diaz-andrade.pdf

Eckes, S. E., & Ochoa, T. A. (2005). Students with disabilities: Transitioning from high school to higher education. *American Secondary Education, 33*(3), 6-20.

Edmonds, C. D. (2004). Planning for accessibility and usability in e-learning. *Journal of Interactive Instruction Development, 17*(1), 16-22.

Emmett, S. D., & Francis, H. W. (2015). The socioeconomic impact of hearing loss in U.S. adults. *Otology & Neurotology, 36*(3), 545-50.

Englander, M. (2012). The interview: Data collection in descriptive phenomenological human scientific research. *Journal of Phenomenological Psychology, 43*(1), 13-35.

Equity and Diversity Directorate. (2011). *Recruitment of persons with disabilities: A literature review.* Public Service Commission of Canada. Retrieved from http://www.psc-cfp.gc.ca/plcy-pltq/eead-eeed/rprt/pwd-ph/pwd-ph-eng.pdf

Eriks-Brophy, A., Durieux-Smith, A., Olds, J., Fitzpatrick, E., Duquette, C., & Whittingham, J. (2006). Facilitators and barriers to the inclusion of orally educated children and youth with hearing loss in schools: Promoting partnerships to support inclusion. *The Volta Review , 106*(1), 53-88.

Eschenmann, T. W. (2012). *An experimental study to test the relationship between learner control and locus of control on e-learning in a corporate context.* Doctoral dissertaion, Virginia Polytechnic Institute and State University. Retrieved from http://scholar.lib.vt.edu/theses/available/etd-06082012-141446/unrestricted/Eschenmann_TW_D_2012_1.pdf

Fahy, P. J. (2008). Characteristics of interactive online Learning media. In T. Anderson (Ed.), *The theory and practice of online learning* (2nd ed., pp. 167-199). Edmonton, AB: AU Press, Athabasca University. Retrieved from http://www.aupress.ca/books/120146/ebook/99Z_Anderson_2008-Theory_and_Practice_of_Online_Learning.pdf

Feder, K., Michaud, D., Ramage-Morin, P., McNamee, J., & Beauregard, Y. (2015). Prevalence of hearing loss among Canadians aged 20 to 79: Audiometric results from the 2012/2013

Canadian Health Measures Survey. *Health Reports, 26*(7), 18-25. Retrieved from http://www.statcan.gc.ca/pub/82-003-x/2015007/article/14206-eng.htm

Fichten, C. S., Asuncion, J. V., Barile, M., Fossey, M., & de Simone, C. (2000). Access to educational and computer technologies for post-secondary students with disabilities: Lessons from three empirical studies. *Journal of Educational Media, 25*(3), 179-201.

Fichten, C. S., Asuncion, J. V., Wolforth, J., Barile, M., Budd, J., Martiniello, N., & Amsel, R. (2012). Information and communication technology related needs of college and university students with disabilities. *Research in Learning Technology, 20*, 323-344.

Fichten, C. S., Asuncion, J., & Scapin, R. (2014). Digital technology, learning, and postsecondary students with disabilities: Where we've been and where we're going. *Journal of Postsecondary Education and Disability, 27*(4), 369 - 379.

Fichten, C. S., Asuncion, J., Barile, C., Robillar, M., & Lamb, D. (2003). Canadian postsecondary students with disabilities: Where are they? *Canadian Journal of Higher Education, 33*(2), 71-113.

Fichten, C. S., Ferraro, V., Asuncion, J. V., Chwojka, C., Barile, M., Nguyen, M. N., . . . Wolforth, J. (2009). Disabilities and e-learning problems and solutions: An exploratory study. *Educational Technology & Society, 12*(4), 241–256.

Fichten, C. S., Jorgensen, S., Havel, A., & Barile, M. (2006). *College students with disabilities: Their future and success.* Retrieved from http://files.eric.ed.gov/fulltext/ED491585.pdf

Fichten, C. S., Nguyen, M. N., Amsel, R., Jorgensen, S., Budd, J., Jorgensen, M., . . . Barile, M. (2014). How well does the Theory of Planned Behavior predict graduation among college and university students with disabilities? *Social Psychology Educucation, 17*, 657–685.

Finlay, L. (2009). Debating phenomenological research methods. *Phenomenology & Practice, 3*(1), 6-25.

Franks, J. D. (2001). Hearing measurement. *Occupational exposure to noise: Evaluation, prevention and control*, 183-232. (B. Goeltzer, C. H. Hansen, & G. A. Sehrndt, Eds.) World Health Organization. Retrieved from http://www.who.int/occupational_health/publications/noise8.pdf

Galagan, P. A. (2000). Getting started with e-learning. *Training & Development, 54*(5), 62-64.

Galarneau, D., & Radulescu, M. (2009). Employment among the disabled. *Perspectives on Labour and Income, 10*(5). Retrieved from Statistics Canada: http://www.statcan.gc.ca/pub/75-001-x/2009105/article/10865-eng.htm

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking and computer conferencing: A model and tool to assess cognitive presence. *American Journal of Distance Education, 15*(1), 7-23.

Hearing Loss Association of North Carolina. (n.d.). *HoH Glossary and Acronyms*. Retrieved from Hearing Loss Association of North Carolina website: http://www.nchearingloss.org/gloss.htm

Hull, C., Sitlington, P., & Alper, S. (2001). Post-secondary education for students with learning disabilities: A synthesis of the literature. *Exceptional Children, 68*(1), 97-118.

Human Resources and Skills Development Canada. (2013). *Federal disability reference guide.* Retrieved from http://www.esdc.gc.ca/eng/disability/arc/reference_guide.pdf

Jaworski, A., & Stephens, D. (1998). Self-reports on silence as a face-saving strategy by people with hearing impairment. *International Journal of Applied Linguistics, 8*(1), 61-80.

Kim-Rupnow, W., Dowrick, P., & Burke, S. (2001). Trends in distance education: Implications for improving access and outcomes for individuals with disabilities in post-secondary distance education. *American Journal of Distance Education, 15*(1), 25-40.

Kinash, S., Crichton, S., & Kim-Rupnow, W. A. (2004). A review of 2000–2003 literature at the intersection of online learning and disability. *American Journal of Distance Education, 18*(1), 5-19.

Koelsch, L. E. (2013). Reconceptualizing the member check interview. *International Journal of Qualitative Methods*, 168-179.

Lartz, M. N., Stoner, J. B., & Stout, L.-J. (2008). Perspectives of assistive technology from deaf students at a hearing university. *Assistive Technology Outcomes and Benefits, 5*(1), 72-90.

Laurentian University. (2013). *Policy and guidelines on students with special needs.* Retrieved from http://142.51.1.171/webfm_send/2013

Liversidge, A. G. (2003). *Academic and social integration of deaf and hard-of-hearing students in a Carnegie Reseach-I university.* Doctoral dissertation, University of Maryland. Retrieved from http://drum.lib.umd.edu/bitstream/handle/1903/52/dissertation.pdf;jsessionid=E8F4CF75E0BF2E9550B04F12CEFB5F1C?sequence=1

Long, G. L., Vignare, K., Rappold, R. P., & Mallory, J. (2007). Access to communication for deaf, hard-of- hearing and ESL students in blended learning courses. *International Review of Research in Open and Distance Learning, 8*(3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/423/933

McGill, R. (2008). Who are e-learners. In E. M. Norlin, & T. A. Travis (Eds.), *E-learning and business plans: National and international case studies* (pp. 3-14). Lantham, Maryland: Scarecrow Press, Inc.

Memorial University. (2013). *Accommodations for students with disabilities*. Retrieved from http://www.mun.ca/policy/site/policy.php?id=239#

Mercado, D. (2013). Instructional design strategies used to provide equal learning opportunity for deaf and hard of hearing learners. *Journal of the American Deafness & Rehabilitation Association, 47*(1), 147-163.

Microsoft Corp. (n.d.). *Microsoft accessibility*. Retrieved from https://www.microsoft.com/enable/microsoft/mission.aspx

Moisey, S. D. (2004). Students with disabilities in distance education: Characteristics, course enrollment and completion, and support services. *Journal of Distance Education, 19*(1), 73-91.

Moore, M. G., Kearsley, & Greg. (2012). *Distance education: A systems view of online learning* (3rd ed.). Belmont, CA: Wadsworth, Cengage Learning.

Most, T. (2004). The effects of degree and type of hearing loss on children's performance in class. *Deafness and Education International, 6*(3), 154-166.

Most, T. (2006). Assessment of school functioning among Israeli Arab children with hearing loss in the primary grades. *American Annals of the Deaf , 151*(3), 327-335.

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance education, 26*(1), 29-48.

National Educational Association of Disabled Students. (n.d.). *Enhancing accessibility in post-secondary education institutions: A guide for disability service providers.* Retrieved from http://www.neads.ca/en/norc/eag/eag_en.pdf

National Institute on Deafness and Other Communication Disorders. (2013). *Age-related hearing loss*. Retrieved from http://www.nidcd.nih.gov/health/hearing/Pages/Age-Related-Hearing-Loss.aspx

Neuman, W. L. (2005). *Social Research Methods: Quantitative and Qualitative Approaches.*

Neuman, W. L. (2006). *Social research methods: Qualitative and quantitative approaches. Boston: Pearson* (6th ed.). Boston, MA: Pearson Education, Inc.

Niagara College. (n.d.). *Deaf, deafened, and hard of hearing* . Retrieved from Disability services: http://www.niagaracollege.ca/disability-services/disabilities-and-accommodations/deaf-deafened-and-hard-of-hearing/

Norman, G. R., & Streiner, D. L. (2008). *Biostatistics: The bare essentials.* Hamilton, Ontario: BC Decker Inc.

Ontarians with Disabilities Act, 2001. (2011). *Ontarians with Disabilities Act, 2001, S.O. 2001, c. 32*. Retrieved from Government of Ontario: http://www.ontario.ca/laws/statute/01o32#BK19

Ontario Human Rights Commission. (2004). *Guidelines on accessible education.* Retrieved from http://www.ohrc.on.ca/sites/default/files/attachments/Guidelines_on_accessible_education.pdf

Opitz, C. (2002). Online course accessibility: A call for responsibility and necessity. *AACE Journal, 10*(1), 81-105.

Paist, E. H. (1995). Serving students with disabilities in distance education. *American Journal of Distance Education, 9*(1), 61-70.

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Thousand Oaks, California: Sage Publications, Inc.

Pena-Shaff, J. B., & Nicholls, C. (2004). Analyzing student interactions and meaning constuction in computer bulletin board discussions. *Computers & Education, 42*(3), 243-265.

Prater, M. A., Redman, A. S., Anderson, D., & Gibb, G. S. (2014). Teaching adolescent students with learning disabilities to self-advocate for accommodations. *Intervention in School and Clinic, 49*(5), 298-305.

Qi, S., & Mitchell, R. E. (2012). Large scale academic achievement testing for deaf and hard-of-hearing students: Past, present, and future. *Journal of Deaf Studies and Deaf Education, 17*(1), 1-18.

Richardson, J. T. (2001). The representation and attainment of students with hearing loss in higher education. *Studies in Higher Education, 26*(2), 183-204.

Richardson, J. T. (2015). Academic attainment in deaf and hard-of-hearing students in distance education. *Open Learning: The Journal of Open, Distance and e-learning, 30*(2), 164-177.

Richardson, J. T., & Long, G. L. (2003). Academic engagement and perceptions of quality in distance education. *Open Learning, 18*(3), 223-244.

Richardson, J. T., & Woodley, A. (1999). Approaches to studying in people with hearing loss. *British Journal of Educational Psychology, 69*(4), 533-546.

Richardson, J. T., Long, G. L., & Woodley, A. (2004). Students with an undisclosed hearing loss: A challenge for academic access, progress, and success? *Journal of Deaf Studies and Deaf Education, 9*(4), 427-441.

Roberts, B. (2013). *A lifeline for disability accomodation planning: How models of disability and human rights principles inform accommodation and accessibility planning.* Doctoral dissertation, Queens University, Kingston, ON. Retrieved from https://qspace.library.queensu.ca/bitstream/1974/7806/3/Roberts_Barbara_L_201301_PHD.pdf

Rosemont College. (2002). *Politique d'intégration scolaire et d'éducation interculturelle.* Retrieved from http://www.crosemont.qc.ca/public/bd6fad11-ee4c-4d0c-a5d7-c094a8a27d06/mes_documents/college_reglements_politiques_programmes/politique_integration_scolaire_education_interculturelle_webfev2006.pdf

Royal Roads University. (2009). *Accessibility policy for students with a disability*. Retrieved from http://policies.royalroads.ca/policies/accessibility-policy-students-disability

Russell, D., & Demko, R. (2005). *Accommodating learners with disabilities in post-secondary education in Alberta: A review of policies, programs, and support services.* Government of Alberta. Retrieved from http://eae.alberta.ca/media/134909/aldpss.pdf

Rutka, J. (2010). *Discussion paper on hearing loss.* Retrieved from Veterens Review and Appeals Board: http://www.vrab-tacra.gc.ca/Publications/Discussion-Paper-Document-de-travail-eng.cfm

Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. *Field Methods, 15*(1), 85-109. Retrieved from http://www.utsc.utoronto.ca/~kmacd/IDSC10/Readings/Data%20analysis/themes.pdf

S. 2561--100th Congress. (1988). *Technology-Related Assistance for Individuals with Disabilities Act of 1988.* Retrieved from http://www.gpo.gov/fdsys/pkg/STATUTE-102/pdf/STATUTE-102-Pg1044.pdf

Saldana, J. (2009). *The coding manual for qualitative researchers.* Thousand Oaks, California: Sage Publications, Inc.

Scherer, M. J. (2002). The change in emphasis from people to person: Introduction to the special. *Disability and Rehabilitation, 24*, 1-4.

Schmetzke, A. (2001). Online distance education – "Anytime, Anywhere" but not for everyone. *Information Technology and Disabilities Journal, 7*(2). Retrieved from http://itd.athenpro.org//volume7/number2/axel.html

Seale, J., Daffan E., A., & Wald, M. (2008). *Exploring disabled learners' experiences of e-learning: LEXDIS project report.* University of Southhampton. Retrieved from http://eprints.soton.ac.uk/64850/1/LEXDIS_ProjectReport_Dec08.pdf

Sharpe, M. N., Johnson, D. R., Izzo, M., & Murray, A. (2005). An analysis of instructional accommodations and assistive technologies used by postsecondary graduates with disabilities. *Journal of Vocational Rehabilitation, 22*(1), 3-11.

Shemesh, R. (2010). Hearing impairment: Definitions, assessment and management. *International Encycloaedia of Rehabilitation*. (J. H. Stone, & B. M, Eds.) Retrieved from http://cirrie.buffalo.edu/encyclopedia/en/article/272/#s6

Shen, D. C., Tsai, C., & Marra, R. (2013). Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction. *Internet and Higher Education, 19*, 10-17.

Sims, R. (2006). Beyond instructional design: Making learning design a reality. . *Journal of Learning Design, 1*(2), 1-7.

Sims, R., & Bovard, B. (2004). Interacting with online learners: How new elaborations of online presence can foster critical thinking and reflection. In R. Atkinson, M. C, D. Jonas-Dwyer, & R. Phillips (Ed.), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference, 5-8 December.*, (pp. 841-850). Perth.

Skinner, M. E., & Lindstrom, B. D. (2003). Bridging the gap between high school and college: Strategies for the successful transition of students with learning disabilities. *Preventing School Failure, 47*(3), 132-137.

Smith, P. L., & Ragan, T. .. (2005). *Instructional design* (3rd ed.). Hoboken , NJ: John Wiley & Sons, Inc.

Snyder, T. D., & Dillow, S. A. (2015). *Digest of education statistics 2013 (NCES 2015-011).* Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. . Retrieved from https://nces.ed.gov/pubs2011/2011015.pdf

Spencer, L., Ritchie, J., Lewis, J., & Dillon, L. (2003). *Quality in qualitative evaluation: A framework for assessing research evidence.* London: Government Chief Social Researcher's Office. Retrieved from http://www.civilservice.gov.uk/wp-content/uploads/2011/09/a_quality_framework_tcm6-38740.pdf

Statistics Canada. (2015, March 13). *Table 2: Prevalence of disability, by age group, aged 15 years or older, Canada, 2012*. Retrieved from A profile of persons with disabilities among Canadians aged 15 years or older, 2012: http://www.statcan.gc.ca/pub/89-654-x/2015001/tbl/tbl02-eng.htm

Stinson, M. S., & Liu, Y. (1999). Participation of deaf and hard-of-hearing students in classes with hearing students. *Journal of Deaf Studies and Deaf Education, 4*(3), 191-202.

Stodden, R. A., Whelley, T., Chang, C., & Harding, T. (2001). Current status of educational support provision to students with disabilities in postsecondary education. *Journal of Vocational Rehabilitation, 16*(3), 189-198.

Tallent-Runnels, M. K., Thomas, J. A., Lan, W. L., Cooper, S., C., A. T., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76*(1), 93-125.

Tambs, K. (2004). Moderate effects of hearing loss on mental health and subjective well-being: Results from the Nord-Trøndelag hearing loss study. *Psychosomatic Medicine, 66*, 776–782.

Taylor-Powell, E. &. (2003). *Analyzing qualitative data.* University of Wisconsin , Program Development and Evaluation. Retrieved from http://learningstore.uwex.edu/assets/pdfs/g3658-12.pdf

Test, D. W., Fowler, C. H., Wood, W. M., Brewer, D. M., & Eddy, S. (2005). A conceptual framework framework for self-advocacy for students with disabilities. *Remedial and Special Education, 26*(1), 43-54.

Thomas, M. J. (2002). Learning within incoherent structures: The space of online discussion forums. *Journal of Computer Assisted Learning, 18*(3), 351-366.

Thompson Rivers University. (2009). *Academic accommodations and services for students with disabilities.* Retrieved from http://www.tru.ca/__shared/assets/Services_for_Students_with_Disabilities5619.pdf

Tufford, L., & Newman, P. (2012). Bracketing in qualitative research. *Qualitative Social Work, 11*(1), 80-96.

Turcotte, M. (2014). *Insights on Canadian society: Persons with disabilities and employment.* Statistics Canada. Retrieved from http://www.statcan.gc.ca/pub/75-006-x/2014001/article/14115-eng.pdf

Turner, D. W. (2010). Qualitative interview design: A practical guide for novice investigators. *The Qualitative Report, 15*(3), 754-760.

University of Manitoba. (2015). *The University of Manitoba accessibility policy.* Retrieved from http://umanitoba.ca/admin/governance/media/Accessibility_Policy_-_2015_01_01.pdf

University of Ottawa. (2011). *Accommodation in and out of the classroom – Recommendations towards the full integration and participation of students with a hearing disability at the University of Ottawa.* Retrieved from http://www.uottawa.ca/ombudsperson/sites/www.uottawa.ca.ombudsperson/files/accommodation_for_students_with_disabilities_0.pdf

Urbano Blackford, J. (2007). Statistical issues in developmental epidemiology and disabilities research: Confounding variables, small sample size, and numerous outcome variables. In R. C. Urbano, & R. M. Hodapp (Eds.), *Developmental epidemiology of mental retardation and developmental disabilities.* (pp. 93-120). San Diego, California: Elsevier Inc. .

Vonderwell, S. (2003). An examination of asynchronous communication experiences and perspectives of students in an online course: A case study. *Internet and Higher Education, 6*(1), 77-90.

Wang, Y., Peng, H., Huang, R., Hou, Y., & Wang, J. (2008). Characteristics of distance learners: Research on relationships of learning motivation, learning strategy, self-efficacy, attribution and learning results. *Open Learning, 23*(1), 17-28.

Wooten, P. M. (2014). *A phenomenological study of online learning for deaf students for postsecondary education: A deaf perspective.* (Doctoral dissertation, Liberty University). Retrieved from http://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=1880&context=doctoral

World Health Organization (WHO). (2001). The International Classification of Functioning, Disability and Health (ICF). Geneva. Retrieved from http://psychiatr.ru/download/1313?view=1&name=ICF_18.pdf

World Health Organization. (n.d.). *Disabilities and rehabilitation*. Retrieved from http://www.who.int/disabilities/technology/en/

Yin, R. K. (2009). *Case Study Research: Design and Methods* (4th ed.). Thousand Oaks, California: Sage Publications, Inc.

APPENDIX A - Recruitment email and Letter

In July, 2015, the following message was sent via email to 519 students enrolled in Athabasca University's Centre for Distance Education programs. The recruitment letter was attached to the email and is shown on the next two pages.

Hello CDE Students,

Please read the message attached to this email sent to you on behalf of thesis student Catherine Grater-Nakamura in regards to her research on "Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education".

Any questions can be directed to Catherine by emailing < *mail address was inserted here* >.

Thank you.

CDE contact information inserted here

Ethics File #21675

Athabasca University
1 University Drive
Athabasca, AB T9S 3A3

July 3, 2015

Hello,

I am a student in the Master of Education (Distance Education) program at Athabasca University. I am currently conducting research under the supervision of Dr. Tom Jones, Associate Professor, Centre for Distance Education, Athabasca University, and I am inviting you to participate in my research study.

Purpose of the Study

The primary purpose of this proposed study is to develop specific recommendations for distance education institutions or course designers for enhancing the accessibility of course material for learners with hearing loss. Recommendations will stem from the insight gained by investigating the experiences of undergraduate and graduate students with hearing loss who are enrolled in a course or program delivered at a distance. In particular, I will be seeking participants' assessments of factors that enhance the accessibility of instructional design elements, or act as barriers to full participation in course activities. As a student with hearing loss, I am aware that students have different abilities and potential limitations that can affect their academic outcomes.

Voluntary Participation

You are under no obligation to participate in the study. However, your opinions on ways to improve access to courses and course materials are important; therefore, I would appreciate the opportunity to receive your input related to this topic. If you agree to participate, you have to right to refuse to answer any questions or withdraw from the research at any time during the process without prejudice or reprisals.

Study Procedures

There are two phases to this research project. Phase 1 will take place in July, 2015 and involves answering survey questions. The questionnaire is available online and will take approximately 10 to 15 minutes to complete. In the questionnaire, you will be asked about selected demographic information, such as age, gender, education level, employment status, etc.). You will also be asked for information related to your hearing loss, academic accommodations or support services received, and your experiences with distance education. The survey can be found my clicking on the following link: *survey URL was inserted here.*

You may also be invited to participate in Phase 2 of the research, which will involve a subset of participants who will be asked to be individually interviewed in order to provide more detailed views and opinions related to accessibility issues. The interviews will occur in August, 2015. If interviewed, you will be given an opportunity to review the transcript from the

interview and will be able to delete, modify, or elaborate on any of your responses, if you so choose. This may require up to an additional one hour of your time.

Risks

There are no known or anticipated risks of harm associated with participating in the study.

Privacy and Confidentiality

The information collected will be used for research purposes only. All information will be kept confidential by encrypting digital files, and storing and retaining them on a password protected computer, and by storing the audio recorder in a locked cabinet. Only my research supervisor and I will be able to access any identifying information.

Results of this study may be published in a thesis report and may be published in an academic journal. Publications may include quotes from your interview. Your anonymity will be respected by using a pseudonym instead of your name and efforts will be made not to disclose your identity. You may request a paper or electronic copy of any paper written about the study.

Questions

If you have any questions about this study or would like additional information to assist you in reaching a decision about participating, please feel free to contact me via email at *contact email was inserted here*, or Dr. Tom Jones at 1-866-514-6233 or by email to tomj@athabascau.ca. In addition, this study has been reviewed by the Athabasca University Research Ethics Board (Ethics File No. 21675). Should you have any comments or concerns regarding your treatment as a participant in this study, please contact the Office of Research Ethics at 1-800-788-9041, ext. 6718 or by e-mail to rebsec@athabascau.ca.

Thank you for your consideration and your interest in this project.

To participate in the survey, please go to: *link to survey URL was inserted here* or copy the URL into your browser. *Survey URL was inserted here.*

Yours sincerely,
Catherine Grater-Nakamura
MDE Program Student
Athabasca University
contact email was inserted here

APPENDIX B - LimeSurvey Consent Page

Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education (REB File No. 21675)

Athabasca University REB File No. 21675

This survey is designed to learn more about the experiences of students with hearing loss while they are/were enrolled in distance education courses. We are particularly interested in learning more about accessibility barriers and possible solutions for enhancing the accessibility of course material for all students.

This survey will take approximately 10 minutes to complete.

There are 30 questions in this survey

Consent to Participate

Project Title: Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education

1 [Consent]

You are invited to participate in a research study to explore factors influencing the accessibility of distance education course material for undergraduate and graduate students who are deaf or hard of hearing.

We hope to learn more about students' experiences while enrolled in distance education courses, particularly accessibility barriers and possible solutions for enhancing the accessibility of course material for all students.

As a participant in this study, you will be asked to complete a questionnaire in which you will be asked general demographic information, as well as questions related to your hearing loss, education, use of academic accommodations and support services, and delivery of course material. A subset of participants will be invited to participate in an interview to provide more detailed views and opinions related to their experiences as a student enrolled in postsecondary courses delivered via distance education.

Participation in this study is voluntary and might not benefit you personally. There are no known or anticipated risks to participation in this study. You have the right to refuse to participate and to withdraw from the research at any time, without prejudice or repercussions. You may also refuse to answer any question.

The information collected will be used for research purposes only. All information will be held confidential, except when legislation or a professional code of conduct requires that it be reported. You will not be identified individually in any way in any written reports of this research. All information will be kept confidential by encrypting digital files and storing them on a password protected computer, and by storing the audio recorder in a locked cabinet. Only my research supervisor and myself will be able to access any identifying information, and all data will be destroyed once analyzes are complete.

This study has been reviewed by and received ethics clearance from the Athabasca University Research Ethics Board (REB File No. 21675). If you have any comments or concerns resulting from your participation in this study, please feel free to contact the Office of Research Ethics at 1-800-788-9041, ext. 6718 or by e-mail to rebsec@athabascau.ca.

To participate in this study, please click "Yes" then "Next" at the bottom of the page. To exit the survey, please click "No."

Thank you for your assistance with this project.

Student Researcher:

Catherine Grater-Nakamura

Graduate Student, Ma University

Email: catsgn@rogers.com

Thesis Supervisor:

Dr. Tom Jones

Associate Professor, Centre for Distance Education, Athabasca University

Email: tomj@athabascau.ca
Phone: 1-866-514-6233

A copy of this consent form can be returned to you at your request.

By clicking "Yes", I agree to participate in a study being conducted by Catherine Grater-Nakamura under the supervision of Dr. Tom Jones of the Centre for Distance Education, Athabasca University.

I have made this decision based on the information I have read in this Consent Letter and have had the opportunity to receive any additional details I wanted about the study. I understand that I may withdraw this consent at any time by telling the researcher. I also understand that this project has been reviewed by, and received ethics clearance through, the Athabasca University Research Ethics Board, and that I may contact this office if I have any concerns or comments resulting from my involvement in the study.

* Please choose only one of the following:

- ○ Yes
- ○ No

If "No" was clicked, the, respondent received this message:

29. Thank you for your consideration. If you change your mind and consent to participating in the survey, please begin again.

APPENDIX C - LimeSurvey Questionnaire Questions

Following are the questions that were included in the LimeSurvey questionnaire. NB the numbering starts at 2 because the first question asks for consent to participate (see previous page).

Part 1: Demographic Information

2. **Please indicate your gender.**
   Please choose **only one** of the following:
   O Female
   O Male

3. **Please indicate your age.**
   Please choose **only one** of the following:
   O Younger than 30 years of age
   O 30 – 39
   O 40 – 49
   O 50 – 59
   O 60 years of age or older

4. **Please indicate your marital status.**
   Please choose **only one** of the following:
   O Single
   O Married
   O Common Law
   O Divorced
   O Widowed

5. **Do you reside in Canada?**
   Please choose **only one** of the following:
   O Yes
   O No

If yes:

6. **Province or territory of residence.**
   Please choose **only one** of the following:
   O Alberta
   O British Columbia
   O Manitoba
   O New Brunswick
   O Newfoundland and Labrador
   O Northwest Territories
   O Nova Scotia
   O Nunavut
   O Ontario
   O Prince Edward Island
   O Quebec
   O Saskatchewan
   O Yukon

If no:

7. **Please indicate your country of residence in the commend box.**
   Please choose **only one** of the following:
   O I live outside Canada.

   Comment:

8. **Please indicate your current employment status.**
   Please choose **only one** of the following:
   O Employed full time
   O Employed part time
   O Not currently employed

Part 2: Education

9. **Please indicate the highest academic credential you have received.**
   Please choose **only one** of the following:
   O High school diploma
   O Certificate
   O College diploma
   O Bachelor's degree
   O Master's degree
   O PhD / EdD
   O Other (Please specify in the comment box.)

   Make a comment on your choice here:

10. **Are you currently enrolled in an undergraduate or graduate course and / or program that is being delivered via distance education (e.g., online, Internet-, computer-, or web-based)?**
    Please choose **only one** of the following:
    O Yes
    O No

If yes:

11. **Please specify.**
    Please choose **only one** of the following:
    O I am currently enrolled in an undergraduate course and /or program that is delivered via distance education.
    O I am currently enrolled in a graduate course and /or program that is delivered via distance education.

If no:

12. **How long ago were you enrolled in an undergraduate or graduate course and /or program that was delivered via distance education?**
    Please choose **only one** of the following:
    O Never
    O Less than 6 months ago.
    O 6 - 12 months ago
    O More than 12 months ago (Use the comment box to specify how long ago.)

    Make a comment on your choice here:

13. Please indicate the number of courses delivered via distance education you have completed.
Please choose **only one** of the following:
O 0
O 1
O 2 - 5
O 6 - 10
O 11+

Part 3: Hearing Levels

14. Do you have hearing loss?
Please choose **only one** of the following:
O Yes
O No

If yes:
15. Please indicate your type of hearing loss.
Please choose **only one** of the following:
O Congenital (i.e., hearing loss present at birth)
O Acquired (i.e., hearing loss acquired after birth)
O Combination (i.e., hearing loss present at birth and got worse over time)
O Unsure

If no:
30. Thank you for your time and your participation in this research.

16. Which of the following options best describes your degree of hearing loss?
Please choose **only one** of the following:
O Mild
O Moderate
O Severe
O Deaf

Part 4: Academic Accommodations and Support Services

17. Have you ever officially disclosed your hearing loss to the university where you have taken distance education courses?
Please choose **only one** of the following:
O Yes
O No

18. Have you ever received academic accommodation or support services from a university and related to your hearing loss?
Please choose **only one** of the following:
O Yes
O No
O Unsure

If yes:

19. What academic accommodations or support services did you received from your university?

Please choose **all** that apply and provide a comment.

O None
O Increased time to complete the course
O Increased time to complete tests or assignments
O Course material delivered in an alternative format
O Assessment for assistive technology
O Assistance with procurement of assistive technology
O Financial assistance to procure assistive technology
O Training on the use of assistive technology
O Other (please specify)

If no:

20. Please indicate why you did not receive academic accommodation or support services from your university.

Please choose **all** that apply and provide a comment.

O Chose not to disclose hearing loss to university
O Did not need accommodation or support
O Did not think to ask for accommodation or support
O Did not think it was fair to ask for accommodation or support
O Received sufficient support from outside or alternative sources
O Other (please specify)

21. Have you ever received support (financial or otherwise) for assistive technology related to your hearing loss from any source other than the university?

Please choose **only one** of the following:

O No
O Yes (Using the comment box, please specify sources of support.)
O Not sure

Make a comment on your choice here:

Part 5: Course Delivery and Instructional Design

22. Has your hearing loss presented any barriers to your ability to fully participate in any course(s) delivered via distance education?

Please choose **only one** of the following:

O Yes, I experienced barriers related to my hearing loss. (Using the comment box, please describe the barriers that prevented you from fully participating in any courses.)

O No, I did not experience any barriers to fully participating in all my courses.

O Not sure

Make a comment on your choice here:

23. Have you ever participated in synchronous class discussion using the telephone (teleconference) or voice of Internet protocol (VoIP [e.g., Skype]) technology?

Please choose **only one** of the following:

O Yes

O No

O Not sure

If yes:

24. Did your hearing loss prevent you from fully participating in the class discussion delivered via teleconference or voice of Internet protocol (VoIP) technology?

Please choose **only one** of the following:

O Yes

O No

O Not sure

25. Thank you for your time and for completing this survey. Please indicate whether you are will to be contacted to discuss the possibility of participating in an interview to further explore your experiences wile enrolled in distance education courses.

Please choose **only one** of the following:

O Yes, I am willing to be contact to discuss the possibility of participating in an interview.

O No, I decline to be interviewed.

O I am not sure if I am willing to be interviewed. I need more information before making a decision.

If yes:

26. Contact information

Please choose **only one** of the following:

O Yes, please contact me. My contact information is provided in the comment box.

Make a comment on your choice here:

If you consent to being contacted to discuss the possibility of participating in an interview to more fully explore your experiences in undergraduate or graduate courses delivered via distance education, please click on the "Yes" button above and provide your contact information so that I may contact you to arrange a suitable time and method to conduct the interview.

Thank you again for your time and participation.

If yes:

28. Thank you! I will be in contact with you shortly.
Cate Grater-Nakamura
MEd (c), Athabasca University

If not sure:

27. Please provide your contact information if you need more information about the research in order to help you make an informed decision about participating in an interview to fully explore your experiences in undergraduate or graduate courses delivered via distance education.

Please choose **only one** of the following:

O Yes, please contact me to provide more information. My contact information is in the comment box.

Make a comment on your choice here:

If no:

30. Thank you for your time and your participation in this research.

If you change your mind about being interviewed or require any further information, please do not hesitate to contact me at contact email inserted here.

Thank you.

Catherine Grater-Nakamura

MEd (c), Athabasca University

APPENDIX D - Guiding Interview Questions

Questions related to Hearing Loss

- What challenges do /did you experience related to your hearing impairment?

- What previous experience have you had with distance education courses (i.e., those that are related to your hearing loss)? Describe.

- Did participants disclose their hearing impairment to the academic institution? (Follow-up to online survey questionnaire) If so,
  - Were academic accommodations requested? If so,
  - What accommodations were requested?
  - What accommodations were granted?

- In your assessment, has your hearing loss limited your educational experience? If so,
  - What were the limitations?
  - Was anything done to address the issue? If so, what was done?

Questions related to Assistive Technology

- Do you use or rely on assistive technologies /devices to reduce the impact of your hearing impairment during daily activities? If so,
  - What assistive device(s) is /are used?

- Do you use or rely on assistive technologies or computer software programs to improve access to course materials or assist in completing course work? If so,
  - What assistive technologies and /or software programs are used?
  - How do you measure /assess the usefulness of the assistive technologies?

Questions related to Instructional Design

- What is your preferred method of course delivery (i.e., what media)?

- In your experience, what type(s) of course deliver methods have been the most challenging? Why?

- In your assessment, do you perceive that you experienced any barriers to learning resulting from accessibility challenges related to hearing impairment? If so,
  - What were those barriers?
  - Was anything done to address the issue? If so, what was done?

- Are you aware of any instructional design elements to support D/HH learners that were/are used in the distance education courses you have taken? If so, what were they?

- Did you notice any specific modifications made to course design or course delivery to accommodate students with hearing impairment and improve accessibility? If so,
    - What accommodations /modifications did you notice?
    - In your assessment, how useful were these accommodations?
    - How is the degree of usefulness assessed?

- Did you find anything specific that worked for you (i.e., improve accessibility)?

- What specific recommendations do you have for instructional design strategies to improve accessibility?

APPENDIX E - Athabasca University Research Ethics Board Approval

Initial Certification of Ethics Approval Notice

Certification of Ethics Approval

Athabasca University
RESEARCH CENTRE

March 05, 2015

Mrs. Catherine Grater-Nakamura
Other Academic Centres/Depts\Centre for Distance Education
Athabasca University

File No: 21675

Expiry Date: March 4, 2016

Dear Mrs. Catherine Grater-Nakamura,

The Centre for Distance Education Departmental Ethics Review Committee, acting under authority of the Athabasca University Research Ethics Board to provide an expedited process of review for minimal risk student researcher projects, has reviewed you project, 'Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education' and accepted your revisions.
Your application has been **Approved on ethical grounds** and this memorandum constitutes a ***Certification of Ethics Approval***.

Ethics Approval Renewal

Ethics Approval Renewal Form Received (2)

Athabasca University
RESEARCH CENTRE

February 26, 2016

Mrs. Catherine Grater-Nakamura
Centre for Distance Education\Doctor of Education in Distance Education
Athabasca University

File No: 21675
Certification of Ethics Approval Date: March 05, 2015
New Renewal Date: Feb 25, 2017

Dear Catherine Grater-Nakamura,
Your Renewal Form has been received by the AU REB Office.
Athabasca University's Research Ethics Board (REB) has **approved** your request to renew the *certification of ethics approval* for a further year for your project entitled "Experiences of Deaf and Hard of Hearing Students in Undergraduate and Graduate Distance Education".

APPENDIX F - Focal Theme 1

Focal Theme 1: Students' Use of Assistive Technologies and Support Services

Sub-Theme	Derived Meaning	Significant Words or Phrases
Types of assistive technologies and support services	Various types of technologies can be used by those with hearing loss to mitigate the effect of their physical disability.	
Specialized technologies and support services	Different types of assistive listening devices and other specialized services are available mitigate hearing loss.	• in-the-canal hearing aids • bone implanted hearing aid • cochlear implant • ASL interpreters • note-takers • CART • captioning • TTY • IP relay service
Mainstream technologies	Mainstream information and computer technologies can be used by those with hearing loss in conventional ways and as adaptive tools.	• desktop computer • speakers • head phones • iPad • FaceTime • Skype • digital • Bluetooth • smartphone / android phone / iPhone / cell phone • applications that will record phone conversations

APPENDIX G - Focal Theme 2

Focal Theme 2: Challenges Associated with Hearing Loss

Sub-Theme	Derived Meaning	Significant Words or Phrases
Challenges in daily living	Those with hearing loss experience challenges related to their physical disability in their everyday lives.	

Use of telephones	Communicating via telephone can present unique challenges to those with hearing loss.	• Telephone conversations aren't exactly fun.
		• …defer to my wife…
		• I do hear to a certain extent on the phone, but…that's just with family and friends.
		• To phone strangers is just not feasible for me.
		• I think the main issue is the phone.
		• …was very hard to keep track of on the phone
		• …obviously it's going to be communication issue - whether it's home phones…
		  o cell phone seems to work much better with my hearing aids
		  o cell phone calls are not a problem.

Background noise lack of visual cues	Background noise and the inability to see those speaking can contribute to breakdowns in communication.	• …noisy situations - are a real problem • …loud, noisy situations… I tend to be more uncomfortable because I can't hear what people are saying • I can't really read your lips if you're talking to the page when reading • I do tend to lip-read when I'm in a conversation. • as well as darkness • If there's any meeting that's dark, well, forget it.

Sub-Theme	Derived Meaning	Significant Words or Phrases
Barriers to learning	Hearing loss may result in barriers to learning.	
Early educational experiences	Early educational experiences can influence experiences in higher education and academic outcomes.	• by junior high school I was struggling in school • even listening to a lecture […] it's been challenging to me throughout my entire life. • I had a lot of learning disabilities as a younger child just because I wasn't actually hearing. • I was not a particularly good student • "tuning out" when I couldn't hear • I pretty much scraped by in both elementary and high school.
Lack of universally accessible material or activities	Inaccessible education-related materials or activities can impact the ability to fully participate in class- or program-related activities.	• some sort of pre-recorded thing that I'm supposed to listen to and I can barely hear anything.
Facilitators for improving access to course- or program- related materials	Several strategies can be used by those with hearing loss to improving access to educational materials and overcoming potential barriers.	• I can control the nose level and the background…environment • I also used an FM system, which was helpful. • managed to the point of non-issues when using speakers. • make sure to that your volume is adequate before you post it. • closed-captions / closed-captioning / subtitles • using any public domain resources • transcript service / CART / note-takers • video conference
Feelings and emotions	Dealing with hearing loss can contribute to various feelings and emotions.	

Sub-Theme	Derived Meaning	Significant Words or Phrases
Associated with challenges	Challenges associated with hearing loss can result in feelings of frustration, anger, and the perception of injustice.	• struggled / a real struggle • "Well, you can't. You can't do this or you can't do that." • angry / really angry / very very angry • ranting and raving • I'm thinking that's really intrusive • what right do you have to ask these kinds of questions. / They didn't have the right to ask these kinds of questions. • They should just provide it. I mean – this is my right. • But that – it was wrong. • I gave […] an earful! I told him exactly how I felt about the entire process. • how disrespectful the process was of my basic human rights to have full access to my education • I wondered how that could be true
Associated with overcoming challenges	Overcoming challenges associated with hearing loss can result in feelings of satisfaction and accomplishment.	• These can all be managed to the point of non-issues • Did really well there. • my hearing improved considerably • It allowed me to use the phone. • It increased my employability actually. • My speech actually improved. • so that was resolved.

APPENDIX H - Focal Theme 3

Focal Theme 3: Responsibility for Reducing Barriers

Sub-Theme	Derived Meaning	Significant Words or Phrases
Mutual responsibility	Students and educational institutions have a mutual responsibility for promoting universal accessibility.	• on the student side of things, there's a lot of responsibility that we have too • it's a fuzzy area on how much the student should be taking on • not just to pin it all on the instructor or the school • the onus is more on the person with the disability at that point to come forward • I don't want to put all the work on the professor • I'm not saying the university would have to buy it
Recommendations	There are numerous strategies students and educational institutions can employ to ensure course and program materials are accessible.	
Recommendations for students	Students can take steps to ensure they have access to course and program material that is not universally accessible.	• make sure that our systems work ○ And if they're not, then to ask for some sort of accommodation or some sort of help. • any kind of transfer for book capturing • you always have to ask / come forward • I would just be very up front and tell them • …behind the ear receivers / amplifiers / Bluetooth connectivity • applications that will record phone conversations …and from those recordings you can make your own transcripts

Sub-Theme	Derived Meaning	Significant Words or Phrases
Recommendations for educational institutions	Educational institutions can take numerous steps to ensure course and program materials are universally accessible, and to ensure that students are aware of the types of support that are available to them.	• they could make people aware of what's out there. • A list of options that are available • They may or could possibly go further for students who really are unable to use telephony of any sort • the professors should actually…make everyone aware… that Athabasca has resources available • if people are updated about what's available to them or that the professor will be accommodating them, people might be more willing to self-identify in that situation. • provide accessibility guidelines on their websites • video conference instead of a simple conference call ○ having video over audio alone is much better • more mixed-media would be helpful • have some sort of captioning or transcript service available for any kind of video reference material that we use • if you're going to show any videos, closed-captioning would definitely be a must • they should just offer it…say that CART or ASL interpreters will be provided upon request… just have them booked – just in case. • provide transcripts or something like that • learning management system tool that the universities rely on – like Moodle and Desire to Learn and Blackboard and all these things are not accessible.