THE RELATIONSHIP OF LEVELS OF HEARING AND COURSE FORMAT WITH COURSE SATISFACTION: A PREDICTIVE CORRELATIONAL STUDY

by

Diana Blakeney-Billings

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

The purpose of this quantitative study using a predictive, correlational design was to investigate the relationship between two unrelated predictor variables (levels of hearing and course format) and one criterion variable (course satisfaction scores). The study included 239 undergraduate students enrolled in HED 101 at an HBCU institution in Alabama. Hearing loss is an invisible disorder that impacts social, emotional, and educational aspects. This study was critical to determine whether course modality and hearing loss can influence students' course satisfaction. Data collection involved administering the collaborative learning, social presence, and satisfaction (CLSS) questionnaire and an audiological hearing screening that involved collecting pure tone averages of each subject. The data were analyzed using multiple linear regression, which revealed a significant predictive relationship between a linear combination of the predictor variables, which were levels of hearing loss, course format, and the criterion variable of course satisfaction. However, none of the individual predictors were found to be significant. The results emphasized the importance of further research to explore the impact of hearing loss levels among college students. Educational institutions have a vested interest in understanding students' hearing levels to ensure equitable access to educational resources through appropriate accommodations. The findings of this study can significantly benefit educators by informing course design and necessary accommodations for students, including those with mild or slight hearing loss. Consequently, further studies are warranted to investigate hearing loss levels among college students, providing valuable insights to assist educators in course development and the necessary modifications to cater to students with varying degrees of hearing loss.

Keywords: levels of hearing loss, course satisfaction, course format, traditional, hybrid, asynchronous, hard-of-hearing

Dedication

I dedicate this dissertation to the memory of my parents, Reid "Buddy" and Flora Ayles Sledge, and my maternal grandparents, Robert and Bertha "Buh" Ayles. Their unwavering belief in my abilities and the sacrifices they made have been instrumental in my success in college and life.

I also dedicate this dissertation to my loving husband, Lee, who has been my rock throughout this journey. His prayers, support, and spiritual guidance have sustained me during times of struggle.

To my incredible children, Amy and Bruce Bogertey and Andy and Amanda Blakeney, your unconditional love and encouragement have given me the strength to navigate the challenges of balancing long-term COVID symptoms, working full-time, and pursuing a doctoral degree. Your presence in my life has been a constant source of motivation.

I would like to express a heartfelt dedication to my 4-year-old grandson, Jaxon Reid. Your boundless curiosity, inquisitive nature, and the affectionate way you randomly express "I love you, Grammy" have brought immense happiness into my life. As you continue to grow, my greatest wish is for you to be inspired to pursue your own dreams, and who knows, maybe one day become a doctor, just like me. I am eternally grateful to God for blessing me with the incredible privilege of being your grandmother.

I am eternally grateful to God for granting me the necessary skills, determination, and resilience to overcome the challenges I faced throughout this journey. His messages and scriptures have served as reminders of my capabilities, and His unwavering presence has given me the strength to persevere. Thank you, God, for never leaving my side and for instilling in me the belief that I can accomplish anything with Your strength.

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I wish to acknowledge the late Dr. Thomas Crowe, my former undergraduate and graduate Program Coordinator at Ole Miss. Dr. Crowe was a remarkable individual who inspired all of us, including myself. He recognized my potential and allowed me the opportunity to prove myself. Even after all these years, his impact on my life remains profound. It is with great regret that he is not here to witness the fulfillment of my journey, but his empowerment and belief in me have been a constant source of motivation.

To these individuals, Dr. Barthlow, Dr. Gorman, and Dr. Crowe, I owe a debt of gratitude for shaping me into the person I am today. Their guidance, mentorship, and unwavering support have played a pivotal role in my academic and personal development.

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List of Abbreviations

Americans with Disability Act (ADA)

Americans with Disability Act Amendment Act (ADAAA)

American National Standards Institute (ANSI)

American Speech-Language Hearing Association (ASHA)

Certificate of Clinical Competence in Audiology (CCC-A)

Computer-mediated communication (CMC)

Collaborative Learning, Social Presence and Satisfaction Questionnaire (CLSS)

Decibel of Hearing level (dB HL)

Educator's Digital Competence (EDC)

Face-to-face modality (F2F)

Free, Appropriate Public Education (FAPE)

Historically Black Colleges and Universities (HBCU)

Higher Education Institutions (HEIs)

Hard-of-hearing (HOH)

Information and Communications technology (ICT)

Individuals with Disabilities Act (IDEA)

Institutional Review Board (IRB)

Kaiser-Meyer-Olkin (KMO)

More knowledgeable other concept (MKO)

Online group learning (OGL)

Online learning environment (OLE)

504 Rehabilitation Act of 1973 (Section 504)

Variance Inflation Factor (VIF)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative predictive-correlational study was to investigate the relationship between two unrelated predictor variables (levels of hearing and course format) and one criterion variable (course satisfaction scores). Chapter One provides a background for the topics of course format, course satisfaction, and levels of hearing loss. Included in the background is an overview of the theoretical framework for this study. The problem statement includes a discussion of the scope of recent literature on this topic. The purpose of this study is followed by the significance of the current study. Finally, the research question is introduced, and definitions pertinent to this study are provided.

Background

The impact of the COVID-19 pandemic on numerous institutions of learning, including higher education, created a migration to more online or hybrid modalities than the traditional face-to-face (F2F) in-person courses (Ali, 2020; Fatonia et al., 2020; Kingsbury, 2021; Singh et al., 2021,2022). In addition to the change in modalities, other challenges included heightened emotions, immersion in online technology, device difficulties, and critical coursework disruptions (Elshami et al., 2021; Krishnan et al., 2020; Schafer et al., 2021). Individuals with any level of hearing loss can experience learning barriers alongside their peers with normal hearing. Research should be continuous to understand students' obstacles in the course modality. The transfer to online learning brought about many studies addressing students' perceptions of online courses compared to face-to-face classes (Bali & Liu, 2018; Elshami et al., 2021; Jafar & Sitther, 2021; Singh et al., 2022; Suwantarathip, 2019). However, only a few international studies addressed HOH students and higher education experiences. In the United States, a few

studies have addressed the relationship between student outcomes in face-to-face and online course format in an HBCU (Singh et al., 2021).

Historical Overview

Singh (2019) concluded that a college education is beneficial and essential in today's technologically advanced and globalized system. The percentage of the workforce with a college degree tripled from the 1960s when only 20% had a college degree. Education has become mandatory for obtaining fulfilling jobs in professional arenas. Research supported the notion that a college education increased earnings, job opportunities, and self-efficacy (Singh, 2019). College graduates make positive contributions to society. Additionally, individuals with various disabilities, including those with hearing loss, had a 31% attendance rate in 4-year higher education institutions, which is half of their peer population (Cuevas et al., 2019).

The Americans with Disabilities Act (ADA) described a disability as a “physical or mental impairment that substantially limits one or more of a person’s major life activities” (Singh, 2019, p. 244). The ADA was enacted in 1990 by the federal government. Federal mandates included the Americans with Disabilities Act Amendment Act (ADAAA) in 2008 and the 504 Rehabilitation Act of 1973. In Section 504, the law prohibited discrimination against individuals with disabilities, including those with hearing loss, in any federally funded program, and set the foundation for the enactment of the ADA (Bell & Swart, 2018; Richardson et al., 2004; Singh, 2019; Welling & Ukstins, 2019). Unlike a high school student who is protected under the Individuals with Disabilities Act (IDEA) and the Free Appropriate Public Education (FAPE), the college student with a disability must self-identify; however, less than 10% will (Bell & Swart, 2018; Richardson et al., 2004; Singh, 2019). The fundamental purpose of the

ADA was to integrate people with disabilities into the mainstream environment of public life (Gargiulo & Metcalf, 2017; Singh, 2019; Welling & Ukstins, 2019).

Newman et al. (2009) reported that HOH college students accounted for 2% of disabilities on college campuses, while the National Postsecondary Student Aid Survey (NPSAS) reported that of two thousand students reporting disabilities, 37% had hearing impairments (Singh, 2019). Often these students did not know where to report their disabilities; however, instructors should have provided information on the Office of Disability Services in the syllabi and included it in the learning management system (LMS) of web-based courses (Singh, 2019). Research has shown that students with disabilities had to overcome barriers to gain independence and graduate college. Unfortunately, the matriculation rates were much lower than those of their cohorts without disabilities (Olusanya et al., 2019). Newman et al. (2009) reported only a 29% graduation rate.

Society-at-Large

An unprecedented academic change was occurring because institutions utilize online course modalities. To try and "alleviate negative consequences and challenges in education, government and health authorities in different countries have recommended to fulfill requirements of academia by providing learning opportunities for students" (Singh et al., 2021, p. 153). In the United States, students with disabilities are covered under federally mandated laws that endure educational equality and opportunity, such as Section 504 of the 1973 Rehabilitation Act and ADA regarding discrimination (Bell & Swart, 2018; Richardson et al., 2004; Welling & Ukstins, 2019).

However, students with undisclosed hearing loss did not self-report, which could have contributed to poor grades, course ratings, and attrition (Frumos & Rosu, 2019; Richardson et al.,

2004). Retention rates decreased due to unsatisfactory learning experiences. Students with no technical or trade skills found menial labor and became dependent on the government for assistance (Singh, 2019). In 2015, individuals with disabilities composed twelve percent of the population (Center for Disease Control and Prevention, 2015).

Theoretical Background

The underlying theories used for this study are Tinto's (1993) social integration theory (Croxton, 2014; Elshami et al., 2021; Fincham et al., 2021; Graham & Massyn, 2019; Miyazoe & Anderson, 2010; Tian et al., 2011) and social constructivism (Vygotsky, 1978). Knowledge can be constructed in the social context while students interact, participate in activities, and obtain feedback (Elshami et al., 2021). This interaction played a role in student satisfaction and increased as the interactivities within the learning environment increased (Miyazoe & Anderson, 2010). Satisfaction in online learning was multidimensional and complex and was considered a positive element in academic performance and student engagement (Croxton, 2014; Elshami et al., 2021; Meyer, 2014). The literature presented a mix of outcomes regarding student satisfaction with online and face-to-face courses (Fishman et al., 2013; Gómez-Rey et al., 2016; Kurucay & Inan, 2017; Rienties & Toetenel, 2016).

Tinto's (1993) social integration theory investigated the role of student integration in online student persistence or attrition. The importance of developing a strong sense of community should be parallel with the social processes in activities. This type of teaching cultivated a sense of community. Researchers revealed that college success was involved (Astin, 1984; Pascarella & Terenzini, 1980; Tinto, 1997). The greater the integration or involvement in college life, the greater the persistence and learning. This integration supported the students' acquisition of the skills necessary for development and knowledge. However, online instructors

who accepted this ideology could process and reconceptualize how to include this valuable sense of community into the online platform, especially when moving entirely online. Learning became disarticulated when geography separated learners accustomed to traditional face-to-face learning (Croxton, 2014; Elshami et al., 2021). The theoretical framework for collaborative learning, social presence, and satisfaction (CLSS) instrument had roots in social constructivism (Vygotsky, 1978). So and Brush (2008) believed that distance learning pedagogy entailed this theory. The idea of social constructivism was based on the belief that a person acquired knowledge from meaningful social interactions with others. These interactions with others are essential to satisfaction (Elshami et al., 2021; Miyazoe & Anderson, 2010). Vygotsky (1978) proposed that the development of cognition is associated with the zone of proximal development. The theory transformed distance learning from transmitting learning to acquire higher cognitive learning abilities with collaboration (Bali & Liu, 2018; So & Brush, 2008; Spears, 2012). Vygotsky (1978) postulated that learning was enhanced with interactions instead of isolation in the asynchronous online platform (Bryceson, 2007; Picciano, 2021). Interaction was a vital educational component that promoted persistence, motivation, and effective learning (Baker & Moyer, 2018; Chung et al., 2020; Graham & Massyn, 2019).

The theory's development focused on classrooms with knowledge acquisition and collaboration (e.g., traditional face-to-face courses) rather than independent learning and reiterating verbatim what the instructor stated (Elshami et al., 2021). Therefore, the classroom activities are student-centered (or learner-centered) and included collaboration (Bruce & Borders, 2015; Núñez-Canal et al., 2022; Piaget & Cook, 1952; Vygotsky, 1978). The instructor was not in charge of learning but was the facilitator of activities (Graham, 2019). From a social

constructivist perspective, the classroom was a community where learners felt a sense of belonging as knowledge is constructed collectively (Raza et al., 2020; Voskoglou, 2022).

Problem Statement

Since the 2020 pandemic changed the educational institution's fabric, educators have dramatically changed their teaching methods to include more online and blended classrooms due to social distancing requirements. Additionally, there was a paucity of literature on the challenges students and faculty encounter (Saichaie, 2020; Singh et al., 2021). Yang et al. (2021) reported the effects of psychological issues on students' levels of hearing, particularly in the HOH student population. Yang et al. concluded that hearing loss caused learning, language, and social impairments. Cognitive issues and problems are associated with a lack of visual cues from face coverings and understanding abilities (Chodosh et al., 2020; Hsu, 2017; Kaya et al., 2021). Another challenge that arose was fatigue (Holman et al., 2019).

The topic that the literature had failed to adequately address was the intersection of hearing loss, course format, and learning satisfaction among college students with hearing loss. Previous studies identified four themes in the HOH population during COVID-19, namely struggling with online technology, coursework disruptions, heightened emotions, and hearing difficulties when using hearing devices (Bell & Swart, 2018; Garg, et al., 2021; Krishnan, et al., 2020; Richardson, et al., 2004). The literature indicated that these student difficulties could potentially intersect with course format and learning satisfaction. Furthermore, a number of studies (Krishnan et al., 2020; National Science Teaching Association [NSTA], n.d.; Welling & Ukstins, 2019) have underscored the difficulties encountered by individuals with hearing loss (HOH) as a result of their hearing loss being invisible. Another problem identified was that students often lacked awareness of their hearing as a barrier and were hesitant to self-identify

due to fear of embarrassment or shame (Bell & Swart, 2018; Garg, et al., 2021; Richardson, et al., 2004). Given the limited research on the topic and the need for more evidence regarding the optimal course modality for satisfaction among college students with hearing loss, the present study aimed to contribute to the existing body of knowledge in this area.

Purpose Statement

The purpose of this quantitative, predictive correlational design study was to investigate how well course satisfaction scores can be predicted by the level of hearing loss and course format. The predictor variables were the four levels of hearing loss and course format (e.g., traditional, online, and hybrid). The level of hearing loss predictor variable was defined as follows:

a. Minimal/slight hearing loss - audiometric thresholds between 16 to 25 dB HL

b. Mild hearing loss - audiometric thresholds between 26 to 40 dB HL

c. Moderate hearing loss - audiometric thresholds between 41 to 55 dB HL

d. Moderate-severe hearing loss - audiometric thresholds between 56 to 70 dB HL

In the sample, there were no subjects with hearing losses greater than the moderate-severe level (Welling & Ukstins, 2019). The variable levels of hearing loss were addressed by providing each participant with a free hearing test. The screenings were provided by trained communicative sciences and disorders graduate students under the supervision of a licensed and certified audiologist.

The predictor variable of course format included the traditional face-to-face, online, and hybrid (online and traditional face-to-face) modalities offered at both universities. Traditional face-to-face learning was considered a “learning environment in a typical classroom [that] can be characterized as active interactions between learner and instructor or between learner and other

learners" (So & Brush, 2008, p. 318). An online learning modality was a learning platform that offered completely online courses (i.e., asynchronous), online with students (i.e., synchronous), hybrid or blended (i.e., part of the course is online and other times in a face-to-face environment) to facilitate learning (Fouad et al., 2022; Suwantarathip, 2019). According to Suwantarathip (2019), the hybrid modality referred to the combination of online learning and the traditional classroom environment, allowing for the incorporation of the strengths and benefits of both formats. In this study, the CLSS questionnaire was utilized to collect course satisfaction scores as the criterion variable from undergraduate students enrolled in HED 101 at a public HBCU institution. Course satisfaction was determined based on student satisfaction (Suwantarathip, 2019), as well as attitudes and achievements related to the learning outcomes and experiences in various course modalities (Tratnik et al., 2017). The sample included participants from traditional, online, and hybrid courses.

Significance of the Study

Limited quantitative research has been conducted on course modalities, student satisfaction, and hearing loss, specifically in the context of Historically Black Colleges and Universities (HBCUs). Previous studies have primarily focused on student satisfaction in traditional or face-to-face delivery modes (Bali & Liu, 2018; Fouad et al., 2022; Hsu, 2017; Jafar & Sitther, 2021; Singh et al., 2021; Wright & Holmberg-Wright, 2018); however, these studies have produced inconclusive findings. Bell and Swart (2018) identified a significant gap in the literature regarding higher education experiences for students with hearing loss, particularly in a global context. Existing literature predominantly centers around children rather than adults, resulting in insufficient information on practical solutions and support within academia.

Consequently, more research must be done on the retention and matriculation of students with hearing loss in HEIs (Bell & Swart, 2018; Ndlovu & Walton, 2016).

King-Berry and Charles (2021) highlighted the challenges faced by students from lower socioeconomic backgrounds in higher education institutions. Research showed that these students often experienced lower standardized test scores, poor study skills, and subpar grades. Unreliable internet access increased their frustrations with online course formats. As a result, HEIs struggled to develop effective solutions and strategies to ensure inclusive education for students with disabilities.

There was a growing call for further research on the characteristics of students enrolled in online courses (Fatonia et al., 2020; Ferri et al., 2020; Fouad et al., 2022). Bali and Liu (2018) have observed a gender bias in participation, with more females than males taking online courses. Studies have predominantly focused on the relationship between course formats and factors such as accessibility, effectiveness, and institutional cost-effectiveness (Gómez-Rey et al., 2016; Kurucay & Inan, 2017). Additionally, Fishman et al. (2013) found that face-to-face learning courses tend to generate higher satisfaction levels compared to online courses. Conversely, other studies indicate that online courses can significantly enhance satisfaction among learners, faculty, and institutions (Cheon et al., 2020; Latip et al., 2020). Faulconer et al. (2018), noted that “finding the root cause to help eliminate differences in student performance across learning modes should remain a high priority for education researchers and the education community as a whole” (p. 404).

Due to the gaps in the existing literature, this study aimed to contribute to the understanding of students enrolled in HBCUs by investigating the predictive relationship between levels of hearing loss, course format, and course satisfaction. Specifically, the study

examined the impact of online learning, hybrid learning, and traditional face-to-face learning on the criterion variable of course satisfaction, considering the predictor variables of hearing loss levels and course format. The findings of this research can enhance the understanding and implementation of best practices in course design for effective learning and student success at individual departments, colleges, and universities.

Research Question

RQ: How accurately can course satisfaction scores be predicted from the linear combination of levels of hearing loss and course format for students taking a HED 101 course at an HBCU?

Definitions

1. *Attrition* - "lack of persistence in higher education" (Bell & Swart, 2018, p. 141).
2. *Audiogram* – a graphic depiction of an individual's hearing thresholds of sensitivity, denoted at the corresponding intensity level (dB level) on the graph at each frequency. Frequency (Hertz) is the x-axis, and intensity is the y-axis (Welling & Ukstins, 2019).
3. *Blended learning* – "means any combination of learning delivery methods, including most often face-to-face instruction with asynchronous and/or synchronous computer technologies. Hybrid learning is another term which has been used synonymously with blended learning" (So & Brush, 2008, p. 321)
4. *Course satisfaction* – a term derived from the student satisfaction, attitudes, and successes in terms of the learning outcomes and experiences within the different course modalities (Suwantarathip, 2019).
5. *Decibel (dB)* – A measurement of intensity within the range of human hearing (Welling & Ukstins, 2019).

6. *Disability* – is a type of mental or physical impairment that is often not obvious which limits at least one major life activity (Singh, 2019).
7. *Hard-of-hearing* – is the preferred terminology of an individual with a hearing loss that can benefit from hearing devices and uses both aural/oral communication skills (Welling & Ukstins, 2019).
8. *Hearing handicap* – an individual's difficulty due to impairment or a disability that creates functional barriers, and there are no accommodations or auxiliary services or devices (Welling & Ukstins, 2019).
9. *Hearing impairment/hearing status* – A hearing impairment, whether fluctuating or permanent, causes adverse educational performance effects (Welling & Ukstins, 2019).
10. *Hybrid learning* – a pedagogical approach that combines the benefits of online learning and the traditional classroom environment (Suwantarathip, 2019).
11. *Institutional integration* – "refers to an individual's ability to adapt to and blend into an educational environment, such as a high school or college" (Cheng & Sin, 2018, p. 819).
12. *Level of hearing loss* - the (a) minimal/slight hearing loss where the audiometric thresholds fall between 16 to 25 dB HL; (b) mild hearing loss where the audiometric thresholds fall between 26 to 40 dB HL; (c) moderate hearing loss where the audiometric thresholds fall between 41 to 55 dB HL; and (d) moderate-severe hearing loss where the audiometric thresholds fall between 56 to 70 dB HL (Manchaiah et al., 2022; Welling & Ukstins, 2019).
13. *Minimal/slight hearing loss* – A classification level of an auditory impairment that can significantly impact understanding speech in noise, educational difficulties, and

localizing a sound source. The audiometric thresholds are between 16 dB and 25 dB HL (Welling & Ukstins, 2019).

14. *Mild hearing loss* – A classification level of an auditory impairment that can significantly impact understanding speech in noise, educational difficulties, and localizing a sound source. The audiometric thresholds are between 26 and 40 dB HL (Welling & Ukstins, 2019).
15. *Moderate/moderate-severe loss* – A classification level of an auditory impairment causes between a 50% to 100% handicap in the individual to miss out on conversational speech, social, educational, vocational settings. The audiometric thresholds are between 41 and 70 dB HL (Welling & Ukstins, 2019).
16. *Online learning modality* – a learning platform that offers completely online courses (asynchronous), online with students (synchronous), or hybrid (where part of the course is online and other times in a face-to-face environment) to facilitate learning (Fouad et al., 2022; Suwantarathip, 2019).
17. *Satisfaction* - "an affective learning outcome indicating the degree of learner reaction to values and quality of learning, and motivation for learning" (So & Brush, 2008, p. 323).
18. *Severe and profound loss* – A classification level of an auditory impairment that causes a 100% handicap in the individual in terms of missing out of conversational speech, social, educational, and vocational settings. The audiometric thresholds are 71 dB HL and greater than 91 dB HL (Welling & Ukstins, 2019).
19. *Threshold* – The American National Standards Institute (ANSI) recommends that the threshold is the lowest intensity level where a patient can respond to a minimum of two

of three tones presented after utilizing the Clark and Jerger Modified Hughson-Westlake Procedure (Steiger & Miller, 2017).

20. *Traditional face-to-face course modality (F2F)* – a "learning environment in a typical classroom [that] can be characterized as active interactions between learner and instructor or between learner and other learners" (So & Brush, 2008, p. 318).

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this literature review was to present the levels of hearing loss, course format, and course satisfaction. The chapter opens with the theoretical framework. This study was grounded in Tinto's (1993) social integration theory which supported the elements of student integration and engagement in learning communities (Croxton, 2014). This study was also grounded in Lev Vygotsky's social constructivism (1978) theory which proposed the idea of learning as a component of social interaction. A review of the literature pertinent to students who were hard of hearing (HOH), course formats, and course satisfaction constituted key components of this chapter, which culminated with a summary (Voskoglou, 2022).

Theoretical Framework

The two theories that framed this study were Tinto's (1975, 1993, 1997, 1998) social integration theory and Lev Vygotsky's (1978) theory of social constructivism. The theory of social integration was foundational for this study regarding the predictor variable of students who were hard of hearing. To address the variables of course format and satisfaction, the Lev Vygotsky theory (1978) of social constructivism supported the foundations of this area of the study.

Theory of Social Integration

Tinto's conceptual model has two dimensions, academic and social integration (Pascarella & Terenzini, 1980; Tinto, 1997). Academic integration focused on the student's ability to synthesize material, succeed academically, and interact with the professor. Social integration involved students' social involvement with other students and instructors (Pascarella & Terenzini, 1980). Both integrations contained informal and formal levels. Social integration's

formal level included social contacts with peers for learning, while informal integration focused on student activities, interactions, and contact (Cheng & Sin, 2018). Social and academic integration were vital for success in higher education and student persistence (Lakhal et al., 2020).

Tinto (1997) theorized that the more students spend time acquiring knowledge and developing higher cognitive skills, the more they learned. Attrition could occur when students do not put enough effort into learning new material and making progress in their studies (Astin, 1975). Attrition was defined as a "lack of persistence in higher education" (Bell & Swart, 2018, p. 141) and occurred when students dropped out of courses (Tinto, 1997). Typically, first-year students had the highest attrition rate at higher education institutions (Bell & Swart, 2018). Attrition rates could also be applied to HOH students. According to Bell and Swart (2018), a study by Allen (1986) found that almost 75% of hard-of-hearing students do not graduate from universities. This finding was supported by Nagle et al. (2016), that noted the dropout rate had only decreased by 70% within the thirty-year timeframe.

Tinto's student integration model (1975, 1993, 1997, 1998) was a longitudinal model based on the overall acceptance rates at higher education institutions and classroom communities. When students felt connected to the academic environment and experience integration, they persisted and graduated from college. The more the students integrated into the educational and social environments, the lower their chances of attrition. Students who did not experience an 'at home' feel in the institution or thought their goals would not be met tended to drop out. Students could become isolated from a lack of social interactions and would not persist or graduate (Bell & Swart, 2018; Singh, 2019).

HOH students could have had difficulties with academic and social integration. For instance, if a long-standing hearing loss was not diagnosed and treated before three years old when early intervention was critical for communication, then the student would have struggled with language delays which contributed to inadequate feelings of academic failure or an inability to integrate socially. If a student had a hearing loss that was diagnosed before the age of three and fitted with hearing aids or cochlear devices, the student had a more significant chance of successfully developing appropriate speech, language, and communication skills (Appelman et al., 2012; Welling & Ukstins, 2019). However, some HOH students possessed underlying developmental language and speech delays that could have contributed to malintegration both academically and socially (Bell & Swart, 2018; Hall, 2017).

Tinto's theory of student integration was grounded in Emile Durkheim's research on student persistence, attrition, and suicide (Rogers, 2018; Tinto, 1993). Durkheim concluded that integrating into significant societal systems (e.g., the state, church, or the family) could have reduced "the cause of suicide in Western societies" (Tierney, 1999, p. 82). Durkheim viewed suicide from a societal context (Easthope, 2017). Van Gennep suggested that various groups of individuals participate in traditions that created an opportunity to matriculate from adolescence to adulthood (Braxton, 2019). Tinto (1993) manipulated the two ideologies and created his college student departure model by extending Van Gennep's three stages of rites of passage to explain integration within the HEI community.

The three stages were transition, separation, and incorporation. Tinto (1993) revised his departure theory to include adult students, HOH students, and students of color. Tinto believed a relationship existed between the classroom and college communities for students. Within Tinto's work, essential elements were found that contributed to the interactive system of both social and

academic formal and informal dimensions focal point in the university setting. When the interactive system was flawed, student departures could increase. Tinto's theory has been used by scholars such as Alberto Cabrera, Ernest Pascarella, John Smart, and Patrick Terenzini (Braxton, 2019).

Some researchers viewed college as an initiation ritual when students successfully interact in both academic and social integration (Tierney, 1999). Tinto purported that student personality traits and family background were predictive factors of the likelihood of graduating from college. Tinto theorized that this integration would decrease attrition. Utilizing tenants from Tinto's model (1993), Tierney (1999) created a model focusing on the college community to reduce the departure of students of color and from lower socioeconomic environments.

Along with departure rates, Tinto (1975) suggested that persistence revolved around the integration of undergraduates into academic (e.g., GPA) and social structures (e.g., non-academic activities) within the higher education institution (Rockinson-Szapkiw et al., 2019). Persistent rates were higher when students have higher GPAs than those struggling with lower GPAs. Students experienced adjustment periods in academic and social environments, which contributed to their decisions to persist or leave college. In the academic setting, faculty and curriculum could contribute to students' decisions about what courses to take and the learning modality (e.g., traditional F2F, hybrid, or asynchronous) they should take (Sawsen et al., 2020).

Rockinson-Szapkiw et al. (2019) noted that program integration was related to persistence and was comprised of three elements—faculty integration, student integration, and curriculum integration. Faculty integration included all levels of students, from undergraduates to doctorate students taking online and F2F courses (Sawsen et al., 2020; Stephen & Rockinson-Szapkiw, 2021). Student persistence could be an issue in higher education (Dwyer, 2017). Online

student persistence involved self-regulated, self-efficacy, and self-directed learning, which are associated with persistence (Rovai, 2003; Stephen & Rockinson-Szapkiw, 2021). Student integration pertained to the satisfaction with peer interactions and non-academic and academic components of the program that students experienced (Dwyer, 2017; Stephen & Rockinson-Szapkiw, 2021). Rockinson-Szapkiw et al (2019) noted that curriculum integration is cultivated by the relevance and quality of the curriculum satisfaction experienced in online learning (Rockinson-Szapkiw et al., 2019).

Student integration was essential for college students, including HOH and students from different races (Thompson-Ochoa, 2020). Tierney (1999) argued that Tinto's integration theory was inappropriate for minority students because they had to adapt to the dominant culture of the university (i.e., white dominance) for academic success. Tierney believed that minority students had to discard their beliefs, attitudes, community norms and cultural values to be successful in college (Rogers, 2018). This integration occurred at both the sub-culture and institution levels. Social integration could have occurred through informal peer associations, faculty and administrators, and extracurricular activities (Dwyer, 2017). Conversely other researchers have suggested that successful student retention can be accomplished regardless of race, socioeconomic status, or disability (Bell & Swart, 2018; Cuevas et al., 2019; Longwell-Grice & Longwell-Grice, 2008).

Regarding HOH students, Tinto (1993) advocated for progressively monitoring students with hearing loss, especially during the first ten weeks of their first-year semester, when the risk of attrition was most significant (Bell & Swart, 2018; Boutin, 2008). Previous research had shown that most students with hearing loss do not feel they belong or are part of the college environment as with normal hearing peers (Bell & Swart, 2018). Disparity had a significant

impact on academic success for students from diverse backgrounds, including first-generation college students and students from lower socioeconomic backgrounds (Longwell-Grice & Longwell-Grice, 2008), as well as students with disabilities, including those with hearing loss (Bell & Swart, 2018). Furthermore, disparities in academic success disproportionately affected first and second-year undergraduates, as well as doctoral students (Foster et al., 1999; Rockinson-Szapkiw et al., 2019; Rogers, 2018).

Three key elements were necessary to improve the graduation rates for HOH students: academic integration, social interactions, and college commitment. The severity of the hearing loss created unique challenges in college life's academic and social integration, such as isolation when HOH students could not interact and adequately hear the lecture (Stinson & Walter, 2021). Those who struggled to fit into their educational environment and had poor social integration skills were more likely to leave college early. Longwell-Grice and Longwell-Grice (2008) interviewed first-generation college students with a hearing level of 50 decibels or greater about their experiences with integrating into college life and found that they experienced significant challenges. Cawthon and Garberoglio (2021) observed that individuals with a higher severity of hearing loss were more prone to isolation due to limited interaction with both their classmates and those with a lower severity of hearing loss. Furthermore, individuals who faced challenges in integrating into their educational environment exhibited poorer social skills, resulting in early departure from college.

Grice and Longwell-Grice (2008) similarly discovered that students lacked contact with faculty beyond the classroom and perceived them as unreachable, leading to feelings of isolation. Rogers (2018) noted that the students could not form a relationship for fear that the faculty members would consider them not to belong in higher education. Tinto (1993) advocated for the

students to form relationships and interactions with faculty members and other students to ensure success and decrease incidences of attrition. Rogers (2018) noted that Tinto's model contained the necessary student integration framework.

Theory of Social Constructivism

Vygotsky's social constructivism was a theory that included information on how learning was both a social and active process. Knowledge occurred because of social interactions with others and environmental factors. Vygotsky (1978) noted that three steps must occur to process knowledge – construction, storage, and retrieval. Construction was the process of acquiring an understanding by constructing pieces together. The storage process involved applying the additional information to one's memory bank, while retrieval utilized the stored information from memory. Social interactions with others contributed to individuals' knowledge acquisition (Zaka et al., 2019). In mediated learning, these interactions could have been with instructors or individuals possessing higher cognitive skills who facilitated the learning environment to foster a sense of understanding of the phenomenon or event. Peer group interactions were also considered a crucial theoretical component in social constructivism (Erbil, 2020; Vygotsky, 1978; Zaka et al., 2019).

Social constructivism had been considered an appropriate theory for students with hearing difficulties, as it emphasized the use of social interactions within the college environment to enhance their learning abilities (Cooper & Fry, 2020). According to Vygotsky's (1978) theory, social interactions in collegiate settings influenced students' behaviors and contributed to the development of an expansive knowledge base. Social engagement was viewed as a foundational attribute of social constructivism, where purposeful and collaborative activities among students facilitated the construction of knowledge (Cooper & Fry, 2020; Elia et al., 2019).

A critical component of Vygotsky's social constructivism was the zone of proximal development (ZPD), which had a central theme: students felt successful within the walls of the ZPD. Vygotsky (1978) described the ZPD as a "new and exceptionally important concept" (p. 85) which provided an understanding of acquiring knowledge. There were two development levels connected to the ZPD: mental development, measured by a battery of tests, and problem-solving traits which evolved through the instructor's guidance or when the student collaborated with peers in a meaningful interaction. Vygotsky postulated that mental health development was fostered through social interactions, which played a pivotal role in promoting growth. According to his theory, cognitive development was influenced by cultural and societal factors, which contributed to the learning process. Additionally, the student-teacher relationship played a crucial role in facilitating learning. To attain success, students needed to possess the appropriate beliefs and attitudes that supported their acquisition of knowledge and educational growth (Kurt, 2020).

In terms of enhancing learning, the Zone of Proximal Development (ZPD) facilitated understanding without overwhelming the students (Kurt, 2020). The ZPD encompassed three ability zones: independent learning, learning with assistance from others, and inability to learn with or without assistance. These zones contained the necessary content and instructions for student learning. Another important aspect of Vygotsky's theory was the presence of a More Knowledgeable Other (MKO), someone who possessed greater knowledge in a particular subject matter (Kurt, 2020). Interactions with instructors or peers in an engaging learning environment proved beneficial for less knowledgeable students.

To facilitate development in cognition, there must be teacher-student interaction (Gredler, 2012). Vygotsky (1978) theorized that learning aligns with the student’s development level when

instructors offered direction and support to foster higher cognitive thinking skills (Spears, 2012; Van et al., 2020; Voskoglou, 2022).

Vygotsky (1978) observed that in the past, the educational system used tests to assess students' mental development and made assumptions about their capabilities. Students with disabilities were often believed to be limited in their abstract thinking abilities and required more direct and concrete learning opportunities. However, Vygotsky challenged this notion and emphasized that disabilities should not prevent students from reaching higher cognitive levels of thinking. He stressed the importance of social interactions for students with any degree of hearing impairment (Kurt, 2020).

Social constructivism was a relevant theory for this research because individuals learned from social interactions. This study addressed the potential effects of students' hearing loss on their opinions of course satisfaction, and the effect of course format on those opinions. Data collection within this population aimed to gain a deeper understanding of their satisfaction with course formats and social interactions, while incorporating the theories of Tinto (1997) and Vygotsky (1978). This approach aimed to provide more accurate results and establish a potential connection between these variables, supported by both empirical and theoretical foundations. The research study aimed to contribute to the existing knowledge on Vygotsky's (1978) social constructivism and Tinto's (1997) social integration theory as they related to students with hearing loss (HOH) and deaf students. Through an examination of these theoretical frameworks within the context of HOH and deaf students, the study sought to enhance understanding of the factors influencing student perceptions and experiences regarding course format and satisfaction.

Related Literature

Individuals with hearing impairments have faced insurmountable challenges in all aspects of life. The experiences of students with hearing impairment differed from normal-hearing individuals. Hearing loss did not discriminate based on gender, ethnicity, socioeconomic status, or age. Any type of hearing loss can lead to increased mental and physical issues, poor social well-being, and inclusive deficiencies in higher education institutions (Garg et al., 2021).

Hearing Loss Challenges

The popularity of online learning has grown exponentially over the years, which has opened educational opportunities for diverse populations, including students with hearing impairments (McKeown & McKeown, 2019). However, numerous problems have occurred in the educational system when attempting to educate all students, including those with disabilities (King-Berry & Charles, 2021; McKeown & McKeown, 2019). Students with hearing loss made up a portion of the 466 million individuals (6.6%) living with hearing loss. Globally, hearing loss was the fourth most common type of disability. This number was projected to increase to approximately 630 million by 2030 (Ariapooran & Khezeli, 2021; Emilija et al., 2022; Garg et al., 2021; World Health Organization [WHO], 2018).

According to McKeown & McKeown (2019), a total of 5.8 million students were enrolled in online learning, and 2.85% of all students took all their courses online. In another study by Seaman et al. (2018), it was noted that during the fall semester of 2016, 56.1% of students were exclusively enrolled in online courses. While acceptance of the modality increased, accessibility for hard of hearing and deaf students was not straightforward (Mantzikos & Lappa, 2020). Richardson et al. (2004) reported a dearth of information on the exact number of college students

with hearing loss in research conducted within the last 18 years. According to their findings, over 42,000 college students with hearing loss have chosen not to disclose this information to disability services. Garberoglio et al. (2019) reported data for the 2015-2016 academic year, that there were 19.5% of college students with a disability. According to this data, 1.3% of students were classified as deaf. However, it is important to note that the data encompassed students classified as hard of hearing (HOH), deaf-blind, and late deafened. This information did not give a precise estimate of the number of HOH college students because of how the students were combined under one term, along with the number of students that did not identify as having a hearing impairment.

HOH students enrolled in online learning encountered difficulties with using the learning management system (LMS), communicating with the instructor and cohorts within the course, and understanding the course content. When students with hearing issues do not self-report or register for assistance through the HEIs' disabilities service office, the students could experience failure. The level of hearing impairment could create social and academic integration challenges, which could lead to frustrations and negative perceptions of academia (McKeown & McKeown, 2019). Stinson and Walter (2018) noted that isolation could occur if an HOH student had difficulties hearing the lecture, interacting within the course with others, or problems using the technology. These experiences could lead to higher attrition within this population.

Additionally, due to language complexity, HOH students might have had trouble with the language used in communicating instructions. Another challenge for the HOH and deaf student population was English literacy which was vital for online learning success. McKeown and McKeown (2019) reported that even with accommodations provided by educational institutions, HOH students struggled with success in their courses. HEIs adhered to Section 508 of the

Rehabilitation Act of 1973 by creating internet website accessibility standards, which included accessible screen readers, synced captions, time-out warnings, and text tags for all images presented in the course.

Most research on hearing loss focused on either hard-of-hearing (HOH) or deaf students. Many students with hearing loss do not fall in those categories but have a "slight, mild, or moderate loss of hearing affecting one or both ears" (Richardson et al., 2004, p. 439). Any hearing impairment can impact students' college experience (Bell & Swart, 2018; Cheng & Sin, 2018; Lor et al., 2021; Richardson et al., 2004). Disabling hearing loss was defined as having a greater than or equal to 30 dB HL threshold in children and greater or equal to 40 dB HL in adults (Garg et al., 2021; World Health Organization, 2018). Conversely, minimal or slight hearing losses (e.g., 16 to 25 dB HL) can impact incidental learning and comprehension of speech in adults (Welling & Ukstins, 2023).

Hearing loss can be categorized on a continuum based on how much hearing loss was present. There are several degrees of hearing loss between these extremes (e.g., slight, mild, moderate, and moderate-severe). The hearing loss can be classified as a unilateral or bilateral loss and can be identified as conductive, mixed, or sensorineural (Ariapooran & Khezeli, 2021; Garg et al., 2021; Nelson et al., 2020). The most prominent permanent type was sensorineural hearing loss, which can be caused by congenital problems, auditory neuropathy, ototoxicity, noise exposure, and age-related hearing loss (Welling & Ukstins, 2019). The greater the degree of hearing loss, the greater the listening difficulty (Nelson et al., 2020).

Hulzen and Fabry (2020) noted that their research increased the awareness of the difficulties HOH students experienced during the pandemic over COVID protocols and social distancing requirements. The HOH students experienced challenges due to the rapid delivery

mode changes, including physical and mental health issues and reduced social interaction due to the restrictions. Students with hearing loss had difficulties learning in the same manner as their normal-hearing peers. Krishnan et al. (2020) noted that people with a hearing impairment have several challenges when learning in the same way as their normal-hearing peers. These challenges included struggling with online technology and devices, having heightened emotions while online, no access to assistive listening devices during online delivery, and experiencing critical coursework disruptions.

Limited research existed on how HOH students perform in HEIs. However, Bell and Swart (2018) recently presented findings on the admission of HOH students in South Africa's higher education system. The findings revealed that there are concerns over under-supported and underrepresented HOH students in HEIs that resulted in poor academic performance outcomes and increased attrition rates among the HOH students. As a result of the findings, there could have been insufficient academic support or limited inclusive curricula standards for HOH students. The research demonstrated that 75% of HOH students failed to graduate, and those who did faced challenges in finding employment in their chosen majors (Bell & Swart, 2018).

Malaysian researchers Krishnan et al. (2020) found that many students with hearing impairment were concerned with ineffective hearing aids and insufficient technology, while Indian researchers Srimasorn and Farzana (2021) noted that deaf students were discouraged from using Indian sign language, which negated their inclusion. Additionally, Krishnan et al. (2020), found that deaf students were not allowed to communicate directly with their cohorts or instructors, which harmed their academic performance.

Lane et al. (2021) noted that interactions with the instructor could accommodate trust that enhances both learning and scaffolding. An emotional presence in the course modality

(especially online and blended) could have created a cohesive social presence. Research showed that HOH students are dissatisfied with the online platform due to the inability to communicate between peers and instructors in traditional modalities (Krishnan et al., 2020). Kokhan et al. (2021) noted that the online platform did not allow for face-to-face physical interactions. The students noted that poor WIFI signals, electricity issues, and technology contributed to the dissatisfaction in their ability to absorb lecture material.

Barriers

HEI students have faced various challenges in the past several years, including social distancing, mandatory face coverings, social isolation, depression, cognitive decline, fatigue, and anxiety (Ali, 2020; Al Majali & Alghazo, 2021; Ariapooran & Khezeli, 2021; Cawthon & Garberoglio, 2021; Emilija et al., 2022; Hsu, 2017; Koetsier, 2020; Krishnan et al., 2020; Schafer et al., 2021; Theodosiou & Corbin, 2020). The new normal in a post-COVID-19 pandemic was social distancing and wearing a face mask in the classroom to help reduce the transmission of diseases. As a result of the barriers from face masks and social distancing, HOH, deaf, and students (and instructors) faced communication barriers (Naylor et al., 2020; Stapleton & Croom, 2016). Non-clear facemasks created a communication barrier because the speaker's voice was muffled, and there were no visual stimuli to understand speech communication (Schafer et al., 2021).

Non-clear face masks also impeded lip or speech reading, reduced the acoustic transmission of speech, and created an additional barrier to the students' understanding of classroom instructions, conversations, and responses (Bell & Swart, 2018; Beukes et al., 2021). The loss of visual cues and the decreased volume of the auditory signal from social distancing impacted the students' primary (oral) mode of communication and listening in the classroom

(Bell & Swart, 2018; Krishnan et al., 2020; Schafer et al., 2021; Trecca et al., 2020). Additionally, poor lighting in the classroom decreased the HOH students' ability to lip-read (Bell & Swart, 2018). As a result, researchers acknowledged the need to provide educators with viable information on obstacles HOH students face in the virtual classroom. Cawthon and Garberoglio (2021) suggested that there must be an ongoing effort to provide knowledge for educators to understand the obstacles that HOH students face in the virtual classroom.

HOH students faced various obstacles, including technological issues, noisy classrooms, and inadequate online lecture materials. Insufficient verbal cues, subtitles, and transcriptions in online videos hindered their learning (Bell & Swart, 2018). These barriers disrupted academic knowledge acquisition and the development of peer and social communities, which were crucial for academic, personal, and vocational success (Nelson et al., 2020).

Strengthening relationships for the HOH students consisted of the need to hear both spontaneous and direct conversations with instructors and peers. These changes could promote persistence in the students (Tinto, 1997). HOH students commonly face challenges in participating and engaging in discussions due to difficulties in perceiving important verbal cues resulting from their hearing deficits (Nelson et al., 2020). Students with hearing loss exhibited a lack of social interaction, poor abstract thinking skills, delayed absorption of learning outcomes and knowledge, an inability to synthesize scholarly sources, and a heavy reliance on others to understand the course material (Bell & Swart, 2018). Integration was impacted by the students' lower self-confidence and self-determination (Cheng & Sin, 2018).

Previous research suggested that students can successfully absorb academic content; however, knowledge acquisition can be compromised due to language, writing, and reading developmental delays. Students with hearing loss experienced a significant reduction in their

reading level compared to normal-hearing students. For instance, Qi and Mitchell (2011) noted that upon graduating from high school, the average reading level of deaf students was a fourth-grade level. However, 20% of these students had a reading level of a second-grader or lower (Bell & Swart, 2018; McKeown & McKeown, 2019). Cheng and Sin (2018) noted creating inclusive policy changes could facilitate creating a commitment of understanding and supporting the HOH students in HEIs. The development of strong communities with peers and social interactions was deemed appropriate for fostering academic, personal, and vocational success. (Nelson et al., 2020). One must understand the students' experiences with social interactions to fully grasp the barriers and make the necessary technological adjustments, including hearing assistance technology. Instructional accommodations and promoting self-advocacy in this student population were critical in education (Nelson et al., 2020).

Cheng and Sin (2018) found a significant relationship between self-determination and the integration of individuals with hearing loss. Integration referred to the ability to adapt and assimilate into an environment, such as higher education institutions (HEIs). However, the HOH population often faced challenges in integrating into the institutional fabric, which negatively impacted their academic performance. The researchers highlighted that hearing loss was often perceived as a cultural attribute, and deaf and HOH students are considered part of a "social-cultural minority" (p. 820). They further observed that levels of self-determination among students with hearing loss were associated with their integration. Increasing self-determination can enhance integration among students with hearing deficits, leading to greater competence, independence, and meaningful social and academic relationships.

Course Delivery Models

Online education changed the educational landscape, and was the prominent modality in HEIs. Many students preferred the freedom to learn in any environment and at any pace, and HEIs provided this flexibility (Haywood & Murty, 2018; Oyarzun et al., 2018). Online learning could be flexible and convenient, allowing students to learn outside the traditional classroom. However, students experienced isolation due to the lack of a physical presence that the F2F modality offered (Oyarzun et al., 2018). Although HEIs' enrollment decreased, the percentage of students enrolling in online courses increased compared to traditional face-to-face methods (Graham, 2019; Haywood & Murty, 2018). Paul and Jefferson (2019) found that students perceived F2F learning as inflexible, restrictive, and impractical. The comparison of the course delivery models of traditional face-to-face, hybrid, or blended learning and online courses will be discussed in the next section. This research study was based on the construct of course delivery models.

Traditional F2F Course Modality

Traditional F2F classrooms provided structure, and instructors could commit to a particular time block for instructions. In addition, feedback between the instructor and students was immediate, with direct contact and instant responses to questions (Graham, 2019). Traditional F2F course modality research had suggested that students prefer taking traditional courses because more information can be learned and retained than in online or hybrid modalities (Graham, 2019; Murillo-Zamorano et al., 2019). Students managed to obtain higher grades, which could be attributed to the study time needed for F2F courses. Traditional courses were instructor-centered, requiring less time on the students' part to self-teach the material compared to other formats, particularly online courses (Weldy, 2018). The instructor was the lead actor, and the students had a passive role in the course (Murillo-Zamorano et al., 2019). However,

traditional F2F lectures focused on the lecturer more than the student and hindered essential skills development required for a successful transition to the workforce (Lai et al., 2018; Murillo-Zamorano et al., 2019; Pelger & Nilsson, 2018). Research indicated limited opportunities for students to interact with other students or professors in traditional F2F modalities (Berry, 2018; So & Brush, 2008). Traditional F2F classrooms provided structure, and instructors committed to specific time blocks. Additionally, feedback between the instructor and students was immediate, with direct contact and prompt responses to questions (Graham, 2019). The traditional F2F modality was essential for students who lacked foundational knowledge and were not academically proficient (Murillo-Zamorano et al., 2019).

Hybrid or Blended Learning Course Modality

Hybrid or blended courses combined F2F learning with the use of online computer technologies through a LMS and was a more flexible delivery mode than F2F (Cheng et al., 2021; Dziuban et al., 2018; Elshami et al., 2021; Hsu, 2017; Singh et al., 2021; Singh et al., 2022; So & Brush, 2008; Sorden & Ramírez-Romero, 2011; Thai et al., 2020). Hybrid courses alleviated feelings of isolation by combining in-person and online components (Lane et al., 2021). They offered flexibility, increased social integration and interaction (Venkatesh et al., 2020), and fostered a sense of community (Haywood & Murty, 2018; Ismail et al., 2022; Jafar & Sitther, 2021; Kazanidis et al., 2019). Previous research indicated that students who experienced negative emotions during the learning process tended to lose interest in the subject matter (Hsu, 2017; So & Brush, 2008).

The hybrid or blended modality incorporated various active learning methodologies, including the flipped classroom and student-centered approach (Murillo-Zamorano et al., 2019; Schwarzenberg et al., 2018). Flipped classrooms demonstrated positive impacts on skills,

knowledge, and engagement (Lai et al., 2018; Murillo-Zamorano et al., 2019). They were found to be effective in promoting active learning and engagement among students (Murillo-Zamorano et al., 2019). Recent research highlighted a gap between the skills acquired by post-college students and the skills required in the job market (Guo, 2018; Murillo-Zamorano et al., 2019; Pang et al., 2019).

Previous research had suggested that blended learning was a learner-centered model (Elmer et al., 2016) and viable for student satisfaction (Ismail et al., 2022; Lane et al., 2021; So & Brush, 2008; Venkatesh et al., 2020). Hybrid or blending learning was dually structured with traditional face-to-face and technology that would not sacrifice the students' social interactions and would not add to the perceptions of psychological distances found within asynchronous online courses (Ismail et al., 2022). However, as modern pedagogical platforms created new and innovative techniques for online learning, many older faculty members favored traditional face-to-face learning (Cheng et al., 2021; Elshami et al., 2021; Hsu, 2017; Paul & Jefferson, 2019; Singh et al., 2021; So & Brush, 2008; Sorden & Ramírez-Romero, 2011). In the hybrid or blending course format, satisfaction could be influenced by factors such as the student's characteristics, environment, and cognitive elements. Venkatesh et al. (2020) suggested that the learning climate and performance expectations contributed to satisfaction. Additionally, gender could influence student satisfaction (Venkatesh et al., 2020).

Venkatesh et al. (2020) observed that cognitive factors related to performance expectations and the social or learning environment influenced student satisfaction in the blended modality. Previous research on blended learning supported the integration of this format in teaching environments, as it contributed to improved instruction within courses (Elmer et al., 2016). Researchers identified responsible and autonomous qualities as key indicators of success

among students in the blended environment (Núñez-Canal et al., 2021). The transition from traditional delivery modes to digital modalities significantly enhanced the digital technological skills of faculty in higher education. As a result, online delivery modes and teaching have been improved (Núñez-Canal et al., 2021). However, students with disabilities must overcome limited access to eLearning platforms and limited technological skills. These students often had to wait for instructor communication, and social distancing experienced in the classroom increased exclusion and segregation from mainstream classmates (Katz et al., 2021; King-Berry & Charles, 2021). Venkatesh et al. (2020) proposed that communication and student social interactions could be maintained through blended learning, utilizing both the traditional face-to-face (F2F) modality and online interactive tools (Ma & Lee, 2021).

Asynchronous Online Course Modality

Online learning was flexible and convenient, enabling students to learn outside the traditional classroom. However, students experienced isolation due to the lack of a physical presence the F2F modality offers (Berry, 2018; Oyarzun et al., 2018). Frustrations with asynchronous (CMC) occurred in online students. CMC benefits were appreciated by students; however, online learning, being a newer modality, could be an uncomfortable experience. Berry (2018) noted that more than 80% of the study population attended traditional F2F courses for degree completion. The constructivist theory was utilized within an online learning environment (OLE) to promote student satisfaction, adaptive behaviors, socialization, personal learning, and active cognition (Lewis, 2019). Previous research indicated that discourse and social presence could contribute to students' disconnectedness and isolation in the OLE (Lowenthal & Dennen, 2017). When a constructivist model was embedded in the OLE, the modality shifted to a student-led approach where students created knowledge based on their prior knowledge and experiences.

This approach facilitated critical thinking and higher-level cognitive skills, promoting problem-solving abilities. The construction of meaning occurred through interactions with peers and instructors (Lewis, 2019).

The constructivist model supported the instructor as a guide while the students learned at their own pace and independently, sharing experiences, ideas, and interacting with peers. Vygotsky (1978) believed that social interactions played a significant role in constructivism. According to Vygotsky, learning occurred through collaborative meaning construction, communication, and active engagement in the learning process. This type of learning involved interactions between stakeholders, such as students and faculty members, facilitating dialogue to enhance understanding of the material and promote knowledge transformation (Lewis, 2019).

There are three main categories of online learning, interactivity, technology, and faculty (Bolliger, 2004; Kurucay & Inan, 2017;), that focused on the instructor, institution, and the student (Bolliger & Wasilik, 2012). The research data concerning learning equity within course modalities focused on access, course effectiveness, and institutional cost-effectiveness (Bell & Swart, 2018; Gómez-Rey et al., 2016; Kurucay & Inan, 2017). Students needed interactions and communication from the faculty members, an online presence, and ongoing assessments to negate any feelings of confusion or frustration that can develop by interacting with an online platform. Regarding the instructor's social presence in online learning, the course design could help to promote the presence, which contributed to increased student satisfaction (Oyarzun et al., 2018; Rockinson-Szapkiw et al., 2019; Tu, 2002). One significant challenge with online learning was the need to be disciplined in managing the workload alongside personal commitments and employment, without succumbing to procrastination (Haywood & Murty, 2018).

One primary concern associated with the online modality was the absence of social presence. Unlike the face-to-face (F2F) modality, replicating social nuances in the online modality proved to be challenging. In the blended and traditional modalities, a social presence was more naturally occurring due to social cues. However, in the asynchronous modality, the instructor played a crucial role in intentionally planning and implementing a social presence strategy to foster both learner and instructor social presence (Oyarzun et al., 2018).

Students taking online courses felt frustrated regarding the overall online experience. Some concerns involved the classroom, the professor, and the institution. Other students have worried about lacking time-management skills and knowledge-acquisition abilities (Berry, 2018; Oyarzun et al., 2018; So & Brush, 2008). Students, as stakeholders in HEIs, recognized the outdated nature of traditional brick-and-mortar classrooms. Students wanted to learn at their own pace, in their own space, and they welcomed nontraditional course formats. However, it was important to provide a strong teaching and social presence online through technology (Rockinson-Szapkiw et al., 2019). Students who completed an asynchronous course attributed communication as the key to opportunities for deep reflection and a conducive learning environment (Rockinson-Szapkiw et al., 2019). Online education emerged as a viable option in today's higher educational institutions (Berry, 2018).

Baker and Moyer (2018) suggested that when looking at course components, students consider discussion forums to help develop a sense of social presence in the online environment. However, video lectures were seen as more valuable when it comes to learning, while discussion forums were last on the list in terms of contributing to education. Discussion forums helped establish a sense of community but not as a means of learning. Berry (2018) noted that F2F and online students shared similar concerns; however, online students had other problems regarding

technology, virtual communication, and virtual environments. Virtual groups were a concern because many students did not prefer group learning (whether in person or virtually). CMC could complicate and exacerbate situations, particularly for novice students. The fear concerning learning online was more student-centered and personal. Not every student could master online learning or feel comfortable completing the course. To succeed in online education, students must be technologically savvy and possess superior self-discipline, time management skills, and the necessary demeanor to overcome hindrances to learning that occurred with online platforms (Berry, 2018).

Regarding satisfaction between the modalities, researchers found that face-to-face learning courses yielded higher satisfaction than online courses (Fishman et al., 2013; Paul & Jefferson, 2019). Other studies have shown that student satisfaction in online courses significantly promotes learners, faculty, and institutions (Cheon et al., 2020; Latip et al., 2020). Researchers have called for more studies on the characteristics of students taking online courses (Fouad et al., 2022). Most of the literature reviews revealed that limitations to the studies included a small study participant size (Fouad et al., 2022) and the need for more studies to determine satisfaction or experience with different course modalities (Elshami et al., 2021; Jafar & Sitther, 2021).

According to Bali and Liu (2018), more females than males participated in online courses. This indicated that the study might have had a gender bias. Other researchers noted that students felt that learning online was entertaining and created

independent students. Additionally, the students have stated that online learning was often considered advantageous over traditional face-to-face learning (Almahasees et al., 2021). Conversely, Jafar and Sitther (2021) remarked that traditionally, many individuals felt that

interaction on the online platform was deficient. One reason was the lack of social interaction, presence, and student satisfaction (Shonfeld, 2021). Modern pedagogical platforms provided innovative techniques in online learning (Bali & Liu, 2018). Phillips et al. (2021) suggested the significant struggles noted by the research participants included inadequate or subpar training and support for a smooth transition to the online platform. They underscored the need for facilitating learning within the pedagogical change from F2F to online modalities.

Indeed, previous research had highlighted the challenges that educators faced when transitioning to new learning environments, particularly in the context of hybrid education. Instructors had to stay updated with new technological advances and attend professional training to maintain their digital competence. As a result of this transformation, the Educator's Digital Competence (EDC) was a new learning environment known as hybrid education. To increase the body of knowledge in literature, one had to understand the educator's evolution in the university's new knowledge economy and its mission. The educator was still the gatekeeper for student learning and facilitated a learning environment that promoted responsibility, autonomy, and life skills (Ferri et al., 2020; Holman et al., 2019; Istijanto; 2021; Núñez-Canal et al., 2021; Rodrigo & Tabuenca, 2020).

Social Presence, Social Interaction, Collaborative Learning, and Satisfaction

So and Brush (2008) examined blended learning modalities' relationship with the perceived levels of social presence, collaborative learning, and student satisfaction. Based on the study conducted by So and Brush and the validation of their instrument, the second predictive variable (course format) and the criterion variable (course satisfaction) were obtained from the survey results. The researchers noted that active learning occurred in traditional F2F classrooms with participation from the learner, instructor, and peers. However, with the evolution of modern

technology, distant learning could have provided both asynchronous and synchronous modalities that offered interaction opportunities.

Baker and Moyer (2018) observed that there was a positive relationship between intrinsic motivation and social presence. They emphasized that when students experienced a sense of community, motivation, and social presence, they were more likely to exhibit higher levels of engagement and satisfaction with online learning. Furthermore, students possessed unique characteristics that played a significant role in their success in online modalities. Recognizing and understanding these characteristics were crucial for designing effective courses, promoting success in online learning, and facilitating student retention.

Yang (2021) identified the existence of transactional and psychological issues within distance educational courses. The field of distance education research had shown a growing interest in exploring collaborative learning approaches, which could be explained by (CMC) and the theory of social constructivism. Additionally, both asynchronous and synchronous learning formats had significantly reduced geographic barriers, facilitated the process of learning. However, it was important to note that teaching pedagogies differed between asynchronous and traditional face-to-face learning environments. In the case of asynchronous learning, students' success heavily relied on their self-regulated learning skills. Unfortunately, not all students possessed the innate ability to excel in this mode of learning (Graham, 2019).

So and Brush (2008) noted that social presence was first introduced by Short et al. (1976) in the psychology profession. Short et al. (1976) defined social presence as “a quality of a medium itself” and the theory of social presence as the “degree of salience of the other person in the interaction and the consequent salience of interpersonal relationships” (p. 65). Initially, this theory was not created to explain CMC; however, it was developed to view and explain

telecommunications media's effects on communication. However, Kreijns et al. (2022) suggested that one critical element for online learning was social presence. Research indicated that social presence could influence social interactions in online learning. The social presence theory was related to online group learning (OGL) and CMC tools. With the use of CMC, students could experience F2F communication and group learning, and the group dynamics were not jeopardized within the online platform. Students were successful in group learning when everyone experienced success. Social presence could be viewed as a construct in OGL (Kreijns et al., 2022).

Historically Black Colleges and Universities and Online Learning

HBCUs were developed as the result of exclusion and segregation stemming from the end of the Civil War and slavery. African Americans had numerous challenges, including access to higher education (King-Berry & Charles, 2021). Currently, many HBCUs struggled with providing accommodations to increase the percentage of online students (Jafar & Sitther, 2021). Although African American students made up less than 25% of distance education students at private and for-profit institutions, they are targeted by for-profit online institutions (Jafar & Sitther, 2021). HBCUs addressed the gap between the supply and demand concerning distance learning. Some students found success in hybrid courses, while others preferred traditional classes. Having a choice was considered paramount in the higher education arena. Convenience was identified as one distinctive characteristic of online courses, and enabling African American students to pursue their goals without incurring exorbitant costs from for-profit institutions was another important aspect (Jafar & Sitther, 2021).

Previous research examined various forms of online and traditional face-to-face communication, but there was a scarcity of studies comparing specific courses (Faulconer et al.,

2018; Fouad et al., 2022). However, the available comparative research suggested that synchronous online learning was equally effective. Fouad et al. (2022) reported that synchronous online learning demonstrated comparable effectiveness to asynchronous online learning. The researchers found that access to online pathways was more plentiful and had more significant learning opportunities. Fouad et al. identified challenges, such as technical issues, internet connectivity, and students feeling intimidated and afraid to answer questions. Eventually, the online learning landscape changed, became more flexible, and created a wealth of new possibilities in learning (Fouad et al., 2022). Haywood and Murty (2019) studied the perceptions in an HBCU in Georgia, which yielded comparable results to other studies; however, they noted that online courses provided more accessibility to the students and fewer distractions with learning. The courses provided opportunities for students to learn online, thereby increasing student satisfaction levels.

Over the last 10 years, researchers have focused on comparing face-to-face and distance education (Graham, 2019; Johnson et al., 2021). Researchers focused on the instructor's point of view rather than the student's perception. Negative perceptions could lead to poor retention. Johnson et al. (2021) compared and analyzed course formats of F2F, hybrid, and online to understand learning and satisfaction in an HBCU. Previous research revealed that students are very satisfied with all components of an online course except for peer interactions and peer support (Haywood & Murty, 2018). In comparison, other research supported F2F as the preferred modality (Weldy, 2018) over the hybrid platform even though online learning had shown an increase in acceptance over the other modalities (Wright & Holmberg-Wright, 2018). Hamann et al. (2021) added that student success might decline when students take mostly online courses.

Gauging student satisfaction had been an essential evaluation of distance education effectiveness (So & Brush, 2008). Allen et al. (2002) conducted a meta-analysis of 24 articles and found no significance between student satisfaction ratings between F2F and online learning courses. So and Brush (2008) noted that other factors in distance learning were anxiety, frustration, or course dissatisfaction. Research had shown that many sources of dissatisfaction among students had been identified, including low instructor expectations, tight timelines, overwhelming workloads, occasional faulty software interfaces, slow internet access, and the lack of synchronous communication (Kitchen & McDougall, 1998; So & Brush, 2008). Social presence was vital to student satisfaction (Gunawardena & Zittle, 1997; Kreijns et al., 2022).

Students' satisfaction interrelated with faculty satisfaction including interactions and technology satisfaction (Ismail et al., 2022; Shonfeld, 2021). Faculty and students were required to possess technical and pedagogical skills (Yildiz, 2018). Several studies had investigated satisfaction levels between genders; however, the results were contradictory, and no evidence of differences was found in the online format (Harvey et al., 2017). Elmer et al. (2016) found that males had a higher satisfaction level in learning in blended modalities than females due to computer self-efficacy and less anxiety. The finding confirmed previous research indicating that decreased computer self-efficacy and increased anxiety levels influenced satisfaction perceptions in blended learning. However, Martin and Bolliger (2018) discovered that females reported higher satisfaction rates in online learning courses compared to males. Other studies indicated that student satisfaction correlated with their perceptions of instructor characteristics such as openness, supportiveness, and vulnerability, particularly in the hybrid or blended modality (Lo, 2010).

So and Brush (2008) examined perceived levels in distance education on collaborative learning, satisfaction, and social presence. The results indicated that connection was essential for motivation to engage in the activities presented in the online course. “When students have difficulty creating the appropriate level of mutual closeness, trust, and interdependence, their participation in group projects is likely to be low” (p. 329). The findings suggested the insignificance of social presence in terms of the relationship between social presence and satisfaction (So & Brush, 2008; Van et al., 2020).

Research had suggested a correlation between online course satisfaction and collaborative learning (Chatterjee & Correia, 2020; Oyarzun et al., 2018; So & Brush, 2008; Trninic et al., 2018). Higher levels of collaborative learning were associated with more satisfaction among students and increased social presence. Effective collaborative learning required engagement with social constructs, which could be enhanced through online modalities. To develop cognitively, one must have social interaction with others. Effective collaborative learning entailed principles from the Russian psychologist Vygotsky’s (1978) social constructivism.

One method was group work that promoted deeper learning, student achievement, and engagement (Theodosiou & Corbin, 2020). According to So and Brush (2008), three factors can affect student satisfaction with collaborative learning: instructor's emotional support, the structure of the course, and the level of communication. Collaborative learning has been shown to predict the positive construct of student satisfaction (Lane et al., 2021; So & Brush, 2008; Trninic et al., 2018). Some researchers have noted that the desire to learn could develop from interacting with others and creating a sense of community. When online students perceived a sense of community, the outcome of online learning was positive. When connections are established between other cohorts, perceived value, engagement, and lower anxiety or frustration

levels exist. The students preferred online courses to traditional ones (Baker & Moyer, 2018; Trninic et al., 2018).

The identification of the critical factors that influenced all three aspects resulted in positive responses to the learning experience. Interestingly, the results were contradictory to the transactional distance theory (Moore, 1991), which "proposes that increasing structure in distance education is likely to decrease dialogue and increase transactional distance" (p.330). So and Brush (2008) focused on the learner-learner interaction and suggested that the results were due to different interactional types, while Moore (1991) only focused on the instructor-to-learner influence. The results indicated that collaborative learning did increase interactions among the students and increases dialogue in the online course modality.

Summary

Research has revealed that hearing loss can create a challenge for individuals regarding learning, and the research has found that this population does not learn the same as their hearing peers (Bell & Swart, 2018; Cheng & Sin, 2018). One must understand the challenges of hearing loss and course format to empathize with this population. Bell and Swart (2018) stated that administration in higher education should pay greater attention to considering modifications, accommodations, and assistive technologies for both students and faculty. Without sufficient visual and auditory cues, modes of communication can be stifled in all populations, especially HOH individuals (Welling & Ukstins, 2019).

Students with hearing loss faced challenges in the classroom that contributed to social isolation (Krishnan et al., 2020; Schafer et al., 2021). Their inability to interact with other students impeded the learning process. Online tutorials often failed to motivate these students. Despite hearing loss being an unseen phenomenon, many educators underestimated the impact of

this disability. When instructors lacked understanding of hearing loss, misconceptions arose. For example, some individuals classified all students with hearing loss as either hearing or deaf, overlooking the degrees and types of hearing loss (Kramer & Brown, 2023; Krishnan et al., 2020; Welling & Ukstins, 2019).

Limited research focused on HBCU public universities regarding student satisfaction with online or traditional learning. There were very few quantitative studies found in literature that addressed these topics. The focus had been on various pedagogies and student satisfaction in traditional or face-to-face delivery modes; however, there appeared to be inconclusive results on the findings (Bali & Liu, 2018; Fouad et al., 2022; Jafar & Sitther, 2021; Singh et al., 2021). Although student enrollment in online courses increased, students still reported feelings of isolation (Ali & Smith, 2015; Jafar & Sitther, 2021; Lane et al., 2021). Jafar and Sitther's (2021) results showed that the pedagogy of A&P STEM hybrid courses could be as effective as the traditional face-to-face courses in HBCUs. Student evaluations supported the results. However, Corgan Monto (2016) reported conflicting results concerning traditional versus hybrid.

The theory of social constructivism impacted distance education (Hsu, 2017; So & Brush, 2008). This theory was based on Vygotsky (1978) and implied that knowledge could be acquired "through the process of negotiating meanings with others" (p. 320). Over several decades, Vygotsky's theory was utilized as a significant factor in the development of distance education pedagogy. This shift focused on not only delivering content but also creating a learning space for collaboration and the acquisition of higher cognitive skills (So & Brush, 2008).

There was an overabundance of research that compared online course modalities to traditional face-to-face courses. Previous research highlighted the individual components of social interaction, social presence, collaborative learning, and satisfaction, while advocating for

their inclusion (So & Brush, 2008; Spears, 2012). These landmark studies helped validate the significance of technology in all course formats. When educators transitioned from traditional face-to-face to online learning, they should have maintained the standards of excellence. Advanced educational technologies continued to uphold these standards (Kazanidis et al., 2019; Shonfeld, 2021; Spears, 2012).

So and Brush (2008) concluded that older students had higher satisfaction levels than younger students. The more online courses students took reflected a positive outcome regarding student satisfaction. Students experienced in taking online courses had a favorable satisfaction reflection than novel students to online learning (Veerasamy et al., 2020). The final statistically significant finding was the social presence and student preference for individual learning over group learning. There was a negative correlation noted supporting individual learning. The students who worked alone had a lower social presence level than those who preferred group learning (Veerasamy et al., 2020). So and Brush (2008) recommended further research to compare blended course modalities with student success, interactions, and individual differences as independent variables (Veerasamy et al., 2020).

This study aimed to contribute to the existing literature regarding students enrolled in HBCUs and their experiences with online learning, traditional face-to-face learning, and course satisfaction. The findings of this research could be helpful to individual departments, colleges, and universities in gaining an understanding of different formats and cultivating best practices for developing courses that promote effective learning and student success (Cheng & Sin, 2018). By identifying the participants' demographics, educators could gain insights into the students' characteristics related to hearing levels, course format, and course satisfaction.

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative, predictive correlational design study was to investigate how well course satisfaction scores can be predicted by the level of hearing loss and course format. This chapter introduced the study's design, including complete definitions of all variables. The research questions and null hypothesis follows. The details of the participants and setting are provided, including race, ethnicity, demographics, and gender. An in-depth description of the instrumentation, procedures, and data analysis plans are presented.

Design

This research study was a quantitative predictive correlational design study to investigate how well course satisfaction scores can be predicted by the level of hearing loss and course format. A predictive correlational design was used to investigate the relationship between one or more predictor variables and one criterion variable (Warner, 2013). This design was nonexperimental; therefore, the researcher did not manipulate or control any variables. One goal was to predict the relationship between the variables (Creswell & Guetterman, 2019). According to Gall et al. (2007), a predictive study involved calculating correlations between a complex behavior pattern (referred to as the criterion) and variables believed to be associated with the criterion. The distinction between these studies lay in the measurement of predictor variables prior to the measurement of criterion variables. It should be noted that no causal relationship could be inferred based on these variables.

Creswell and Guetterman (2019) stated that six steps are necessary for conducting a predictive correlational design, including determining if the study can address the research problem. Research questions and hypotheses are needed to support this type of study and the

association of the predictive variables. The criterion must be appropriately defined (Gall et al., 2007). All participants were from a convenience sample. The sample size population must fit the statistical analysis criteria. An appropriate and reliable instrument must be chosen for the study. The data must be collected using the instrument and monitoring any potential validity threats. Questionnaires and surveys are used in this study design to measure both the criterion and predictive variables (Gall et al., 2007). The data analysis and reporting of findings were conducted next, followed by the reporting and interpretation of the results. In a predictive study, the predictor method(s) scores were correlated with the criterion scores. The data collected must support the research question(s), the theory, and the study's hypothesis (Laerd Statistics, 2018).

The predictive correlational research design was appropriate for this study because it allowed for the utilization of various statistical methods. The study included two predictor variables, levels of hearing loss, as determined through an audiological hearing evaluation, and the course format (e.g., traditional face-to-face, online, and hybrid), both of which were categorical. The criterion variable consisted of course satisfaction scores, as assessed by the CLSS questionnaire (So & Brush, 2008), which measured perceived collaborative learning, social presence, and overall student satisfaction (Spears, 2012). The research design was appropriate and practical because the researcher was interested in the combined relationship of the two predictor variables with the single criterion variable. In this type of statistical analysis, the variation in the criterion variable was explained by the variance of each predictor variable, and the combined effect of both predictor variables designed by adjusted R squared (Creswell & Guetterman, 2019; Kline, 2015).

Another reason this research design was appropriate for the study is that the strength of data collection can be impacted by this design, the interpretation, and the analysis. The design

offered precise procedures and interpretations of the relationship between the variables, which was vital for this study. The scores collected were viewed in both negative and positive directions using graphs to identify the variables' correlation (Gall et al., 2007). Another reason for using this research design was that it is not as expensive as experimental research and was less time-consuming. Gall et al. noted that analysis helps researchers visualize the variables' influence, the relationship, and the direction of the relationship simultaneously within a single study.

Quantitative predictive correlational research investigated and studied problems. This design determined the direction and strength of two or more variables in a linear relationship. Gall et al. (2007) defined the research as "very simple, involving nothing more than collecting data on two or more variables for each individual in a sample and computing a correlation coefficient" (p. 335). The rational and theoretical constructs helped to direct the design. This type of design was the most appropriate for this research study.

Research Question

RQ: How accurately can course satisfaction scores be predicted from the linear combination of levels of hearing loss and course format for students taking a HED 101 course at an HBCU?

Hypothesis

H_0: There will be no significant predictive relationship between the criterion variable, course satisfaction scores, and the linear combination predictor variables (hearing loss and course format) for students taking a HED 101 course at an HBCU.

Participants and Setting

Population

The participants for the study were drawn from a convenience sample of college students located in the southern portion of the United States at a public HBCU during the 2022-2023 school year. The participants were selected from students enrolled in HED 101 courses either online, hybrid, or traditional face-to-face platforms. The university was considered a mid-size institution with a student population of over 6,000. In-state students made up over half of the population (e.g., 4,010), while out-of-state students represented about 33% of the overall undergraduate population. The university offered bachelor's, master's, and doctoral degrees and was accredited by the Southern Association of Colleges and Schools Commission on Colleges [SACSCO], 2019. For this study, the number of participants that were sampled was 80, which according to Gall et al. (2007), exceeds the required minimum of 66 for predictive correlational design when assuming a medium effect size with a statistical power of .7 at the .05 alpha level (Warner, 2013).

Participants

The sample consisted of 90 males and 147 females, and two subjects identifying as non-binary (See Table 1).

Table 1

Gender of Participants

Gender	N	%
Female	147	61.5%
Male	90	37.7%
Non-binary	2	0.8%
Total	239	100%

According to Table 2, the age range of the students was from 18 to 29 years old, with the highest percentages of students being 20.1% and 19.7% for 19-year-olds and 21-year-olds, respectively.

Table 2

Age of Participants

Age	Number	%
18	43	18.0%
19	48	20.0%
20	43	18.0%
21	47	19.7%
22	28	11.7%
23	15	6.3%
24	3	1.3%
25	2	0.8%
26	6	2.5%
27	1	0.4%
29	3	1.3%
Total	239	100%

As shown in Table 3, the ethnicity makeup included 86.6% African American students, 8.8% Caucasian students, 2.5% Asian Pacific Islander students, 0.8% Latino students, and 1.3% Hispanic students.

Table 3:

Ethnicity

Ethnicity	Number	%
African American	207	86.6%
Caucasian	21	8.8%
Hispanic	3	1.3%
Latino	2	0.8%
Asian Pacific Islander	6	2.5%
Total	239	100%

The student population consisted of individuals taking Personal and Community Health courses (i.e., HED 101) which was a required general education core course for all degree programs. The students typically were first or second-year students unless they were repeating the course for grade improvement.

Setting

The participants were from online, hybrid, and traditional face-to-face HED 101 courses offered at the HBCU. There was no control group. Each participant in the study was given a free hearing test to establish their level of hearing. The testing was performed in a setting where the ambient noise level was low and conducive to audiological screenings (i.e., a small classroom). Background noise levels were continuously monitored with a sound level meter per the American National Standards Institute *S3.6-1996* (Frank, 2000).

Instrumentation

One instrument used in this study was the CLSS questionnaire (So & Brush, 2008), which collected data for the criterion variable of course satisfaction. The instrument had been utilized in several previous studies (Cheng et al., 2021; Raisolsadat et al., 2020; Sorden & Ramírez-Romero, 2011; Spears, 2012). The second instrument was an audiometric hearing test conducted prior to collecting the criterion variable data using the CLSS. The thresholds identified from the hearing test were averaged, and a four-frequency threshold for each ear was obtained and categorized based on different levels of hearing for each participant, specific to each ear.

The CLSS Questionnaire

So and Brush (2008) defined collaborative learning as a "form of learner and learner interaction" (p. 319) and "an instructional approach in which a small number of learners interact together and share their knowledge and skills to reach a specific learning goal" (p. 322). Social presence was "A psychological degree to which a learner perceives the presence of and connectedness with other learners" (p. 323). The researchers defined satisfaction as "An affective learning outcome indicating the degree of (a) learner reaction to values and quality of learning, and (b) motivation for learning" (p. 323).

The purpose of this instrument was to measure students' perceptions of collaborative learning, social presence, satisfaction, while also collecting data on the criterion variable of course satisfaction. So and Brush (2008) tested the instrument's reliability using Cronbach's alpha. The results showed a .72 reliability by using respondents' data. For face-to-face learning, the coefficients were .84, and online yielded a .88 coefficient (So & Brush, 2008; Spears, 2012).

The instrument used a five-point Likert scale that ranged from Strongly Disagree to

Strongly Agree. Responses were as follows: Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, and Strongly Agree = 5. Random numbers were assigned to each of the students. The participants' mean score for satisfaction was only used for analysis, even though the whole survey was given to each participant. The four sections were as follows: a. general information (i.e., gender, age, ethnicity), b. satisfaction, c. collaborative learning, and d. social presence (So & Brush, 2008). The total number of questions in the CLSS was 41. Section I. contained six demographic elements for the participants to answer. Section II (satisfaction) contained 11 questions. The reliability of the satisfaction scale was .85, from using Cronbach's alpha to the satisfaction scale and the respondents' data. The coefficients for face-to-face and online courses were .90 and .93, respectively (So & Brush, 2008). So and Brush (2008) used 10 questions from the GlobalEd Questionnaire (Gunawardena & Zittle, 1997) for satisfaction subscale two. Gunawardena and Zittle (1997) reported Cronbach's alpha as .87. To establish the validity of the instrument, the researchers performed an exploratory factor analysis. Even though the sample size was small, Bartlett's tests of sphericity and Kaiser-Meyer-Olkin (KMO) results indicated that factor analysis could be done on the current data. "After factor analysis, 12 items did not load on any factors or highly cross-loaded on multiple factors were removed" (So & Brush, 2008, p. 324). For the final analysis, the instrument consisted of the satisfaction scale having 11 items, the collaborative learning scale with eight, and the social presence scale with 17. Sorden and Ramírez-Romero (2012) conducted a small pilot study of five students to establish the validity of the questionnaire.

Additionally, an expert committee was established with three colleagues to address ambiguity with the questions or any issues. The committee determined that none of the questions were ambiguous, and all questions were kept from the original ones. In 2012, Spears checked the

validity with an expert panel of four professors with one being from the Statistics department. The panel examined the construct validity of the questionnaire. The panel consisted of experts in facilitating and developing traditional and online course modalities, survey research, and dedication to student learning understanding. The expert panel reviewed all four scales (e.g., social interaction, social presence, satisfaction, and collaborative learning) to ensure that each question was a valid construct measurement. A checklist was used for measurement validity, and any additional suggestions were noted to improve the questionnaire content. There were two rounds of revisions which yielded favorable results that the scales were valid. "All four panel members agreed the scales were valid measures of the constructs" (Spears, 2012, p. 25).

The collaborative learning subscale was subscale three and measures perspectives on preferences on face-to-face interaction and overall satisfaction when comparing the modalities of online versus face-to-face. The collaborative learning subscale has eight questions. The items were based on earlier work by Driver (2002) and Kitchen and McDougall (1998) concerning collaborative learning online. So and Brush (2008) established a .72 reliability for the collaborative learning scale. The data from the respondents was calculated with Cronbach's alpha yielding coefficients of .84 for face-to-face and .88 for online courses.

The social presence scale, the computer-mediated communication (CMC) questionnaire (Tu, 2002) measured four factors social presence, interactivity, social context, privacy, and online communication (So & Brush, 2008). The purpose was to examine distance learning modalities' transactional and psychological issues. The complexity of the relationship in a blended learning modality was used to measure students' perceptions of social presence, satisfaction, and collaborative learning. This questionnaire evaluated educational experiences and assessments of CMC in students (Gunawardena & Zittle, 1997). The social presence scale

had been utilized to assess online courses' social presence (Bali & Liu. 2018; So & Brush, 2008; Spears, 2012; Van et al., 2020). Gunawardena and Zittle (1997) used Cronbach's alpha to establish a .88 reliability. The researchers used the respondents' data to calculate the reliability. Cronbach's alpha coefficient was .85 for the social presence scale (So & Brush, 2008). The face-to-face and online courses had .72 and .76 coefficients, respectively.

The survey was designed to be completed in less than 15 minutes. Trained graduate students in Communicative Sciences and Disorders administered the CLSS questionnaire in person. Each part of the survey included clear instructions. The CLSS had a combined possible score ranging from 36 to 180 when all questions were answered. A score of 36 represented the lowest possible score, indicating dissatisfaction with the course, collaborative learning, and social presence. In this study, the lowest score obtained on the Satisfaction scale was 11, suggesting that the student was not satisfied with the course. On the other hand, the highest score attained was 55, indicating positive course satisfaction. Only the numerical values from Section 2 (Satisfaction) were entered into the statistical software. All reports and data were securely stored in the researcher's office under lock and key. The computer containing the data was protected by double authentication of the password, ensuring its safety and security. No unauthorized individuals had access to the computer.

Audiological Threshold Testing

Hearing screenings have evolved from the early 19th century to the 21st century. Cordia C. Bunch developed the first audiometer in 1919 in the United States for private use. From 1920 to 1940, Bunch pioneered the relationship between hearing loss types and the audiometric patterns produced from the hearing tests. After World War I, a commercial audiometer was developed by R.L. Wenger and Harvey Fletcher, known as the Western Electric 1-A Model. The

audiogram was the graph that audiometric thresholds were reported on that Wenger and Fletcher used in the early 19th century (Kramer & Brown, 2023; Ruben, 2021). The instrument was used in numerous studies (Alessio et al., 2020; Kim et al., 2017; Kim et al., 2018).

Before performing audiometric testing, each participant underwent an otoscopic examination to ensure that no cerumen or outer and middle ear infections were present. Two Welch-Allyn otoscopes were used for this part of the procedure. The otoscopes used were the Welch Allyn 3.5 V HPX Diagnostic Fiber-Optic Otoscope with Reusable Ear Specula, which were owned by the researcher. If cerumen was detected, the hearing screening was postponed until the cerumen was removed. Once the participant's otoscopic examination revealed clear external auditory canals with no middle ear pathologies, the participant underwent the audiometric evaluation.

Three Beltone Model 119 audiometers were used for the hearing screenings. The researcher owned the audiometers, which were calibrated annually by Med-Acoustics to American National Standards Institute (ANSI) standards. Supra-aural Telephonic Dynamic Headphone-type or TDH-39 and TDH-49 headphones were coupled to the audiometers for the screening. The graduate volunteers underwent a semester of intense training in Audiology, where they were trained in performing proper hearing screenings, conducting otoscopic examinations, and following universal safety measures. These measures included wearing gloves, using a new disposal speculum for each participant, wearing facemasks, and cleaning all surfaces before and after each participant with Clorox wipes (see Appendix A). Each student volunteer had passed Audiology 308 or 514 and had over ten hours of experience in performing hearing screenings. The researcher adhered to the American Speech-Language-Hearing Association (1997) guidelines, which required the supervisor to be an Audiologist with the Certificate of Clinical

Competence (CCC-A) from the American Speech-Language-Hearing Association (ASHA) and possess state licensure in the testing state. The graduate volunteers were supervised by a certified Doctor of Audiology.

During the testing, participants provided subjective responses, such as raising a hand upward, to indicate their perception of the audiometric tones. The intensity of the tones was adjusted based on the individual's response. If a response was detected, the clinician decreased the intensity by 10 dB HL and presented another tone. Conversely, if no response was observed, the intensity level increased by 5 dB, followed by the presentation of another tone. This *down 10, up 5* procedure continued until two responses were recorded at a specific frequency for each ear. These recorded audiometric thresholds were then documented on the audiogram for each ear (Kramer & Brown, 2023; Steiger & Miller, 2017).

After completing the testing, the supervisor calculated the level of hearing loss for each ear by averaging the audiometric thresholds at 1000 Hz, 2000 Hz, 3000 Hz, and 4000 Hz, and then dividing the sum by four. These pure-tone averages were utilized to determine the level of hearing loss and hearing handicaps (Kramer & Brown, 2023). The entire hearing test, including the otoscopic examination, was completed within a timeframe of less than 15 minutes.

The purpose of this instrument was to measure the predictive variable of hearing loss levels. Patients were given written and verbal instructions for the audiometric hearing test. The test used a pulsed-tone stimulus to obtain thresholds for each frequency, following the Carhart and Jerger's Modified Hughson-Westlake Procedure (Hoffman et al., 2017; Steiger & Miller, 2017). This procedure accurately measured the thresholds for each tested frequency (Steiger & Miller, 2017).

Course modality was determined by reviewing the electronic system of the HBCU's Banner course offerings. The study included face-to-face traditional courses, online platforms, and hybrid course options for the HED 101 course to ensure an appropriate sample size. All sections of HED 101 were included to obtain subjects for the study.

Procedures

Before collecting any data, the researcher applied to the Liberty University Institutional Review Board (IRB) and awaited approval. Once the study was approved, the researcher then contacted the HBCU to obtain IRB permission to conduct the study. After receiving that university's IRB agreement, recruitment of participants began immediately (see Appendix B). The recruitment letter was given to each subject that agreed to participate (see Appendix C). Due to the overwhelming number of participants, there was no need to issue a follow-up letter for the study (see Appendix D).

Each participant was given a handout with the study information and a hard copy of the questionnaire to explain the purpose of the study. Informed consent forms were provided in person and online (see Appendix E), along with instructions and demographic questions (gender, age, race, ethnicity). The researcher requested permission to administer the survey to the students during or after each class. Each participant turned in their consent forms before undergoing the hearing test.

The audiological data for each participant was sorted by course modality and course reference number (CRN). Online students who agreed to participate in the study had their hearing evaluated after submitting the consent form in person. The researcher maintained a spreadsheet with participants' emails and scheduled hearing times and dates. The hearing level data was stored on a locked computer with restricted access, ensuring confidentiality (accessible

only to the researcher for record-keeping and data security). Before conducting the study, the researcher emailed for permission to use the survey instrument, CLSS, from Hyo-Jeong So and Thomas A. Brush. Dr. Hyo-Jeong So, the author of the CLSS, gave permission to use the survey (see Appendix F). Each survey and audiometric test had a reference number corresponding to each participant, which the researcher controlled to ensure security measures.

Data Analysis

In this quantitative study with a predictive, correlational design (Patten & Newhart, 2017; Warner, 2013), the statistic used was multiple linear regression analysis. The variables were not manipulated, and no causal inferences were made. Multiple linear regression analysis was recommended when testing the effect of two or more predictor variables and one criterion variable measured on a continuous scale (Manchaiah et al., 2022).

Furthermore, multiple linear regression analysis revealed how each of the predictor variables contributed to the variance while controlling for other predictor variables. This study examined the relationship between course satisfaction, as measured by the CLSS, and a linear combination of levels of hearing loss and the course modality of students taking HED 101 at an HBCU. The researcher sorted the data and scanned for inconsistencies in each variable. The Statistical Package for the Social Sciences (SPSS) software program was used to run the statistical analysis. The researcher computed numeric summaries for each research question using the software. The two predictor variables are levels of hearing loss (e.g., five levels) and course format (e.g., face-to-face, online, or hybrid). To use categorical variables with more than two characteristics in regression, dummy variables were created to categorize the predictor variables. These variables can take on discrete values, such as 0, 1, and subsequent values. There was an interception and a coefficient for each dummy variable. The study sample

exceeded the minimum sample size requirement of 66 for multiple regression (SAGE Research Methods Datasets, 2015).

A standard multiple linear regression was performed. With this analysis, all predictor variables were entered at once, with coefficients calculated for one regression equation representing all predictors (Warner, 2013). The simultaneous or standard data entry allowed for a conservative prediction of the individual variable effect assessment while controlling for other predictors. Standard regression typically showed the variance proportion in the criterion variable due to a specific predictor variable being less than when the predictor variable was entered in a statistical or hierarchical method (Manchaiah et al., 2022).

Assumptions for multiple linear regression included the criterion variables measured on the ratio or interval levels; however, the predictor variables were categorical (Warner, 2013). The criterion variable, course satisfaction scores on the CLSS, was measured on the ratio level. The observations within each of the variables were independent. The sample size was larger than 50 (Gall et al., 2007; Warner, 2013). In the study, the test compared the sample scores to a set of normally distributed scores with the same standard deviation and mean (Manchaiah et al., 2022).

Screening for missing data and inaccurate entries was performed. The effect size was reported using an adjusted *R squared* value which is a "goodness-of-fit measure that shows how close the data are to the fitted regression line" (Manchaiah et al., 2022, p.197). The null hypothesis was rejected at the 95% confidence level. For each independent or predictive variable, the statistical significance test was performed to test whether the coefficients in the population were equal to zero. If $p<.05$, the coefficients were statistically significant in determining the best predictor of the criterion variable (Laerd Statistics, 2018).

CHAPTER FOUR: FINDINGS

Overview

The purpose of this quantitative, predictive correlational study was to determine if levels of hearing and course modality could predict course satisfaction scores. The predictor variables were levels of hearing and course modality. The criterion variable was course satisfaction scores. A multiple linear regression was used to test the hypothesis. The results section included the research question, null hypothesis, data screening, descriptive statistics, assumption testing, and results.

Research Question

RQ: How accurately can course satisfaction scores be predicted from the linear combination of levels of hearing loss and course format for students taking HED 101 at an HBCU?

Null Hypothesis

H_0: There is no significant predictive relationship between the criterion variable, course satisfaction scores, and the linear combination predictor variables (hearing loss and course format) for students taking HED 101 at an HBCU.

Data Screening

The researcher sorted the data and scanned for inconsistencies on each variable. No data errors or inconsistencies were identified.

Descriptive Statistics

Descriptive statistics were obtained on each of the variables. The sample consisted of 239 participants. Course satisfaction was measured using the collaborative learning, social presence, and satisfaction (CLSS) survey by So and Brush (2008). Table 4 provides the descriptive

statistics for the criterion variable.

Table 4

Descriptive Statistics

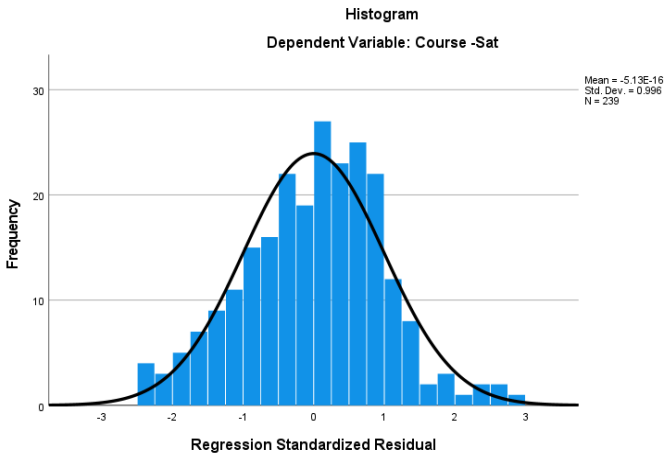
	M	*SD*	*N*
Course-Sat	3.279	.988	239

Assumption Testing

The assumption of linearity and the assumption of bivariate normal distribution did not apply to the data set as all predictor variables were categorical. However, the criterion variable was normally distributed as indicated by the histogram in Figure 1.

Figure 1

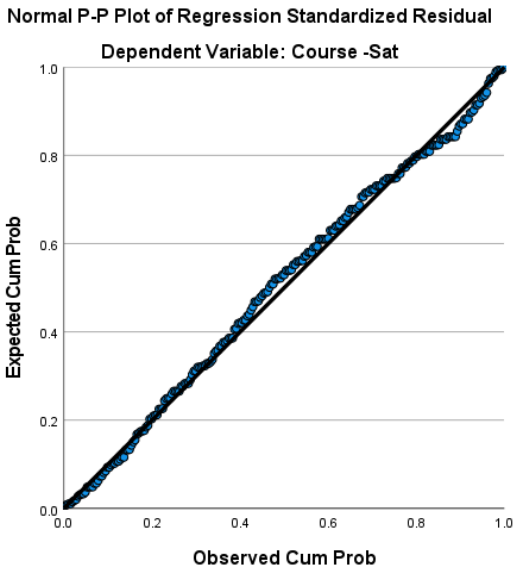
Assumption of Normal Distribution



In Figure 2, the "Normal P-Plot of Regression Standardized Residual" assessed the normality assumptions. Each point plotted on the line indicated the expected distribution when the residuals were within the normal distribution, demonstrating the closeness of the alignment of the residuals. The points were aligned normally with the reference line.

Figure 2

Normal P-Plot of Regression Standardized Residual



Assumption of Multicollinearity

Table 5 provides the collinearity statistics for each of the factors in the model. A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity (Frost, 2022). This test was run because if a predictor variable (x) is highly correlated with another predictor variable (x), they essentially provide the same information about the criterion variable. If the Variance VIF is too high (greater than 10), then multicollinearity is present. Acceptable values are between 1 and 5. The data had a VIF of 1.000, which indicated that there is no multicollinearity. The absence of multicollinearity was met between the variables in this study. This assumption is tenable as well.

Table 5

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Hear Loss	Format
1	1	2.289	1.000	.05	.07	.06
	2	.501	2.138	.03	.79	.24
	3	.210	3.302	.92	.13	.70

Note: a. Dependent Variable: Course -Sat

Results

A multiple linear regression analysis was conducted to see if there was a relationship between hearing levels and course format and course satisfaction. The predictor variables were hearing levels and course format. The criterion variable was course satisfaction. Inferential statistics were conducted for the hypothesis. Based on the results presented in Table 8, the researcher rejected the null hypothesis at the 95% confidence level where $F(2, 236) = 76.787$, $p < .001$. There was a significant predictive relationship between the predictor variables (levels of hearing loss) and course format, and the criterion variable (course satisfaction).

As shown in Table 6, the model summary gave an overview of the regression model, including the adjusted *R square* which was 0.389. Although the adjusted *R square* will always be smaller than *R square*, the adjusted *R square* was used to report the proportion of variance explanation. The adjusted *R square* was a goodness-of-fit measurement. The variance accounted for was 38.9%. The adjusted *R square* was also an estimate of the effect size, and due to the results, a large effect size was indicated according to Cohen's (1988) classification.

Table 6

Model Summary[b]

Model	*R*	*R Square*	Adjusted *R Square*	Std. Error of the Estimate	Durbin-Watson
1	.628[a]	.394	.389	.773	.003

[a] Predictors: (Constant), Format, Hear_Loss

[b] Dependent Variable: Course -Sat

Because the researcher rejected the null, analysis of the coefficients was required. Based on the coefficients, it was found that levels of hearing loss were the best predictor of course satisfaction where $p < .001$. Table 7 provides the coefficients.

Table 7

Coefficients

	Model	Unstandardized Coefficients B	SE	Standardized Coefficients Beta	*t*	Sig.
1	(Constant)	3.843	.087		44.135	<.001
	Hear_Loss	-.663	.054	-.632	-12.275	<.001
	Format	.060	.061	.050	-.976	.330

[a] Dependent Variable: Course Satisfaction

An analysis of variance (ANOVA) was performed to determine the statistical significance of the regression model along with the significance of each of the two predictor variables (see Table 8 for results).

Table 8

ANOVA[a]

Model		Sum of Squares	*df*	Mean Square	F	*Sig.*
1	Regression	91.668	2	45.834	76.787	<.001[b]
	Residual	140.868	236	.597		
	Total	232.535	238			

[a]*Dependent Variable: Course -Sat*

[b]*Predictors: (Constant), Format, Hear_Loss*

Table 9

Correlations

		Course -Sat	Hear_Loss	Format
Pearson Correlation	Course -Sat	1.000	-.626	*-.086*
	Hear_Loss	-.626	1.000	*.059*
	Format	-.086	.059	*1.000*
Sig. (1-tailed)	Course -Sat	.	.000	.092
	Hear_Loss	.000	.	.181
	Format	.092	.181	.
N	Course -Sat	239	239	239
	Hear_Loss	239	239	239
	Format	239	239	239

The Pearson Correlation (see Table 9) showed that the *r* value (strength and direction) of the correlation between hearing loss and course satisfaction was -.626. The negative sign indicated that as the level of hearing loss increased (meaning they had lower and lower ability to

hear) their course satisfaction decreased. The value of -.626 was a strong negative correlation. The results revealed that hearing loss did contribute significantly to the model with a $p < .001$.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter presents the conclusion of the study based on the findings presented in Chapter Four. The purpose of this quantitative, predictive correlational design study was to investigate how well course satisfaction scores can be predicted by the level of hearing loss and course format. The chapter opens with a discussion of the findings in Chapter Four. The implications and limitations of the study follow. The chapter ends with recommendations for future research. This chapter summarizes the study presented in the previous chapters and discusses the results. The chapter is divided into four sections: discussion, implications, limitations, and recommendations for future research.

Discussion

The purpose of this quantitative predictive, correlational design study was to investigate the relationship between two unrelated predictor variables (levels of hearing and course format) and one criterion variable (course satisfaction scores). The study was comprised of 239 students enrolled in HED 101, a general education course. The data were analyzed using multiple linear regression analysis, which revealed a significant relationship between the predictor variables (levels of hearing loss) and course format, significantly predicting the criterion variable (course satisfaction). Based on the results of the multiple linear regression, the null hypothesis was rejected. Because the researcher rejected the null, analysis of the coefficients was required. The levels of hearing loss were the best predictor of course satisfaction.

The research question was as follows: How accurately can course satisfaction scores be predicted from the linear combination of levels of hearing loss and course format for students

taking HED 101 at an HBCU? The null hypothesis stated: There will be no significant predictive relationship between the criterion variable, course satisfaction scores, and the linear combination predictor variables (hearing loss and course format) for students taking a HED 101 course at an HBCU.

The existing literature lacked sufficient research on the predictive relationship between the variables under investigation in the context of HBCU public universities. Specifically, there was limited research examining student satisfaction with online or traditional learning, as well as the prevalence of levels of hearing loss among the student population. Addressing these gaps in the literature formed the essence of this study. Existing research had primarily centered on exploring various pedagogies and student satisfaction in traditional or face-to-face delivery modes, but the findings have been inconclusive (Bali & Liu, 2018; Fouad et al., 2022; Jafar & Sitther, 2021; Singh et al., 2021). The existing research on course satisfaction across different modalities, including face-to-face (F2F), hybrid, and asynchronous formats, had yielded mixed results. Studies conducted by Fishman et al. (2013), Gómez-Rey et al. (2016), Kurucay & Inan (2017), and Rienties & Toetenel (2016) have presented varying findings regarding the impact of course modality on course satisfaction. These inconsistent results indicated that the current literature does not firmly establish the relationship between course modality and course satisfaction.

Considering these inconsistent findings, the present study aimed to investigate the relationship between course modality, course satisfaction, and levels of hearing loss within students who attended an HBCU. By exploring this relationship, the study sought to contribute to a better understanding of how different course formats may influence course satisfaction, particularly among students with hearing difficulties. The study aimed to enhance the

understanding of students with hearing loss by incorporating the variable of hearing loss and exploring their experiences and perceptions in different course modalities. Through this research, the goal was to provide additional insights into the relationship between course modality, course satisfaction, and levels of hearing loss, to enhance the understanding of the factors contributing to students' satisfaction with their educational experiences in various learning environments.

In terms of the variable of levels of hearing loss, previous research had focused more on HOH or deaf students. Richardson et al. (2004) noted that many students have levels of hearing loss less than 30 dB HL. Previous research had supported the idea that hearing impairment can impact college experiences (Bell & Swart, 2018; Cheng & Sin, 2018; Lor et al., 2021; Richardson et al., 2004). Welling and Ukstins (2023) noted that even the slightest hearing loss (e.g., 16 to 25 dB HL) could impact comprehension and incidental learning. Nelson et al. (2020) noted that the more pronounced the hearing loss, the greater the difficulty hearing conversations. As a result of not hearing efficiently, students could become frustrated and not persist. Krishnan et al. (2020) noted that students with hearing loss face insurmountable challenges in learning compared to normal hearing peers. The findings of this study revealed that students with any level of hearing loss could report poor course satisfaction scores.

Tinto (1993) proposed the importance of closely monitoring students with hearing loss, particularly during the initial 10 weeks of their first semester, as this period carries a higher risk of attrition (Bell & Swart, 2018; Boutin, 2008). Existing research indicated that many students with hearing loss did not feel a sense of belonging or inclusion within the college environment, unlike their peers with normal hearing (Bell & Swart, 2018).

The disparity discussed in this context could have a significant impact on the academic success of students from diverse backgrounds, including first-generation college students,

students from lower socioeconomic backgrounds (Longwell-Grice & Longwell-Grice, 2008), and individuals with disabilities, specifically hearing loss (Bell & Swart, 2018). Previous researchers have noted that disparities in academic success disproportionately affect first and second-year undergraduates (Foster et al., 1999; Rockinson-Szapkiw et al., 2019; Rogers, 2018). These disparities could hinder the educational progress and outcomes of students from various backgrounds, including those with hearing loss.

Considering the research findings, it became evident that addressing the unique challenges faced by students with hearing loss was crucial for fostering their academic success and promoting inclusivity within higher education institutions. By monitoring and providing appropriate support during the critical early weeks of the semester, institutions could help mitigate the risk of attrition among students with hearing loss. Additionally, creating an inclusive and supportive environment that fostered a sense of belonging for all students, regardless of hearing ability, could contribute to their overall academic achievement and well-being. The study's results supported the findings of previous researchers and the need to monitor first and second-year students.

The researcher identified a significant correlation between course modality, levels of hearing loss, and course satisfaction. This finding supported the notion that learners' construction of knowledge was influenced by their sense of community and belonging, as noted by previous researchers (Raza et al., 2020; Voskoglou, 2022). Notably, levels of hearing loss exhibited the strongest statistical significance in relation to course satisfaction. These results suggested that hearing loss can impede meaningful interactions and create a disconnect, thereby impacting the sense of community and overall course satisfaction.

The two main theories used for this study were Tinto's social integration theory (1993) and Vygotsky's social constructivism (1978). Tinto proposed that student integration and developing a strong sense of community in college were necessary for attrition and persistence. Developing higher cognitive learning skills could enable individuals to cultivate these abilities and achieve academic excellence. This notion was supported by research findings from various studies. Elshami et al. 2021 noted that students needed a social context where interactions with other students can foster growth. Lakhal et al. (2020) noted that social integration facilitated a sense of belonging, encourages peer support, and fosters a supportive learning community. On the other hand, academic integration promoted engagement with course material, the development of critical thinking skills, and knowledge acquisition. Academic integration referred to students' ability to synthesize information, achieve academic success, and engagement with professors (Pascarella & Terenzini, 1980). It encompassed the student's capacity to effectively navigate and participate in the academic aspects of their educational experience. Although this study only examined course satisfaction, other predictive variables could have been included in future replications. For instance, measures of social presence and the correlation between variables (which are part of the CLSS) could have been incorporated into the analysis to better support student and academic integration.

Student integration was vital for college students, including those with hearing loss and individuals from diverse racial backgrounds (Thompson-Ochoa, 2020). However, it was worth noting that other researchers have suggested that successful student retention can be achieved regardless of race, socioeconomic status, or disability (Bell & Swart, 2018; Cuevas et al., 2019; Longwell-Grice & Longwell-Grice, 2008). Previous research had consistently demonstrated that many students with hearing loss do not experience inclusion within the college environment,

unlike their peers with normal hearing (Bell & Swart, 2018). This lack of belonging could pose significant challenges for students with hearing loss and may impact their overall college experience, academic success, and retention rates.

Cheng and Sin (2018) found a significant relationship between self-determination and the integration of individuals with hearing loss. Integration refers to the ability to adapt and assimilate into an environment, such as higher education institutions (HEIs). However, the HOH population often needed assistance integrating into the institutional fabric, which could negatively impact their academic performance. Increasing self-determination could enhance integration among students with hearing deficits, leading to greater competence, independence, and meaningful social and academic relationships. The study's results do support and offer additional information on how students with a hearing loss consider course satisfaction in that the results show that a hearing loss can change course satisfaction. Of the total population, 51% of students were tested and found to have a hearing loss. Creating an inclusive and supportive environment for students with hearing loss was crucial for their sense of belonging and integration. Institutions could promote awareness, provide accommodations, and foster a culture of inclusivity to ensure equal value and inclusion for students with hearing loss.

According to Tinto's theory (1997), students who invested time and effort into acquiring knowledge and developing higher-order cognitive skills were more likely to experience academic success and learning. Astin (1975) also supported this notion, emphasizing the importance of student engagement and active involvement in the learning process. Overall academic and social integration were interconnected and essential for student achievement, persistence, and overall educational outcomes in higher education.

Vygotsky (1978) supported the idea that learning from interactions fosters growth. Other researchers have supported interaction as a vital element for motivating and creating effective learning, student persistence, and satisfaction (Elshami et al., 2021; Miyazoe & Anderson, 2010). Even with the zone of proximal development (Vygotsky, 1978) concept, distance learning has been transposed to fostering the acquisition of higher cognitive thinking elements by collaborations and interactions among peers. The results of this study supported Vygotsky's theory. As the data analysis showed, if a student has difficulties hearing in class (regardless of the modality), their learning acquisition could be interrupted. In the context of this research, social constructivism provided a relevant lens to examine how students with hearing loss engage in social interactions within the college environment and how these interactions may have influenced their learning experiences and course satisfaction.

Implications

Educators and administrators could better understand the specific needs of individuals with hearing loss by conducting further research and considering the insights provided by scholars like Bell and Swart (2018) and Welling and Ukstins (2019). This knowledge could inform the implementation of appropriate modifications, accommodations, and assistive technologies that could promote inclusive and accessible learning environments for all students, including those with hearing loss. The limited availability of visual and auditory cues in specific classroom settings could pose significant communication challenges for all individuals, particularly those with hearing loss. Welling and Ukstins emphasized the impact of these challenges on individuals with hearing loss, highlighting the importance of finding effective modes of communication that facilitate understanding and participation.

HEI policymakers could consider this study's results and add policies that could provide appropriate support and accommodations addressing the impact of hearing loss on course satisfaction. These included accessibility measures, communication support, enhanced support services, and faculty training. Course materials, instructional resources, and lectures should be more accessible to students with hearing loss. Closed captioning transcripts that are edited to represent the speaker's words on the videos, visual aids and diagrams that can help supplement the auditory information from the instructor, and classroom access to assistive technology such as FM systems or hearing loops would benefit all students (Welling & Ukstins, 2019).

Communication support for instructors should focus on how to communicate with students with hearing loss effectively. Faculty development workshops on proper communication strategies, including facing the audience, speaking clearly, and utilizing nonverbal body language, including gestures and visual cues, should be discussed, along with discussions on promoting a more inclusive classroom, inclusive teaching practices, and strategies for supporting students with hearing loss. These implementations could enhance faculty's ability to create an inclusive learning environment and promote sensitivity and awareness.

In addition to communication support, additional student support services should be refined to promote awareness and the impact of levels of hearing loss. Other support services should include enhanced academic accommodation, including interpreters, academic accommodation, and note-taking. These services are typically offered; however, there is no follow-through after the accommodation is approved. Raising awareness about hearing loss and the services should be a priority in HEIs, especially institutions where retention is down, and attrition is high. The research has shown that students will not seek out accommodations due to feelings of inadequacy (Bell & Swart, 2018; Chung & Sin, 2018; Jafar & Sitther, 2021; Lakhal et

al., 2020; McKeown, 2019; Nelson et al., 2020). Policymakers should take a proactive approach to address the needs of students with hearing loss, which can ultimately foster an inclusive educational environment that promotes students' course satisfaction and overall success.

Understanding these obstacles was essential for fostering empathy and developing appropriate support strategies. In their work, Bell and Swart (2018) emphasized the importance of higher education administration's attention to modifications, accommodations, and assistive technologies for both students and faculty. This highlights the need for institutions to proactively address the needs of individuals with hearing loss and ensure that appropriate resources and support are available to enhance their learning experiences.

The existing research on the challenges in higher education institutions (HEIs), particularly regarding psychological issues in the HOH population, was limited (Saichaie, 2020; Singh et al., 2021; Yang et al., 2021). Other researchers have concluded that students with hearing impairments can experience language, learning, and social disorders (Chodosh et al., 2020; Hsu, 2017; Kaya et al., 2021). The present study sought to fill a critical gap in the existing literature by examining the relationship between course format, course satisfaction, and levels of hearing loss in college students, with a particular focus on students who attended HBCUs.

Considering the study's results on the prevalence of hearing loss among college students, acknowledging the importance of and the need for further comprehensive evidence regarding the most effective course modality in terms of satisfaction for this population was paramount. Further research is needed to provide more robust and conclusive findings to guide policymakers in HEIs in designing and implementing optimal course formats that cater to the specific needs and preferences of students with hearing loss. By addressing this research gap, researchers could

enhance the overall educational experience and satisfaction of students with hearing loss, ultimately promoting inclusivity and accessibility in higher education.

The implications derived from this study are as follows:

1. Importance of addressing the needs of students with hearing loss: The study revealed a statistically significant correlation between course modality, levels of hearing loss, and course satisfaction. This suggests that institutions must prioritize addressing the needs of students with hearing loss. Recognizing their challenges and barriers, educators and administrators could take proactive measures to create an inclusive and supportive learning environment.
2. Enhancing sense of community and belonging: The study found that levels of hearing loss had the highest statistical significance regarding course satisfaction. This highlights the importance of fostering a sense of community and belonging for students with hearing loss. Institutions should strive to promote meaningful interactions, provide appropriate accommodations, and facilitate a supportive social environment to help these students feel valued and included.
3. Consideration of course modality: The study's findings indicate that course modality plays a role in influencing students' satisfaction levels. Institutions should consider providing a range of modalities that accommodate diverse learning needs, including hearing loss, to enhance overall student satisfaction.
4. Further research and development: The implications of the study point to the need for further research and development in accommodating students with hearing loss. Institutions can benefit from conducting additional studies to deepen their understanding

of the specific challenges faced by these students and explore practical strategies to improve their learning experiences and outcomes.

Overall, the implications of the study underscored the significance of creating an inclusive and supportive educational environment that addressed the needs of students with hearing loss, promoted a sense of community and belonging, and considered the impact of course modality on student satisfaction.

Limitations

This study possesses several limitations that warrant acknowledgment. The design of the study is subject to certain limitations that should be addressed. Firstly, the reliance on convenience sampling raises concerns regarding the representativeness of the sample, potentially compromising the generalizability of the findings. A more rigorous approach, such as random sampling, could have bolstered the study's validity. Additionally, the use of a convenience sample introduces limitations to both the internal and external validity of the findings, underscoring the need for caution when interpreting the results. The contextual limitations stem from the study's focus on a single university, which may restrict the generalizability of the results to other settings or populations. The limitations of this study arose from the unique characteristics and circumstances of HBCUs and their student population.

Additionally, the convenience sampling method used in the study could have led to selection bias, as participants were easily accessible and may not have accurately represented the broader population. In this case, the overrepresentation of African Americans compared to other ethnic populations indicated a potential bias in the sample composition. It is important to acknowledge these limitations when interpreting the study's findings. The results may provide valuable insights within the specific context of the university and the core course offered.

However, caution should be exercised when generalizing the findings to other populations or settings. It is worth noting that the percentages of student participants from the majority group align with the local population, considering that the university was an HBCU with a larger minority population.

A third limitation concerning another potential internal validity concern was the presence of measurement bias in the data collection process. While the hearing evaluations were conducted by multiple individuals who received the same training for consistency, there is still a possibility of measurement bias affecting the accuracy of the collected data. The researcher did take this into account and closely supervised every hearing test and reviewed the results to minimize any measurement biases in the data collection process.

In addition, it is important to acknowledge that a portion of the study relied on a survey employing a Likert scale. It is crucial to recognize the inherent limitations associated with this measurement instrument. While Likert scales offer valuable quantitative data, they may only capture a fraction of the complexity inherent in participants' experiences and perspectives. Thus, caution must be exercised when interpreting the results based solely on the survey responses. To obtain a more comprehensive understanding of the participants' experiences and enrich the study's findings, the inclusion of complementary qualitative methods could have been beneficial.

Furthermore, it is essential to consider the potential biases and inaccuracies that can arise from self-reported measures. Self-reporting biases pose another limitation inherent in the study's design. Participants may be inclined to provide answers they believe the researchers expect, leading to distorted findings. To address these biases, it is recommended to employ multiple data collection methods, such as observations or objective measures, alongside self-reporting. By incorporating diverse data sources, the potential biases and inaccuracies associated with self-

reporting can be mitigated. In this study, the researcher took steps to minimize such biases by encouraging participants to provide honest answers and to avoid selecting a particular response option merely to conform (e.g., consistently choosing the neutral option throughout the survey).

Considering these internal and external validity concerns, it is essential to exercise caution when interpreting the study's results and considering their applicability to other populations or settings. The limitations of participant characteristics and the potential biases associated with self-reported measures should be considered during the analysis and interpretation of the findings.

Recommendations for Future Research

Individuals with any level of hearing can face learning barriers with their normal hearing peers. Researchers could consider designing studies that specifically investigate the impact of course format on student satisfaction, considering the influence of hearing-related factors. Ongoing research is crucial to provide educators with valuable data and insights into the challenges individuals with hearing loss face in virtual and face-to-face classrooms.

Scholars have advocated for further investigation into the characteristics of students enrolled in online courses, as highlighted by Fatonia et al., 2020; Ferri et al., 2020; and Fouad et al., 2022. Bali and Liu (2018) discovered a gender imbalance in online course participation, indicating the presence of gender biases, with a higher proportion of females compared to males. Previous research on course formats and learning quality had primarily focused on institutional perspectives, specifically with regards to aspects such as accessibility, effectiveness, and cost-effectiveness (Gómez-Rey et al., 2016; Kurucay & Inan, 2017). According to Faulconer et al. (2018), researchers must prioritize identifying the underlying factors responsible for disparities in student performance across different learning modes.

The following are recommendations for future research:

- Conduct further research to address retention and matriculation issues in higher education institutions (HEIs) and contribute to filling gaps in the existing literature.
- Investigate the impact of different delivery modes on student satisfaction and identify practical pedagogical approaches to enhance learning experiences for all students.
- Utilize a mixed-method approach combining quantitative and qualitative methods to enhance study outcomes.
- Conduct interviews with a subset of students to explore their experiences with hearing loss in the classroom.
- Conduct a longitudinal study to examine the long-term effects of different course modalities on academic performance and overall well-being of college students with hearing loss at different HEIs.
- Investigate factors within hybrid and asynchronous course formats that may contribute to lower course satisfaction scores among students with hearing loss, such as communication barriers, technological limitations, or instructional strategies.
- Explore the impact of individualized accommodations and support services on course satisfaction and academic success of students with hearing loss across different course modalities.
- Compare experiences and outcomes of students with hearing loss in various academic disciplines to identify discipline-specific challenges and opportunities for improving course delivery.

- Examine the role of faculty training and awareness in effectively addressing the needs of students with hearing loss in different course formats and explore strategies to enhance faculty competence and confidence in supporting these students.
- Investigate the influence of additional variables, such as assistive technologies, captioning services, or peer support networks, on course satisfaction and overall learning experience of students with hearing loss in different course modalities.
- Explore the experiences and perspectives of students with hearing loss to gain insights into their unique challenges, preferences, and suggestions for improving course satisfaction and accessibility.

By pursuing these research recommendations, a deeper understanding can be gained of the factors influencing course satisfaction among students with hearing loss. This will provide evidence-based insights to inform the development of inclusive and supportive educational environments.

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APPENDIX A

HEARING SCREENING PROTOCOL

I. Universal precautions will be observed during and after the hearing screenings. The clinician will wipe down the testing area and equipment before and after each student's hearing screening with Clorox wipes. The clinician will also wear a protective face mask on the day of testing.

II. All interactions and student information will be held in strict confidence. No identification of students (other than age, race, and gender) will be available. The information will be stored in a locked office.

III. Consent/Case history questions (see attached) will be given to the student before the hearing screening

IV. Before performing audiometric testing, each participant will undergo an otoscopic examination to ensure no cerumen or outer and middle ear infections are present. The clinician will explain to the students that she will be using the otoscope to check the ear canal to make sure testing can be performed and nothing is impeding testing results (e.g., wax, foreign body, presence of an infection in the ear canal).

V. The clinician will explain the procedure of the hearing screening by stating, "I am going to screen your hearing today. I will put the headphones over your ears (after removing bulky earrings or eyeglasses from the student who could interfere with reliable test results). Once I do this, you will hear some tones or beeps. Every time you hear the sound (even if it is slightly heard), please raise your hand."

VI. The case history/screening form will be filled out during each frequency screened with an "X" under the appropriate heading (response or no response). If a "no response" is recorded, then the clinician will increase the intensity of the signal by 5 dB HL until a response is recorded. She will then decrease by 10, present another stimulus, and if a response is recorded, then will establish the threshold (must have two responses at the same frequency for the threshold). This "down 10, up 5" procedure will continue until two responses at a particular frequency per ear have been recorded. This is the audiometric threshold number recorded on the screening form for each ear. An example, "if the student doesn't respond at the intensity level being tested (20 dB if the testing area is quiet or in a booth, or 25 dB), then the intensity is raised by 5 dB HL. If the student responds, then the clinician will decrease back to the screening intensity level and present another tone. If there is no response, the intensity will be increased by 5 dB HL, and the tone will be presented again. If the student responds, a threshold has been found (e.g., 30 dB HL if the screening level was 25 dB)."

VII. Once the information has been attained, the clinician will take the headphones off the student and thank them for participating in the study. She will let them know if they passed the screening or not.

APPENDIX B

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

February 7, 2023
Diana Blakeney-Billings
Michelle Barthlow

Re: IRB Approval - IRB-FY22-23-678 THE RELATIONSHIP OF LEVELS OF HEARING AND COURSE MODALITY WITH COURSE SATISFACTION: A PREDICTIVE CORRELATIONAL STUDY

Dear Diana Blakeney-Billings, Michelle Barthlow,

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the following date: February 7, 2023. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

4. Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications.)

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX C

Recruitment Letter to Participate

Dear Participant:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Ph.D. The purpose of my research is to investigate the relationship between levels of hearing, course modality, and course satisfaction scores). I am writing to invite eligible participants to join my study.

Participants must be 18 years of age or older, be undergraduate college students and be enrolled in HED 101 via traditional, online, or hybrid formats. Participants, if willing, will be asked to complete the Collaborative Learning, Social Presence, and Satisfaction (CLSS) survey, which takes less than 15 minutes to complete on paper, and agree to a hearing test which will take 15 minutes or less. Demographic information will need to be filled out by each participant before the hearing test is conducted by trained graduate students in the Communicative Sciences and Disorders program. Names and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me to confirm your eligibility and to schedule a hearing evaluation.

A consent document will be given to you before completing the CLSS survey. The consent document contains additional information about my research. If you choose to participate, you will need to sign the consent document and return it to me at the time of the hearing evaluation before completing the CLSS survey.

Participants will be entered in a random drawing to win one of three $50 gift cards to Amazon, Walmart, or Target. A benefit of participating in this study includes obtaining the results from your hearing evaluation.

Sincerely,

Diana Blakeney-Billings, Au.D., CCC-A
Principal Investigator/Ph.D. Doctoral candidate

APPENDIX D

Recruitment: Follow-up

Dear Participant:

As a graduate student in the Department of Education at Liberty University, I am conducting research as part of the requirements for a Ph.D. Last week, a letter was given to you inviting you to participate in a research study. This follow-up email is being sent to remind you to complete the survey and schedule a time for the hearing evaluation if you would like to participate and have not already done so. The deadline for participation is March 10, 2023.

Participants, if willing, will be asked to complete the Collaborative Learning, Social Presence, and Satisfaction (CLSS) survey, which takes less than 15 minutes to complete on paper, and participate in a hearing test which will take 15 minutes or less. Demographic information will need to be filled out by each participant before the hearing test is conducted by trained graduate students in the Communicative Sciences and Disorders program. Names and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me to confirm your eligibility and to schedule a hearing evaluation.

A consent document will be given to you before completing the CLSS survey. The consent document contains additional information about my research. If you choose to participate, you will need to sign the consent document and return it to me at the time of the hearing evaluation before completing the CLSS survey.

Participants will be entered in a random drawing to win one of three $50 gift cards to Amazon, Walmart, or Target. A benefit of participating in this study includes obtaining the results from your hearing evaluation.

Sincerely,

Diana Blakeney-Billings, Au.D., CCC-A
Principal Investigator/Ph.D. Doctoral candidate

APPENDIX E

CONSENT

Title of the Project: The Relationship of Levels of Hearing and Course Modality with Course Satisfaction: A Predictive Correlational Study.
Principal Investigator: Diana Blakeney-Billings**,** Doctoral Candidate, School of Education, Liberty University.

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be 18 years of age or older, be an undergraduate college student and be enrolled in HED 101 via traditional, online, or hybrid formats. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

The purpose of the study is to investigate if there is a relationship between levels of hearing loss, course format, and course satisfaction scores. The predictor variables are the four levels of hearing loss and course format (e.g., traditional, online, and hybrid). The criterion variable is course satisfaction scores.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following:

1. Participate in filling out the collaborative learning, social presence, and satisfaction (CLSS) survey in person as a paper copy. The survey will take less than 15 minutes to complete. The survey includes questions about your attitudes regarding your course satisfaction in the course modality of HED 101. Questions will address the course modality using a Likert Scale of 1 to 5 points on the CLSS aspects found within the various course modalities. You will also be asked for demographic information (e.g., age, race, education level).
2. Participate in a hearing evaluation. The hearing evaluation will begin with an otoscopic examination of each ear canal to ensure no presence of wax or any foreign bodies which could cause false results. You will also participate in listening to verbal instructions for a hearing evaluation which will be given to you by a clinician. These instructions are, "The clinician will place the headphones on your ears. Please remain quiet and listen carefully for a tone or "beeping" sound in your right ear initially. Please raise your hand every time you hear or think you hear the tone. They will become very faint; however, it is important that you respond to each tone. The process will be repeated for the left ear. You must respond with a statement that you understand the directions and are ready for the test." Participate with having headphones placed over your ears after instructions are given for the hearing evaluation. Each ear will be tested separately. Once the hearing threshold has been established for each ear (e.g., the response to the lowest intensity level twice), then the headphones will be removed. This procedure will take approximately 15 minutes.

   The total time for all procedures is less than 30 minutes.

How could you or others benefit from this study?

The direct benefits participants should expect to receive from taking part in this study include increasing their knowledge and understanding of their hearing level as a result of the hearing evaluation.

Benefits to society and to the educational and audiological disciplines include contributing to the body of knowledge about how people's attitudes on course modality affect course satisfaction and to see if hearing loss plays a factor in the course satisfaction results. It is important to understand how one's attitudes impact their course satisfaction. In participating in this study, you are contributing to this understanding. Hearing loss is an invisible disorder which impacts social, emotional, and educational elements. Identification of a loss is key to intervention and assisting with overcoming barriers particularly in educational arenas.

What risks might you experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life. A Doctor of Audiology will be present throughout all of the hearing evaluations to mitigate any physical risks encountered.

Incidental Findings: Should the medical tests associated with the study procedures indicate an urgent medical problem, the researcher will advise you to seek medical attention from a physician. However, neither the Liberty principal investigator, nor any members of the research team will offer a possible diagnosis or additional medical advice to you about your test results.

Injury or Illness: Liberty University will not provide medical treatment or financial compensation if you are injured or become ill from participating in this research project. This does not waive any of your legal rights nor release any claim you might have based on negligence.

How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be kept confidential by replacing names with an ID number.
- Data will be stored on a password-locked computer in a locked file cabinet in a locked office. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.

How will you be compensated for being part of the study?

Participants may be compensated for participating in this study. Participants will be entered into a drawing for one of three $50 gift cards (Walmart, Target, Amazon) as compensation for participating in this study. At the conclusion of the study, the three winners will be contacted, and the gift cards given to them or mailed to the winners.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with either university. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Diana Blakeney-Billings. You may ask any questions you have now.

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you agree to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy of the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

.

_____

Printed Subject Name

_____

Signature & Date

APPENDIX F

Permission from Dr. So and Dr. Brush to use the CLSS questionnaire.

5/3/22, 8:33 AM Mail - Outlook
Tue 5/3/2022 7:46 AM

Dear Diana,
Thank you for your interest in my research. You have my permission to use the instrument. Please give a proper citation in your dissertation.
All the best to your research.
Regards,
Hyo-Jeong

---------- 원본 메일 내용 ----------

Good afternoon,
My name is Diana Blakeney-Billings, and I am a doctoral candidate at Liberty University in the United States. I am doing a predictive correlational study using two predictor variables and one criterion variable. One predictor variable is course modality (e.g., online, traditional hybrid, and traditional face-to-face) and I am also looking at course satisfaction. For these two variables I needed a reliable and valid instrument. Your 2008 study was very informative, and the collaborative learning, social presence, and satisfaction (CLSS) questionnaire is perfect for my study.

As required, I need the author's permission to use the study in written format. I would really appreciate your permission to use this study.
Sincerely,
Diana Blakeney-Billings

5/3/22, 8:32 AM Mail
Re: Requesting permission to use your Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire
Brush, Thomas A.
Tue 5/3/2022 6:44 AM

Good morning, Diana.
I assume you are referring to the instrument used in this study?
So, H. & Brush, T. (2008). Student perceptions of collaborative learning, social presence, and satisfaction in a blended learning environment: Relationships and critical factors. Computers & Education, 51, 318-336.
If so, then you can contact the primary author of the study, Hyo-jeong So (my former student). She is actually the author of the instrument.
Good luck with your study!
Dr. Brush
--

Subject: Requesting permission to use your Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire

Good evening, Dr. Brush,
My name is Diana Blakeney-Billings, and I am a Doctoral candidate at Liberty University. My thesis is a quantitative predictive correlational research design study that will examine the relationship between two predictive values (e.g., levels of hearing and course modality) and one criterion variable of course satisfaction. I want to administer the Collaborative Learning, Social presence, and Satisfaction (CLSS) instrument completely; however, the study will primarily focus on the satisfaction scores of the sample population.

As a requirement for this dissertation, I must reach out to the author of the CLSS questionnaire and get permission from the author.

I appreciate your consideration, and I look forward to hearing from you soon.

Sincerely,

Diana Blakeney-Billings, Doctoral Candidate