DEAF AND HARD OF HEARING ONLINE LEARNERS IN POSTSECONDARY EDUCATION: PART 1- STUDENT PERSPECTIVES PRE-COVID-19

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ABSTRACT

Online course design and delivery rapidly expanded due to Covid-19. The impact on Deaf/Hard of hearing (D/HH) learners since the pandemic is unknown. In this prepandemic qualitative study, however, ninety-three (93) D/HH online students participated in a survey, from which nine (9) participated in a focus group interview to share their experiences in their online classes. The results describe both the positive influences and the challenges affecting this population in mainstream online classes. A forthcoming article will study postpandemic perspectives to further guide online course design and delivery for D/HH learners.

Keywords: *deaf, hard of hearing, online learning, perspectives, higher education, disability, mainstreamed education, technology integration, accessibility, deaf culture, recommendations, strategies, online courses, pre-COVID 19, online program management, student retention, student attrition, American Sign Language*

INTRODUCTION

It can be difficult for students with a hearing loss to keep up with instruction and to fully participate in discussions in a traditional, lecture-focused college classroom. (Alasim, 2018; Long et al., 2012). Since the majority of information for them is received through their eyes, processing the multiple inputs (instructor, PowerPoint slides, Sign Language Interpreter, other students) in a classroom setting can be overwhelming. If the negative effects of visual dispersion are not monitored and controlled by the instructor, i.e., allowing students time to read content before the instructor speaks, pausing to allow the interpreter to finish signing a question before calling on a student to answer it,

pointing to the student answering the question to identify who is speaking, and limiting one student to respond at a time, communication breaks down and Deaf/Hard of Hearing (D/HH) students do not have equitable access to the information. (Albertini & Schley, 2003; Richardson et al., 2010).

Satisfaction and academic achievement for students with a hearing loss enrolled in either traditional lecture or online courses have been studied prior to COVID-19 (Long et al., 2011). In fact, D/HH students enrolled in online courses, especially those that had a high level of online interaction, received higher grades and reported greater overall satisfaction than D/HH students in comparable traditional, face-to-face courses. Although similar

results were reported elsewhere with hearing students (Means et al., 2009), the Long, et. al. study illuminates how the quantity of online interactions relate to important success factors and how D/HH students receive special benefits for academic achievement through online discussions in these online courses.

Part 1 of this study investigates D/HH students' perspectives of mainstreamed online courses. The study was situated in a mainstreamed university in Rochester, NY that is home to the National Technical Institute for the Deaf (NTID) at Rochester Institute of Technology (RIT)—the largest technical college for D/HH learners in the world. In this article, the term *mainstreamed* refers to a course where the majority of enrolled students are hearing and a minority are D/HH. If the course was online and asynchronous, enrollees may not have known who is D/HH unless it is disclosed. As such, D/HH students are afforded the same access to information and the ability to participate in online discussions as their hearing peers in an asynchronous course. This study seeks to identify unique practices that can ensure D/HH succeed in online courses in spite of inherent academic challenges.

LITERATURE REVIEW

According to their *Distance Education Enrollment Report 2017,* the percent of college students taking online courses continues to rise, e.g., up nearly 4% in 2015 (Allen & Seaman, 2017). According to *Inside Higher Ed,* federal data showed that in 2018 more than a third of all college and university students took at least one online course (Lederman, 2019). Likewise, the number of D/HH students enrolled in mainstream postsecondary education has also steadily increased (Richardson et al., 2010). Prior to COVID-19, 27% of traditional college-aged students (age 17–24) attended colleges and universities in the United States (U.S. Census Bureau, 2017-2021). The majority of these students received their education in mainstreamed classes alongside hearing classmates (Horn et al., 2002; Lang, 2002). However, statistics at that time indicated that approximately 70%–75% of D/HH students enrolled in postsecondary programs failed to graduate. This was more than twice the 30% attrition rate of hearing students (Marschark, 2007; Stinson & Walter, 1997). Causes have been linked to a lack of a first-language base in

prelingually-deaf children due to an inability to sufficiently process spoken communication auditorily as well as the lack of access to a visual language, such as American Sign Language (ASL), early in life. (Hrastinski & Wilbur, 2016; Nagle, et al., 2016). This results in an inability to fully participate and learn from the communication mode used first in the home and later in mainstreamed schools (DeLana et al., 2007; Schmitz, 2005). For those who successfully graduate from high school, many are severely underprepared for college with as many as half entering higher education with fourth-grade reading skills (Albertini & Schley, 2003; Cawthon, 2004; Paul, 1996, 2009; Quigley & Paul, 1987; Traxler, 2000). Since the pandemic began in March 2020, a shift to synchronous and asynchronous online course delivery ensued further disadvantaging D/HH college students.

While D/HH college students face many academic challenges, colleges are expected to provide them with a plethora of support services, accommodations, and approaches for learning. With the increase of online course/degree offerings and attention to making them accessible, D/HH learners are currently given more opportunities to learn in the online arena. Between 2016 and 2020, 36% of entering D/HH freshmen reported having experienced online courses in high school or at another college prior to attending RIT. Even prior to the pandemic, the number of D/HH students enrolled in RIT online courses increased to the point where in any one semester as many as 250 D/HH students (approximately 25% of RIT's full-time, D/HH students) were enrolled in at least one online course. And while these D/HH students decide to enroll in these online courses for a variety of reasons, little information exists regarding how to structure an effective online experience for this population. The purpose of this article is to share the perspectives of D/HH students in mainstream online courses at RIT prepandemic in order to better inform online instructors of their learning preferences and challenges. This information will later be used to measure peri- and postpandemic influences to hasten the implementation of effective strategies to meet the needs of D/HH learners in online courses.

GOAL OF THE STUDY

Deaf/Hard of hearing learners possess unique communication and learning needs. This is

especially true in an online environment since it may not be obvious to the instructor and students enrolled in the class that a learner is Deaf. Therefore, the goal of this study is to document the perspectives of D/HH college students in mainstreamed online courses prior to the pandemic in order to identify strategies that promote online student success for this population. This information will then be used to determine the impact COVID-19 has on D/HH students in both synchronous and asynchronous online courses taught during the pandemic and beyond (between 2020 and the present) in Part 2. In tandem, both studies seek to verify effective strategies for online course design and delivery that include D/HH students' perspectives.

THEORETICAL FRAMEWORK

A theoretical framework should be relevant to the study's goals. In this study, we seek to describe how D/HH college students prefer to learn in mainstreamed online courses. Since a phenomenological approach focuses on a subject's experiences, feelings, and perspectives, it is through this lens that we will check assumptions and analyze questions in order to understand how D/HH students learn and succeed in online courses. Through this framework, we hope to identify strategies that effectively promote online student success for this population.

RESEARCH QUESTIONS

This study seeks to inform online instructors who aspire to meet the unique needs of D/HH learners by answering these questions: What factors enhanced the online experience for D/HH college students? and What factors negatively impacted it?

METHODOLOGY

Participants

As part of this research, 93 D/HH students who were enrolled in one or more online courses at RIT prior to the pandemic completed a survey about their online learning experiences. From these participants, 9 D/HH students volunteered to participate in one of two focus group interview sessions to share their online perspectives.

Data Sources

This study analyzed the results from both a survey related to online experiences as well as responses to questions about experiences in mainstream online credit-bearing classes at RIT.

Specifically, an eight-question survey and two focus group interviews were utilized to address the research questions: What factors enhance the online experience for D/HH college students? and What factors negatively impact it? The survey was created and administered to D/HH students enrolled in 137 online courses at RIT over two terms. Questions addressed students' online course frequency, reasons for choosing online courses, D/HH identity, and opinions about varying aspects of online vs in-person courses. Open-ended questions solicited their advice to other D/HH students in online classes and how to improve online courses for D/HH learners (Appendix A). A total of 93 D/HH students completed the survey anonymously.

The second method of data collection for the students' perspectives related to online learning was focus group interviews that occurred at the end of the term. We took turns asking 9 D/HH students open-ended questions about their experiences with mainstreamed online courses at RIT (Appendix B). The interviews were recorded and certified sign language interpreters were present to voice the responses of D/HH respondents who used ASL. The audio recordings of the two group interviews were transcribed by a third-party agency.

DATA ANALYSIS/FINDINGS

Prior Online Experience and Participants' Characteristics

The eight-question survey revealed that one-third of the D/HH students surveyed were enrolled in an online course for the first time; one-third had taken one or two online courses, and one-third had taken three or more online courses. The majority of participants reported taking online courses because it either fit their schedules better (70%) and/or it was the only option and a required course for graduation (37%). Several indicated taking online courses due to ease in communicating with other students (42%) and/or with the instructor (25%) in the course. With regards to getting advised by others, 13% indicated that a friend who had taken the online course suggested it, 15% indicated they had friends in the online course they were taking, and 6% stated their advisor suggested they take the course online. On the other hand, a few indicated their friends had discouraged them from taking online courses but they wanted to try it (9%) and/or they were doing it without the benefit of knowing

others who have taken courses online (6%).

In contrast, six of the nine focus group attendees interviewed had just completed their first online course. Of the three students who had completed more than one online course, one reported having taken three online courses, one reported having taken four, and one reported having taken six to eight online courses. The focus group participants were enrolled in a variety of majors, e.g., accounting, digital media, and environmental management. One was a graduate student in a teacher-training program and the other eight students were in varying years of different undergraduate degree programs.

The survey responses and interview transcripts served as the raw data for this study. Constructivist grounded theory (Charmaz, 2006) was used to analyze student survey responses and interviews. This theory assumes the researcher constructs patterns, categories, and themes and uses participants' views and voices in the analysis. Peer debriefing was also utilized throughout the analysis. Lastly, an external researcher was asked to review all the data prior to finalizing the results. This theory along with the phenomenological approach to interpreting data formed the basis of our analysis. The following themes point to both positive factors and challenges faced by D/HH college students in online courses.

THEME 1: POSITIVE ONLINE COURSE FACTORS FOR D/HH STUDENTS

Instructor Presence

One of the most important factors in creating a positive experience in an online course for D/HH learners is *instructor presence*. Students greatly appreciated instructors who were actively involved with them online. Concerns about not being noticed and not knowing if their contributions were recognized were alleviated when the instructor was involved in discussions. This is particularly noticeable for D/HH students who may be overlooked in traditional classes due to lag time when utilizing interpreters and/or captionists:

> I do remember that I did feel a connection and I think it's because the instructor participated in the discussions as well as the other students. So there was a lot of discussion, even though it wasn't face-to-face. We did a lot of online discussion boards and so there was participation by everyone and again, the teacher participated and that did make a big difference in the online course experience. Because if the teacher participates, that input from the professor stimulates the rest of the group and kind of feeds ideas to the students.

Some students mentioned disapproval with runaway discussions where a couple of students monopolized the discussion with little or no monitoring by the instructor. As would be expected, this is not appreciated by students who feel it is the instructor's responsibility to monitor their quality and quantity:

> Our online discussions would get a little out of control at times. He would just assign a topic and let us run with it and there were 1 or 2 girls that were just typing all the time and they would always respond to everybody which was fine I guess, and the other people would participate also but sometimes the teacher was busy or whatever, and wouldn't.

Instructor Reminders

D/HH students liked it when online instructors remind them of weekly activities and upcoming assignments. This was true regardless of whether they were experienced online learners or not. Students mentioned that they were constantly checking to be sure assignments were turned in on time, as compared to a physical classroom where the teacher would remind them about what was due:

> "For example, for my (face-to-face) math class there's always reminders that when we have homework due and when and everything is listed out and whether or not we have a test. I like those reminders but online there's not really anything so I have to physically go online and look in a specific place but if I got those Email reminders that would be really helpful."

Student Interactions

Hearing loss affects over 48 million Americans (Center for Hearing and Communication, 2021); however, less than 2 million are school-aged children. (Center for Disease Control and Prevention, 2015; Center for Hearing and Communication, 2021). Since deafness is a low-incidence disability,

many D/HH students in mainstream settings feel isolated from other D/HH students. In an asynchronous online course, the fact the student has a disability is unknown to the teacher and other students unless it is self-disclosed. In addition, D/HH students have the opportunity to participate with each other in an online class without the barriers or third parties often associated with classroom instruction, i.e., sign language interpreters or real-time captionists. In online chat discussions, students have the opportunity to research and respond to the ideas of their instructors and peers in a thoughtful manner. Once the online interaction process is started, D/HH students report having the same opportunity to learn from their deaf and hearing peers:

> . . . if I notice somebody is doing a lot of outside research, like going to different places online, I'll do my own research and I'll try to add to the discussion or respond. I like to respond to other people's discussions, not just posting random things. If you do that with people they can respond to your posts and get better involved with the discussions. So I did feel connected because I responded to other people as well.

For Deaf people, keeping others informed is an expectation as a member of the Deaf community (Smith et al., 1988). This is exemplified by the number of survey participants who indicated they had friends who had suggested a specific online course (12%) or they had friends participating alongside them in their online course (14%).

Taking Responsibility

Being self-motivated, not procrastinating, and frequently checking the course schedule were cited by those surveyed and interviewed. Students mentioned that taking an online course helped them to manage their time better, which was evidenced in subsequent online courses:

> . . . I tend to be a procrastinator, last minute kind of person with due dates and things and meetings things online so, I also tend to follow the teacher's expectations so it made me feel a little bit lost as far as focus and attention . . . so that's what happened to me the first time but currently I'm taking 2 online courses and as I'm going through the courses I seem to be doing very well in

comparison to the first time when I wasn't used to it but now—that's why I gave myself another chance to do better, to improve what I did in online courses and I seem to be going along pretty good now.

Experience in online learning can lead to better performance in subsequent online courses since repeat students better understand expectations and likely recognize pitfalls to avoid. While this is true for many online students, sharing this information with other D/HH is especially important in the Deaf community, which is founded on a shared language (ASL) and culture (Padden & Humphries, 1988). Deaf culture insinuates that online course recommendations by other D/HH are more valuable because only another D/HH learner would have insight as to what is needed to be successful in an online course.

THEME 2: CHALLENGING ONLINE COURSE FACTORS FOR D/HH STUDENTS

Students' Poor Time Management Skills and the Inability to Focus on Tasks

Most students felt that they had to be more self-motivated, committed, focused, and have good time management skills in order to succeed in an online course as compared to the equivalent in-person course:

> It requires a lot of time management. You need to really plan things out for the week— sometimes that are [sic] hard because you don't feel like you have a lot of work but you really do.

> First of all, I have ADD so it's very easy for me when I'm online to click on a few other pages and a few links here and there and then I'm way off the course topic . . . So it would take me several times to read just one article.

To address this, it would be beneficial for D/HH students enrolling in online courses to be informed/ reminded of the characteristics of successful online students at the start of a term (Boyd, 2004; Song, et al., 2004). This can be done via the instructor, through the student's Academic Advisor, or from the institute's Learning Management System. Ideally, this would help students start strong, pay attention to deadlines, and remain focused on course activities.

Student's Inability to Receive Nonverbal Feedback and In-Class Interaction

Students stated they valued face-to-face interactions with their professors that occurred in traditional courses that they were not able to receive in online courses prior to the pandemic, such as observing facial expressions and body language. D/HH students rely heavily on this to help comprehend meaning (Long et al., 2007). Zoom and other tools have helped address this issue, which will be discussed in Part 2 of our findings. Some participants felt they missed receiving this nonverbal feedback from an online instructor and classmates with text-based classroom chats interactions:

> I rely on body language to see if they (instructors) like or not like what I'm saying sometimes and read them. Sometimes I can tell if I made the professor happy or if I impressed that or not, or if they disagree with me or not. Still, sometimes they can disagree but they like the whole discussion so I do agree with (other student) about having that physical, that personal face-to-face relationship to read them that way.

THEME 3: ACCESS INEQUITIES

D/HH students depend on captioned media to fully access and equally participate in the online environment. During Part 1 of this study, closed captioning was becoming more prevalent with the advancement of technology and automatic speech recognition software. Automatic subtitles in Zoom, which can be recorded, were a helpful solution to some of these challenges. During Part 1 of this study, it often required time, money, and extra work for an instructor to produce an accurate closed-captioned video. Fortunately, the Americans with Disabilities Act (ADA) Section 508 and Web Content Accessibility Guidelines (WCAG 2.0) require all instructional materials to be accessible. Universities that do not provide this access face potential lawsuits. Presently, RIT requires all instructional videos to be accurately captioned whether they are instructor-produced or obtained from other sources.

The lack of captioned multimedia materials was an issue with D/HH online students. Proper and timely captions are key for DHH online students to have equal and effective access to online multimedia materials:

> I do remember when I took a design class there was an example of Adobe CS4 and the teacher wanted us to watch a videotape which was fine. I watched it show how the process worked and that was fine, and there were no captions. I was very limited. I had to work with what was there. I had to find another way to show me the steps by step which wasn't exactly similar. So I needed to understand what was happening better, more visually and not just caption. I watched the video for many hours really trying to understand it better; it was like 10 hours I had to put into looking at it before I could actually make it.

D/HH students faced other inequities as well. As noted in this comment, one D/HH participant had to unfairly purchase a CD in order to gain access to the captions:

> The only negative thing online was I had to purchase a CD (or I had to for that class anyway). It was captioned which is fine but I had to go to Barnes and Nobles to purchase the CD which was captioned, whereas the hearing students didn't have to purchase a CD, they were able to access it for free online which didn't make sense to me.

These are important considerations when selecting or developing video instructional materials for any course even today. All materials should be accessible via captions, screen readers, and braille readers. A student with a disability should not have to endure additional costs to receive the same benefits and access as nondisabled students.

Reading and Writing Skill Issues

Since English may not be the primary language for some D/HH students, the ability to comprehend written text and express oneself well in written English can be a challenge in an online course. This is particularly true when instruction is provided only through text and when discussions are expressed in text within a course management system. Participants reported occasionally struggling in the online course due to their reading and writing skills not being adequate for college-level rigor:

> I had a very low reading ability so I've been working at it long enough to improve my writing and reading skills even more. So now that I can write there is still a lot of my

thought process that I don't express because it's my second language and so you have to think things out differently to make sure they make sense in the second language. Sometimes I get frustrated and just want to give up.

This issue also became apparent when the online student needed to interact with others for a group project or with the teacher during their online office hours. If the instructor or members of the group do not sign, text was often used to communicate via a chat feature. D/HH students would prefer that their teachers know some sign language to be able to communicate with them. Instructors not knowing sign language and not having immediate access to interpreters significantly reduced the student's ability to have spontaneous and uninhibited one-on-one interactions with the instructor. Alternatively, deaf students could use Video Relay Service to communicate with their instructors and peers over phone lines, but similar to the in-person class experience, it removes the face-to-face interaction and forces the student to rely on the interpreter for communication.

Support Service Issues

D/HH students are visual learners who depend on ASL and/or lipreading to receive information. Many D/HH struggle with the reading and writing requirements associated with traditional online courses. In some college settings, access to academic support services, such as tutoring, are limited for them in general and often nonexistent for online courses:

> This may be a little bit off the point but I agree with the other comments and I would rather that there be a tutor provided so deaf people can better understand visually and that would be helpful.

Tutoring is necessary since many D/HH students struggle with reading and writing. Ensuring online students have access to tutoring is critical but few colleges have tutors who can provide tutoring in ASL. The idea of incorporating a video log (vlog) and video tutorials was also suggested:

> What if you had online tutorials maybe webcam tutorials where you could have something visually signed and then you may be able to have tutoring that way.

Fortunately, COVID has shifted how many teachers/tutors deliver in-person instruction remotely. The recent surge in using Zoom (or other videoconferencing platforms) will be explored in Part 2 of this ongoing study.

THEME 4. SUGGESTIONS FOR IMPROVING ONLINE COURSES FOR D/HH

In addition to wanting more online course opportunities, D/HH online students requested instructors have more availability to address problems with course materials. They also wanted online classes to include instructional videos in ASL via a sign language interpreter or instructor who knows ASL. Furthermore, ensuring videos are captioned and that video transcripts are available ensures that D/HH students have the same access as their hearing classmates. Studies show these two resources assist other students in the class as well, not just D/HH (Linder, 2016).

While difficult for most colleges to provide, D/HH students also suggested designating an online section specifically for them. Since the language of the Deaf community forms the foundation for a shared culture and identity, it is natural for them to desire instruction where everyone can communicate in ASL and the instructor is familiar with how D/HH students learn:

> I was wondering the same thing because I can kind of see and notice who is deaf when I take an online class just because of the difficulty of understanding or when their typing so I'm wondering like (Blank) suggested, maybe a video port where you have access services transcribe things and then put them in sign language on the discussion board so that deaf people can see the transcription in English and be able to respond as well for someone who uses ASL. I think that would make things more equal. I think it's not fair to ask someone to use their second language and they may not get a good grade in the class because of that. Maybe that's impossible.

RIT currently offers online courses specifically for D/HH students in Associate Degree programs. All video materials are signed, voiced, and captioned. Students have the option of taking the course in-person or online. Instructors are available to meet students in person and online. Online

tutoring is also provided. This will be further discussed in Part 2 of our study.

THEME 5. SUGGESTIONS FOR IMPROVING THE ONLINE EXPERIENCE FOR D/HH LEARNERS

For culturally Deaf people, access to communication is paramount and withholding information is considered rude (Mindess, 2006). Several participants indicated a desire to know who else was D/HH in the online class while a few liked the fact that their identity was not evident. In addition, posting students' pictures was recommended as a way to enhance student-to-student engagement:

> For me I think they need improvement in online courses to help with the faces. Some sort of visual—a way to see people's faces. I think that would help us identify who they are and facilitate discussions. You are more likely to AIM or instant message with someone if you see them. . . . you may ask someone about a work assignment and have a discussion with them even though you've never met them. We just want to see each other's faces to connect the name and the face.

In fact, keeping others informed is expected of members of the Deaf community (Smith et al., 1988). D/HH interviewees were happy to recommend effective skills and strategies to other D/HH students who might be interested in taking online courses:

> I would recommend that if they are ready to be a self-starter, have self-study and time management skills and if they have committed themselves seriously then fine, go ahead. . . . also if you do it with a good friend it's helpful because you can support each other through the course, you can offer each other the support and maybe that way you won't get lost or lose your motivation so if you have someone there to take the course with you to be involved in some kind of teamwork, that's helpful also . . .

In consideration of supporting each other, interviewees suggested providing students with an orientation to online learning:

> . . . so maybe you could offer a class—like a 1 or 2 credit class on strategies in taking online courses. Maybe you could meet

once a week before you take the class and discuss methods like making sure you check every day, how to manage your time to incorporate the class in your schedule.

These findings suggest ways to meet the unique learning needs of D/HH students in online classes by addressing the factors that enhance the online experiences for them and those that negatively impact their experiences. Instructors who choose to integrate these strategies may succeed in maintaining student motivation and increasing student success in their online courses. As a safeguard, collecting student feedback at the middle and end of each semester can help to ensure students stay engaged and achieve the course learning outcomes. A sense of greater satisfaction in the online learning environment may also be achieved.

CONCLUSION

This study sought to answer the following research questions: What factors enhanced the online experience for D/HH college students? and What factors negatively impacted it? Part 1 of this publication described prepandemic strategies used to design and deliver better online instruction for D/HH students in mainstream online classes. Strategies to enhance online instruction for D/HH students are more than just adding text-based captioning to a video or providing interpreting. It requires an understanding of how D/HH students learn and the importance of providing options for them to express their learning. Following Universal design for Learning (UDL) principles, instructors can design effective online courses and apply strategies to enhance the online learning experiences for everyone.

As a result of this first study, D/HH students perceived asynchronous online instruction as most effective when the instructor was actively involved with discussions and helped guide the online sharing of information. Instructors of online courses should also announce, not just post, deadlines for assignments, clarify course expectations, and encourage all students to post a picture and informal background information on the student roster. These instructional behaviors would benefit all students in online courses.

D/HH students agree that online students should have good time management skills and be self-disciplined to keep up with the class postings

and comments. They also recommend enrolling in a course where the professor is experienced teaching online and is both attentive and interactive in their classes. This advice is timeless regardless of when the online course is taken, as will be discussed in part 2 of our study.

As dictated by the Americans with Disabilities Act (ADA.gov, 1990), all instructional media should be captioned and should be made available at no additional cost. The captions should be done professionally to ensure that the captions accurately reflect the information. All online instructional materials should minimally meet WCAG 2.0 standards.

Students who have time management problems should be warned by advisors that online courses may present challenges, particularly in terms of focusing during online sessions and managing deadlines for assignments. Advisors can reinforce these expectations and encourage students to complete the online course in order to gain benefits for future online classes. This advice is timeless and will also be addressed in part 2 of our study.

When online prepandemic courses incorporated the suggestions described above for their D/HH students, the student satisfaction rate was quite high. During the 2016-17 academic year, six faculty at the NTID delivered their courses online with the D/HH learner in mind. These online students were surveyed after their grades were posted and 100% reported that if given the choice to take the same course online or in person, they would take online courses again and 90% stated they would recommend the online course to other D/HH students. Research on the effectiveness of these courses is ongoing and more results will be shared in part 2 of our study, which addresses designing modern-day online learning courses using current technology, such as Zoom, that meet UDL principles and determining which features promote better learning outcomes and student satisfaction for D/HH learners.

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APPENDIX A—ONLINE COURSE SURVEY

1. How many online courses have you taken at RIT?
- ❑ This is my first time taking an online course.
- ❑ I took one online course previously.
- ❑ I have taken 2 online courses previously.
- ❑ I have taken 3 or more online courses previously.

2. Which of the following statements are true regarding your choice to take online courses? You can select more than one.
- ❑ It is easier for me to communicate with other students when the course is online.
- ❑ I am taking the course online because it fits my schedule better.
- ❑ My advisor suggested I take this course online.
- ❑ I am taking the course online because I want this particular instructor.
- ❑ It is easier for me to communicate with the instructor when the course is online.
- ❑ I have friends in the online courses I am taking now.
- ❑ A friend suggested I take this online course because they took it.
- ❑ None of my friends have taken online courses, I am the first.
- ❑ Friend(s) discouraged me from taking online courses but I wanted to try for myself.
- ❑ I need this course for my degree and the online section was the only way I could take it.

3. Which of the following statements are true about your online course? You can select more than one.
- ❑ I don't know if there are other deaf or hard-of-hearing students in this class.
- ❑ There are other deaf or hard-of-hearing students in this class and I know who they are.
- ❑ I believe there are other deaf or hard-of-hearing students in this course but I don't know who they are.

4. For the course(s) you are taking online, which of these statements seem most true for your experience. You can select more than one.
- ❑ Online courses require more reading and writing than campus based face-to-face courses.
- ❑ The online discussion is better for getting to know your instructor.
- ❑ I miss the interpreter and note takers we have in campus courses.
- ❑ Support services are not as helpful with online courses.
- ❑ The online discussion is better for getting to know the other students.
- ❑ It is easier to work on group projects online.

In the following questions please take a moment to share your written comments. Your comments are very helpful in understanding how online learning affects you and provide much more detail than the click answers above. Thanks for your extra effort in sharing your views here.

5. Briefly summarize why you are taking an online course this quarter (term).

6. Would you advise other deaf and hard-of-hearing students to take an online course? Please explain why or why not.

7. What do you think RIT should do to improve online learning for deaf and hard-of-hearing students?

8. Would you be willing to meet in a small group with other deaf and hard-of-hearing students and researchers to discuss issues and ideas further? If so, please leave your name and email here so we can contact you later this quarter. This will help us understand how to improve your online class experience. Thanks!

APPENDIX B—FOCUS GROUP INTERVIEW QUESTIONS

1. Why did you take an online course?

2. Were there any negative things about learning online?

3. Were there any positive things about learning online?

4. What advice would you give a friend about online learning and skills for success?

5. What are the pros/cons of others knowing that you are D/HH?

6. What can we do to improve online courses?