

**ZOOMING IN ON ZOOM FATIGUE: A CASE STUDY OF VIDEOCONFERENCING
AND ZOOM FATIGUE IN HIGHER EDUCATION**

by

Chandra Kaye Massner

Liberty University

A Dissertation Proposal Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

School of Communication and the Arts

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APPROVED BY:

Carol E. Hepburn, Ph.D., Committee Chair

Carey L. Martin, Ph.D., Committee Member

Robert K. Mott, Ph.D., Online Program Chair

ABSTRACT

The purpose of this qualitative case study was to explore how faculty and students in higher education experience videoconferencing in online courses and why they feel fatigue. Zoom fatigue, the exhaustion users feel when communicating through videoconferencing platforms, is a recently identified phenomenon associated with the extensive use of synchronous videoconferencing communication. The research employed a qualitative case study approach to investigate how faculty and students experience videoconferencing and Zoom fatigue in online courses at a small liberal arts university in Appalachia. Document review, qualitative surveys, and in-depth interviews informed the case study. Faculty and student respondents reported dissatisfaction with teaching and learning through videoconferencing, although their experiences were vastly different. Communication deficiencies inherent in the medium were identified as causing significant interferences for teaching and learning. Based upon findings, a model of Zoom fatigue is proposed that attributes the phenomenon to situational, individual trait, environmental, and communication factors. As online education continues to grow, it is valuable for higher education administrators and instructors to understand how to most effectively interact with students in online environments and what role videoconferencing and Zoom fatigue may play in disrupting that process.

Keywords: Videoconferencing, Zoom fatigue, Online education, Distance education

Copyright Page

Dedication

This dissertation is dedicated to my parents and my daughter. My mom and dad taught me the importance of faith, love, hard work, and education. They always believed in me, even when I doubted myself. My daughter is my inspiration and joy. My hope is that my work will challenge her to even greater heights and strength. Finally, this dissertation is dedicated to the memory of Curt and his unconditional love. I miss him dearly.

Acknowledgements

This dissertation represents the culmination of doctoral work that began 25 years ago. Proverbs 16:9 states, “In their hearts, humans plan their course, but the Lord establishes their steps.” I could not envision everything that came to pass in those intervening years, but I am grateful that God had a plan for me. As Jeremiah 29:11 reminds me, “‘For I know the plans I have for you,’ declares the Lord, ‘plans to prosper you and to not harm you, plans to give you hope and a future.’” I acknowledge this dissertation was completed in His time and under His direction and guidance. He led me to the place, people, and time to make this milestone possible.

I would not have been able to complete this project without the encouragement and support of a community of colleagues, mentors, friends, and family. Thank you to the Appalachian College Association’s support through its Fellowship Program. I owe a deep debt of gratitude to my home institution, including members of the faculty executive committee and the administration, Burton Webb and Lori Werth, for granting me a sabbatical to provide the time I needed to devote to this project and degree. Thank you to Brandi Gollihue for her expertise in administering the fellowship. Thank you to Pam Gilliam, whose presentation a few years ago inspired me to not give up on my dream. I am especially thankful for members of the division of social sciences for their friendship, faith, and guidance, especially Eric Primm who allowed me to bounce ideas off of him about my project throughout my program. Thank you to members of my squad, Nancy Cade, LeAnne Epling, and Rachel Little, who listened to me, believed in me, and pushed me to achieve. The spiritual life team also deserves specific mention. Thank you to campus chaplain Rob Musick and student chaplain Joey May for their insights. Meg Sidle provided additional assistance and guidance throughout my doctoral program, and I am grateful for her wisdom. Thank you also to Jonathan Williamson and Anthony Kelly for their help and to

Haley Fannin for proofing. This dissertation would not be possible without a large group of faculty and students who completed surveys and participated in lengthy interviews. I cannot thank them by name here in order to maintain their confidentiality, but all of them are greatly appreciated. I hope I have represented their voices sincerely and authentically.

Thank you to faculty members of the Liberty University College of Communication and the Arts. I am grateful for the opportunity to earn a doctoral degree in communication remotely, so I appreciate the work of faculty members there to establish this program, especially Dr. Robert Mott, who also provided guidance and support throughout my doctoral program. My chair, Dr. Carol Hepburn, has been a real blessing. Her mentorship, guidance, compassion, and wisdom directed my dissertation journey, and I am thankful God placed her in my life. Thank you, also to Dr. Carey Martin, for his support and guidance in my program and as part of my committee. I also appreciate Dr. Shannon Leinen's feedback. Navigating a new doctoral program online was not easy, and I am grateful for the encouragement from members of that new community, especially Erin Black, Holly Walker, Rachel Little, Randy Townley, and TJ Zito.

Thank you to my parents, for always encouraging me to not give up on my dream. Thank you for helping me make this dissertation and degree a reality. I owe much appreciation to my daughter, Amanda Mae, for reading multiple drafts, suggesting revisions, and assisting me with all of the details. I raised a smart, strong, capable young woman, who helped me in too many ways to list, and I am grateful for her every day. I'm also grateful for my furry companion, Fitz.

I don't recommend quarantining yourself with a dissertation, but I acknowledge that the events of 2020-2021 created a focused environment for me to finally accomplish a goal I set many years ago. Thank you to everyone who made that possible. I learned it's never too late to set a new goal or dream a new dream.

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List of Abbreviations

American Telephone & Telegraph Company (AT&T)

Institutional Review Board (IRB)

Learning Management System (LMS)

National Association of Independent Colleges and Universities (NAICU)

Videoconferencing (VC)

CHAPTER ONE: INTRODUCTION

Overview

The global health pandemic of 2020 hastened a paradigm shift in higher education to online learning that had been developing for years as communication technologies presented opportunities for learning to continue amidst new social distancing mandates. Faculty members at higher education institutions across the country scrambled to shift their courses from face-to-face classes to a virtual instructional delivery mode during the spring 2020 semester as part of larger societal lockdowns (Ralph, 2020). When the worldwide COVID-19 pandemic necessitated the shutdown of the nation's economy, and mandatory social distancing measures were enacted, the disruption to everyday life was mitigated by the greater implementation of communication technologies, especially videoconferencing. After stores, restaurants, and other businesses shuttered, unemployment soared. Schools closed their doors, while colleges sent students home. People turned to remote working, learning, shopping, and worshipping in record numbers as they used technology in previously unimagined ways to substitute for in-person interactions (Rudick & Dannels, 2020).

Online education offered an avenue for students to continue learning while maintaining the required safe social distance. This massive, abrupt pivot to fully online instruction provided both opportunities and challenges for educators in colleges and universities. Online education, which had been increasing its prevalence in recent years (Seaman et al., 2018), suddenly became the predominant method of instruction (Ralph, 2020). The major transformation in instructional delivery was met with mixed results as the unanticipated disruption caused significant distress and turmoil for instructors and students alike (Quintana, 2020). Faculty members struggled with how to best communicate with their students since their previous in-person lecture, discussion,

laboratory, and office hour times had been unexpectedly displaced by a variety of digital instructional tools, including learning management systems (LMS), email, and videoconferencing (VC) platforms. Notably, VC tools, such as Zoom and Microsoft Teams, became a considerable part of many faculty members' and students' everyday activities (Mukherjee & Rana, 2020). While VC was heralded as the closest substitute to face-to-face instruction, many faculty and students reported using the tools was "exhausting," prompting journalists in the popular press to label this new phenomenon "Zoom fatigue" (Bailenson, 2021; Supiano, 2020).

As universities and colleges strive to plan for an uncertain future of higher education, it is apparent a mixture of face-to-face, hybrid, remote, and online instruction will be both necessary and advantageous in the coming years. College students are increasingly learning online (Seaman et al., 2018), and VC is becoming a widespread method of teaching virtually (Ralph, 2020). For these reasons, videoconferencing (VC) fatigue, the general term for a newly identified communication phenomenon resulting from the increased use of synchronous, mediated communication, is clearly worthy of further analysis and understanding in educational contexts. Studying the VC experiences of faculty and students will provide vital insights into how the tool can be strategically used in online learning to meet the needs of students because synchronous online learning will almost certainly continue to play a significant role in instructional delivery methods. Therefore, this study explored how videoconferencing and the problem of Zoom fatigue are experienced within higher education contexts.

This chapter will introduce the topic of videoconferencing and Zoom fatigue and include an overview of the study by providing relevant background information, the statement of the problem, its significance, and the research purpose. Research questions will also be posed.

Definitions of relevant terms will be presented, as well as assumptions.

Background

The use of VC platforms, such as Zoom and Microsoft Teams, exploded in 2020, and their extensive presence in everyday life will likely continue (Wiederhold, 2020). Remote work and education are becoming increasingly more prevalent in the changing economy of the twenty-first century (Gallup, 2017). Driven by the need for remote working and learning, VC platforms quickly became a popular, indispensable part of daily activities. Sullivan-Hasson (2020) described how VC is now an integral part of everyday life, helping users navigate the challenges of social distancing, remote work, and online learning. When face-to-face communication is not possible, VC intuitively feels like a logical substitution due to its media richness (Daft & Lengel, 1986) and similarities to in-person interactions. VC simulates face-to-face encounters because users can see and hear others simultaneously, in real-time (Bailenson, 2021). Traditionally, VC was used in business and educational contexts as a supplemental method of interacting with people across geographic distances. The technology was not designed to serve as the dominate form of communication for educational purposes. As VC became more prevalent, concerns about its implementation developed.

Videoconferencing in Higher Education

During the pandemic of 2020, the traditional ivory towers of America's colleges and universities were transformed by LMS, discussion boards, learning modules, and videoconferences. In this new virtual world of higher education, students and faculty connected through various digital tools. Overwhelmingly, faculty reported they used VC tools, such as Zoom and Microsoft Teams, to respond to the emergency transition to online learning during the spring 2020 semester (Ralph, 2020). VC provides simultaneous visual and verbal

communication, and these tools facilitated faculty members' and students' adjustments to the virtual learning environment. About 80 percent of faculty members reported using VC tools (Ralph, 2020), yet Supiano (2020) found that early into the shift to online education, faculty and students both complained about the mental and emotional toll of VC, describing tools, such as Zoom, as exhausting. VC has been widely accepted in higher education when face-to-face instruction is not possible. Pedagogically, college faculty embraced VC in spring 2020 because it instinctively felt like the best alternative to face-to-face instruction (Supiano, 2020).

However, research demonstrates that may not be the case, as instruction through VC is problematic. Al-Samarraie (2019) claimed that VC presents several challenges for teachers and students, including the fact that VC is more teacher-centered than student-centered, and it is less interactive than other pedagogical approaches. Other studies on videoconferencing in higher education have considered achieving learning outcomes (Bertsch et al., 2007), evaluating student collaboration (Fitzsimons & Turner, 2013), and motivating students (Gillies, 2008). While the popular press has discussed the problems with Zoom fatigue, the topic has generated little scholarly attention (Bailenson, 2021; Lee, 2020) since it is a fairly new identified phenomenon.

For all of VC's benefits, the increased use of video calls in people's daily lives has also led to intense feelings of tiredness. The popular press named the phenomenon associated with the exhaustion "Zoom fatigue," after the most prevalently used platform (Bailenson, 2021; Fosslien & Duffy, 2020; Kobie, 2020; Sander & Bauman, 2020; Wiederhold, 2020); however, the same feeling occurs with other such platforms, including Microsoft Teams and Skype, so VC fatigue is a more generalized term for the phenomenon. Many journalists explained the phenomenon through a psychological approach, yet the feelings are intimately connected to problems with the communication process as users experience it on VC (Bailenson, 2021). Sander and Bauman

(2020) claimed that the fatigue is attributable to the increased emotional effort it takes to participate in online meetings. They outlined a number of factors that contribute to the exhaustion. It takes more effort to process nonverbal communication cues on video than it does in person because even small differences in transmission rates cause dissonance and the screens don't usually capture all of the body language seen in face-to-face interactions, increasing the difficulty in processing nonverbal information (Schroenenberg et al., 2014). There is also increased anxiety about remote workplaces and constant home distractions as people deal with complications of communicating in spaces not conducive to the concentration required for the tasks before them (Fosslien & Duffy, 2020; Sander & Bauman, 2020). An emphasis on facial cues (Bailenson, 2021; Sander & Bauman, 2020) and the ability to see oneself, at a hyper-awareness level, further increase the stress-level and cognitive fatigue (Bailenson, 2021; Ferran & Watts, 2008; Fosslien & Duffy, 2020; Kobie, 2020; Sander & Bauman, 2020). Fosslien and Duffy (2020) added that it's easier to lose focus in video meetings due to the constant barrage of visual cues through the matrix of faces presented on the screen. Listening is also different on video than in face-to-face conversations. Users exhibit a constant eye gaze to show they're listening on video calls, which differs from listening in person when such staring would be considered rude (Bailenson, 2021; Fosslien & Duffy, 2020).

The problem with VC tools can be understood from a media richness perspective (Kobie, 2020). Phone calls focus attention on verbal communication, including the words and tone of voice. Face-to-face meetings are easier to cognitively process than VC meetings because they provide richer verbal and nonverbal data. During VC, verbal and nonverbal cues are mediated through digital tools, which are seemingly synchronous. Actually, VC offers an illusion of synchronicity, and the slight lags in transmission create a sense of cognitive dissonance for users,

which requires increased mental effort to process (Schroenenberg et al., 2014). VC interactions are more media rich than phone calls, but the way in which the interactions are mediated cause numerous opportunities for communication breakdowns.

Users assume that VC's promise of simultaneous verbal and nonverbal interaction is equivalent to in-person communication, but the mediated communication differs in a number of factors common to natural face-to-face communication patterns. The mediated communication violates several interpersonal communication rules, including those related to eye contact, turn-taking, and non-verbal cues (Bailenson, 2021; Feder, 2020; Ferran & Watts, 2008; Fosslien & Duffy, 2020; Kobie, 2020; O'Connell et al., 1993; Sander & Bauman, 2020; Storck & Sproull, 1995). Eye contact is prolonged and sustained during VC, which is uncomfortable for users during extended times, because brief moments of eye contact are associated with natural interpersonal communication (Bailenson, 2021; Sander & Bauman, 2020). There is intense attention on the face during VC because the screen generally focuses on individuals' faces. With this facial emphasis, fewer nonverbal cues are available, so viewers must fill in the missing nonverbal cues, leading to possible communication breakdowns (Bailenson, 2021; Kobie, 2020; Tufvesson, 2020). The technology used during VC complicates the natural flow of interpersonal communication because turn-taking becomes more difficult to manage (Feder, 2020). The mute button must be turned on and off during large video calls, so extraneous sounds do not interfere with the intentional messages. Turning the mute button on and off appropriately creates awkward periods of time that interfere with the natural rhythm of interpersonal communication (Jiang, 2020). Overlapping, a common interpersonal behavior during meetings, does not translate in the mediated communication, further disrupting VC and creating problematic periods in which communication breakdowns occur (Feder, 2020). Due to a continuous feedback video loop, VC

creates an unnatural ability to self-monitor, and this further divides the attention of users and creates an environment that may hinder communication goals (Bailenson, 2021; Miller, 2020; Nicandro, 2020; Tufvesson, 2020). Communication is a complex, interactive process that includes a source, receiver, message, channel, feedback, and context. Any interference that affects one of these factors can cause a communication breakdown (Shannon & Weaver, 1949). VC presents the opportunity for several such breakdowns because it violates the norms of several interpersonal behaviors.

During VC, the communication process is affected in numerous ways that contributes to users' mental and emotional fatigue. Verbal interactions during VC are negatively affected through the mediated environment (O'Connell et al., 1993; Storck & Sproull, 1995). Verbal communication in VC takes place in what is considered real-time, but since it is mediated, there is a transmission time lag, even when the technology works efficiently. Research has demonstrated that even small differentials in transmission affect how conversation partners are viewed (Schroenenberg et al., 2014). When technical issues with internet connectivity occur, increased lags, silence, or distorted voices may result, further confounding the verbal communication process. Turn-taking and overlapping are also problematic during VC as users attempt to negotiate the use of the microphone and mute buttons (Feder, 2020; Jiang, 2020).

In addition to the complexities of the verbal communication during VC, the mediated communication on the screen also confuses the situation. Nonverbally, the torso and head are routinely the focus of VC screens (Storck & Sproull, 1995), so there is an intense emphasis on facial features, including persistent eye contact (Bailenson, 2021; Ferran & Watts, 2008; Fosslien & Duffy, 2020; Sander & Bauman, 2020). With this concentration on facial features, other nonverbal cues are largely lost during VC, so users attempt to fill-in incomplete nonverbal data

(Kobie, 2020; Tufvesson, 2020). These irregular communication patterns are multiplied several times during VC meetings because users are confronted with a matrix of faces, vying for their attention (Miller, 2020; Nicandro, 2020; Tufvesson, 2020). There is a heightened sense of the self during VC because there is a continuous feedback video available (Bailenson, 2021; Davis, 2020; Dewal, 2016; Jiang, 2020; Morris, 2020; Nicandro, 2020). Users may be distracted by this mirror effect that creates a hyper-version of the self, concentrating more on themselves than on the purpose of the video call. Continual self-monitoring leads to increased impression management behaviors (Goffman, 1959) and may cause self-esteem issues further complicating the sense of fatigue (Davis, 2020; Dewal, 2016; Jiang, 2020; Miller, 2020). VC, which is often seen as an acceptable substitute to face-to-face communication, is inherently inferior in verbal and nonverbal communication cues, violating users' expectations of interpersonal interactions. These deficiencies in communication also promote users' sense of fatigue as they add to the cognitive effort required to participate in VC.

Online Learning in Higher Education

The use of VC in online courses is situated within the greater context of online learning in higher education. Online education at the collegiate level began in the 1980s, but since the early part of this century, online enrollment has steadily increased (Harasim, 2017; Lederman, 2018; Seaman et al., 2018). Overwhelmingly, the majority of online learners have historically been non-traditional students, who are 25 and older (Seaman et al., 2020). However, in recent years, more traditional-aged college students have been taking some classes online (Seaman et al., 202). In 2020, the massive transition to online education abruptly forced the majority of traditional aged college students into virtual classrooms (Ralph, 2020). These students did not plan to learn online, and the long-term effects of this disruption to their intended educational plan

remain to be seen. Online education, which became the predominant mode of higher education during a public health crisis, will likely continue to play a significant role in the future of higher education. The higher education industry was already preparing to counter the predicted shrinking enrollments of traditional aged college students (18-24 years of age) in upcoming years by increasing its online education offerings to non-traditional students (Muljano & Luo, 2019). The results of a heightened number of online teachers and learners during 2020 will likely have meaningful impacts on higher education.

Prior to the pandemic of 2020, higher education was in a state of transition, and educators have been seeking to balance the use of technology with the learning needs of students. Since most social interaction is currently mediated through technology, college students expect to use online learning tools in their courses (Feenberg, 2017; Ledbetter & Finn, 2018). Today's college students represent the most connected generation ever. They are described as technologically savvy, independent, innovative, self-sufficient, self-aware, creative, pragmatic, and tenacious (Beck & Wright, 2019; Schwieger & Landwig, 2018). They expect to use technology in their college courses, but they prefer to make the decisions about which online tools to use in their learning, and they report they are more comfortable with moderate use of technology in their courses (Abdelmalak, 2015; Jang, 2015; Gutierrez-Porlan et al., 2018; Ledbetter & Finn, 2018; Palmer et al., 2014; Volvanta & Avraamidou, 2018). In other words, college students want to use technology in their learning, but they would rather select the specific tools to use rather than having specific technological tools mandated by instructors. They also do not want to over-rely on technology for their learning. Numerous online communication channels are available to faculty and students, including VC, collaborative tools, chat, email, social networking sites, and LMS functions (Abdelmalak, 2015; Gutierrez-Porlan et al., 2018; Hamid et al., 2015; Jang,

2015; Supiano, 2020). Faculty must ascertain which communication channels will best help students achieve learning outcomes while increasing student satisfaction and online retention (Muljano & Luo, 2019). The digitized media landscape must carefully be navigated by faculty members to encourage student success. The disruption caused by the pandemic of 2020 forced traditional-aged college students to learn online, which did not reflect their preferences or desires and may have negatively affected their learning experiences.

While online education is widely accepted as an effective means of education, online persistence is a demonstrable problem. Although more than a third of all higher education students enroll in at least one online course, completion and graduation rates are lower for online learners than traditional in-person learners (Muljano & Luo, 2019; Simplicio, 2019). A number of factors contribute to lower retention and persistence rates for online learners, including financial, personal, and motivational reasons. Existing research demonstrates that engagement is a pathway to increasing student retention and achievement. Therefore, building community is essential to promote effective online learning, and evidence exists that the use of VC tools contributes to online learning success because it increases a sense of community for remote students (Scagnoli et al., 2019; Al-Samarraie, 2019).

Existing research has considered a variety of online educational tools, such as wikis, blogs, social networking sites, and collaboration tools (Abdalmalak, 2015; Hamid et al., 2015; Ledbetter & Finn, 2018), while less is known about the use of video and VC in online courses. Some studies have found the use of videos increased learning and student-instructor interaction (Scagnoli et al., 2019; Al-Samarraie, 2019). However, Supiano (2020) claimed VC might not provide the most effective method of online instruction, so more research is needed about synchronous online learning and VC.

Communication is a two-way process, and for effective communication to take place, more information is needed about how both instructors and students experience communication in online college courses. Little to no research about faculty members' preferences about communicating with online students is available (Adams, 2019). How and why faculty members select VC in their courses is worthy of exploration. The current study examined both faculty and student perspectives of VC and Zoom fatigue.

Online education is the most recent mode of distance education, which began about 150 years ago. Worldwide, more than a third of higher education students study remotely (Anderson, 2008; Lee, 2017; Roberts, 2019). Online learning started during the 1980s and 1990s as computer conferencing and computer networks offered new opportunities for course delivery (Harasim, 2000). In 1993, the Web spurred the increased use of online tools for educational purposes (Anderson, 2008; Roberts, 2019). The first online courses and programs were text-based and effective (Feenberg, 2017; Harasim, 2000), but technological advancements during the 2000s, further emphasized increased interaction in online educational environments, and various social networking tools are also being applied in instructional contexts (Harasim, 2017).

During the last 20 years, online education became more prevalent on college campuses, increasing its reach each year (Seaman et al., 2018). In 2020, online education realized its full potential when the majority of American college courses transitioned from face-to-face to online instruction. The massive shift to online education affected 90% of U.S. college and universities in spring 2020 (Ralph, 2020). In fall 2020, the *Chronicle of Higher Education* reported 44% of higher education institutions were fully or primarily online in fall 2020, with another 21% using a hybrid approach that included an online learning component (Elias et al., 2020). Overall, the higher education industry has a vested interest in the success of virtual instruction as it presents a

much-needed opportunity for enrollment growth and a solid stream of revenue in the future. Typically, online education appeals to adult learners, and higher education institutions will need to entice these potential students since the population of traditional college-aged students is predicted to shrink in the coming years (Marcu & Danubianu, 2019; Ortagus & Tanner, 2019).

These paradigmatic changes in higher education have positive ramifications, according to some scholars. The current crisis is teaching students how complex the world is and how an integrated education is best poised to respond to the challenges of tomorrow. Hanstedt (2020) explained, “[T]he global pandemic is breaking the boundary between static university learning and the wicked fluidity of the world” (para. 8). Twenty years previously, one of online education’s pioneers encouraged educators to consider the far-reaching ramifications of online education. Harasim (2000) claimed, “Humans have experienced several paradigmatic shifts, but they have never intentionally shaped them. Today, we have the unique opportunity and responsibility to engage in designing, at least to some degree, the world that we and future generations will inhabit” (p. 52). Part of those transformations include the use of various instructional technologies, such as VC, which will shape higher education and learning for the foreseeable future. While the future of higher education will undoubtedly feature technological advancements, these innovations must be tempered by the ability of instructors and institutions to implement them in effective instructional design to assist students in successfully navigating online learning (Simplicio, 2019).

The development of the internet and subsequent applications have had profound impacts on everyday life. Education has experienced, and will continue to experience, the consequences for years to come as online course design continues to change and evolve. Professors were among the early adopters of computer networks, computer-mediated communication, and the

Web. Today, the internet is an integral part of higher education in both in-person and online environments. Harasim (2017) challenged educators to consider how they view learning in today's technological, mostly online world and how they can better shape the future of education to improve student learning. With most individuals possessing access to email, social networks, and mobile technologies, a fundamental change in higher education is developing. Harasim (2017) called for a transformation, stating, "It is time for an educational paradigmatic shift to transform learning from didactic instruction to the collaborative knowledge-building discourse that reflects and coheres with the 21st-century Knowledge Age" (p. 185). This shift may now be underway, given the rush to online instruction necessitated by the coronavirus pandemic of 2020. Galloway (2020) argued the pandemic wouldn't change the future of education, but it would accelerate it, explaining, "While other crises reshaped the future, COVID-19 is just making the future happen faster" (para. 4).

Colleges and universities must prepare because the future is now, and the promise of online education is here. How colleges and universities respond long-term to the lessons they take from 2020 will shape higher education and learning for the foreseeable future. Successfully navigating the online education landscape will separate the institutions that survive and thrive from those that don't. Online education's role in higher education has been strengthened and legitimized after it became the predominant mode of higher education during a public health crisis. It is likely online education will significantly impact the future of higher education and play a significant role in many learners' lives. As the design and delivery of online education evolves, it is essential research continues to consider how the use of various online communication tools affect faculty and students. Research needs to consider asynchronous and synchronous approaches and determine how faculty and students may perceive the use of these

tools. VC tools, in particular, need more research because they are being more widely adopted, and these synchronous tools offer benefits and challenges. Such research requires a communication perspective to fully understand the complex nature of the mediated learning environment.

Communication Perspective and Theoretical Approach

The current study approached the problem of VC fatigue from a communication context. As it investigated the problems associated with VC fatigue in higher education, this study contributes to mass communication scholarship within the sociopsychological tradition of mediated communication research. Craig (1999) described the sociopsychological tradition as “a process of expression, interaction, and influence” (p. 143). The sociopsychological tradition is primarily interested in how individuals interact and influence behavior and attempts to explain social behavior. Behavior can be influenced by context, and that is the central concern in the proposed study as it seeks to understand how students and faculty perceive videoconferencing fatigue in the online learning context.

VC fatigue will be explained through the framework of three communication theoretical perspectives, which include media richness theory (Daft & Lengel, 1986), self-presentation theory (Goffman, 1959), and expectancy violations theory (Burgoon & Hale, 1988). Media richness theory provides a way to understand why faculty members include VC in their online courses. Self-presentation theory is used to illustrate how VC users attempt to manage their impressions during video calls and the effect this process has on VC fatigue. Expectancy violations theory demonstrates how VC violates expected interpersonal communication patterns. Through these theories, how videoconferencing and Zoom fatigue functions in online courses will be understood.

Problem Statement

The problem of using videoconferences during online higher education courses is fatigue, which creates potential learning disruptions and deficiencies. Despite its ability to provide synchronous verbal and nonverbal communication, videoconferencing causes fatigue. Although the use of VC is intended to add immediacy and increase interaction during online courses (Clark et al., 2015; Gillies, 2008; Francescucci & Rohani, 2019; Themelis & Sime, 2020; Watts et al., 2016), extended use contributes to a recently identified phenomenon, Zoom fatigue, or more generally speaking, VC fatigue (Fosslie & Duffy, 2020; Kobie, 2020; Sander & Bauman, 2020; Wiederhold, 2020). VC fatigue is a new concern that developed during the exponential increase in the use of VC as a result of social distancing requirements during the pandemic of 2020. This phenomenon potentially affects 46% of college faculty who teach online (Lederman, 2020a; Magda, 2018) and the more than six million students who learn online (Seaman et al., 2018). While online learners represent a third of all higher education students, online retention numbers are significantly lower than face-to-face retention rates (Seaman et al., 2018). Research demonstrates that improving interaction between students and with instructors increases retention (Watts et al., 2016). With its simultaneous verbal and nonverbal capacities, VC is viewed as a tool to improve student-instructor and student-student interpersonal interactions in online courses. However, faculty and students describe the use of VC as exhausting (Nicandro, 2020; Quintana, 2020). VC fatigue is a significant problem for online education, negatively affecting students and faculty. There is a lack of research about how faculty and students experience VC in higher education contexts; specifically, VC fatigue has not been considered in the literature. Since VC fatigue is a recently recognized phenomenon, higher education administrators, online

course developers, and instructors need a better understanding of how students perceive and react to the use of VC in online courses.

Motivation, student collaboration, learning outcomes, and pedagogy have been the focus of past studies about the use of VC in higher education (Al-Samarraie, 2019; Bertsch et al., 2007; Fitzsimons & Turner, 2013; Gillies, 2008), but the current literature has not adequately examined the use of VC in higher education. Since Zoom fatigue only recently emerged as a problem due to the exponential increase in VC use predicated by a global health pandemic, there is limited scholarly research (Bailenson, 2021; Lee, 2020) about its particular impact on higher education. Zoom fatigue is an issue that is experienced within a bounded environment, so it may be studied effectively with a qualitative case study research approach. A single-site case study allowed the researcher to explore VC and Zoom fatigue in-depth and understand how faculty members and students experience it during online education. Higher education institutions can learn from the case, and it can inform their plans and strategies to improve online instruction and address online retention.

Significance of the Study

The problem of increased use of videoconferences and Zoom fatigue in online education is a significant new issue for higher education institutions to recognize. The current study benefits higher education institutions by providing valuable insights into faculty and student perceptions of VC use and fatigue, allowing institutions to identify how to best integrate VC. With online learning continuing to expand, meaningful online instructional delivery is essential for students to achieve outcomes and persist in programs. Universities must determine how to efficiently and effectively deliver online content to survive in a competitive educational environment that increasingly relies on digital content. Educators are encouraged to implement a

variety of digital tools in their instruction, and the use of VC in online courses is exponentially increasing. Although this synchronous form of online learning may add to the immediacy and interaction during online courses, VC fatigue may be detrimental to the learning process.

Administrators and faculty members are faced with making decisions about the best use of online learning tools. To better understand what role VC should play in online education, these stakeholders need to better understand how VC fatigue affects online learning. With widespread online education and the implementation of VC in online learning, it is imperative higher education institutions consider how Zoom fatigue impacts faculty and students. This study is valuable to administrators who are responsible for the planning, training, and implementation of existing technologies at their institutions. The research also provides insights to online instructors as they design their courses and select appropriate media to communicate with their students in ways that support learning, achievement, and retention.

Research Purpose

Higher education is experiencing a paradigm shift in learning as digital learning tools and online education are growing at phenomenal rates. In 2018, one-third of all higher education students worldwide studied online (Seaman et al., 2018). In spring 2020, 90% of American colleges and universities transitioned their courses online (Ralph, 2020). While research demonstrates online education achieves similar outcomes as face-to-face instruction (Bell & Federman, 2013; Bernard et al., 2014; Wang et al., 2013; Zhao et al., 2009), online instructors grapple with which digital tools to use to meet learning outcomes and retain students. The use of synchronous VC online instruction has grown exponentially due to demands necessitated by a global health pandemic and instructors' desire to replicate their face-to-face courses in a digital environment. Despite its widespread use, little is known about the use of VC in higher education.

Current literature has not adequately studied synchronous VC instruction in online education, and the problem of Zoom fatigue in higher education has not been investigated.

The purpose of this qualitative, single-site case study was to describe the experience of VC and Zoom fatigue in online courses by faculty and students. VC fatigue is the feeling of exhaustion associated with the extensive use of VC tools. The overall goal of this study is to understand how VC and Zoom fatigue affect faculty and students in online courses. This case study specifically provides a detailed description of one institution's use of VC in online courses and how VC fatigue impacts faculty and students in online courses.

Research questions provide the foundation for the research design, data collection, analysis, and interpretation of results (Creswell & Creswell, 2018). There should be a fit between the research questions and the research design inquiry. For case study research, Creswell and Poth (2018) recommended research questions be phrased in the terms of "how" or "why." The purpose of this research is to explore how and why faculty and students experience videoconferencing fatigue during online courses.

Research Questions

The current study will explore several research questions.

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?

RQ3: How does mediated communication through videoconferencing affect college students as they learn online?

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?

Definition of Terms

An analysis of VC and Zoom fatigue must be rooted in the common understanding of several related concepts. The following terms are defined to provide an understanding of how they are applied specific to this study.

Asynchronous learning: Interactive learning that takes place at separate, independent times. This self-paced, independent type of learning allows learners flexibility to participate in the education process when it is convenient in their schedules and where it is convenient for them. Time and location are independent of the instructor (Francescucci & Rohani, 2019; Skylar, 2009; Watts, 2016).

BigBlueButton: An open source videoconferencing platform for education integrated into learning management systems (BigBlueButton, 2021).

Cognitive load: The amount of information that an individual's capacity for working memory (Ferran & Watts, 2008; Hinds, 1999).

Distance education: Learning that takes place when the instructor and student are in different locations, geographically. Teaching and learning occur apart from each other and are facilitated by various communication means (Abrami et al., 2011; Lee, 2017; Moore, 2018; Renes & Strange, 2011; Seaman et al., 2018).

Hyflex: A course design model that integrates hybrid learning and a flexible structure, allowing students to take a course in-person synchronous, online synchronous, and online asynchronous (Gannon, 2020).

Online education: Learning that takes place entirely through the internet and learners use various technological tools and applications to interact with instructors, content, and other students (Harasim, 2000; Lee, 2017).

Social distancing: Process of keeping a recommended safe physical distance from other individuals to prevent the spread of a contagious disease (CDC, 2020).

Synchronous learning: Interactive learning that takes place when instructors and learners participate in the education process at the same time. This type of learning is scheduled and simultaneous in real-time (Francescucci & Rohani, 2019; Skylar, 2009; Watts, 2016).

Traditional-aged college students: College students who are 18-24 years old.

Videoconferencing: An online platform that offers functionalities, such as synchronous audio, video, text-chat, screen-sharing, polling, breakout rooms, and other interactive tools (Al-Samarraie, 2019; Altiner, 2015; Lawson et al., 2010).

Videoconferencing fatigue: Intense feelings of exhaustion after extended use of videoconferencing tools. Also known as Zoom fatigue (Bailenson, 2021; Jiang, 2020; Leazenby, 2020; Lee, 2020; Miller, 2020; Morris, 2020; Supiano, 2020; Wiederhold, 2020).

Zoom: A term that is used to mean videoconferencing in a general sense, although it is but one platform that offers the communication technology (Bailenson, 2021).

Assumptions

Communication researchers ask why people act, think, perceive, and communicate how they do and what effect that behavior may have on others based upon their worldview and a desire to examine social phenomena. All researchers' backgrounds and histories affect their worldview, philosophy, and orientation to research. Creswell and Poth (2018) explained a researcher's philosophical worldview is based on their ontological, epistemological, axiological,

and methodological beliefs. These philosophical considerations address how researchers view reality, knowledge, value, and procedures. The researcher's worldview and philosophical assumptions closely align with a qualitative orientation to social research.

This research is also influenced by a Christian worldview that affects the academic assumptions and philosophical approaches to research. While all social researchers are held to strict ethical obligations, Christian scholars have higher standards. Jesus says in John 12:26, "If anyone serves me, he must follow me" (*English Standard Version Bible*, 2001/1769). Christians are compelled to follow the example of Jesus Christ in all that they do, including their work. A Christian worldview calls Christians to serve the Lord and following Jesus' example, to serve others before themselves. Mark 10:45 reminds, "For even the Son of Man came not to be served but to serve, and to give his life as a ransom for many" (*English Standard Version Bible*, 2001/1769). Christian social science scholars are called to demonstrate skillful, ennobling research methods (Keller & Alsdorf, 2012).

James 2:18 says, "But someone will say, 'You have faith and I have works.' Show me your faith apart from your works, and I will show you my faith by my works" (*English Standard Version Bible*, 2001/1769). Therefore, Christian social science researchers show their faith by their works, and one way to represent that is through effective qualitative research. According to Creswell and Poth (2018), researchers should seek methodological congruence in their work. This means that "the purposes, questions, and methods of research are all interconnected and interrelated so that the study appears as a cohesive whole rather than as fragmented, isolated parts" (p. 50). Having a Christian worldview that seeks to serve others and connecting that worldview to a research approach that values others' voices is a way to ensure that there is methodological congruence in this study.

The research will also be informed by the researcher's constructivist's worldview. Littlejohn et al. (2017) maintained that communication is central to understanding the human experience. Communication is a highly contextual, complex system of human behavior. Given the complicated nature of human behavior, the researcher believes that communication is best studied through a lens of constructivism. Social constructivists investigate how individuals create meaning through interpretation and interaction (Creswell & Creswell, 2018). The goal is to better understand the social world in which people live and work. Lindlof (2008) defined constructivism as a social science paradigm that assumes individuals actively participate in creating meaning of their world. Constructivists adhere to the tenet that "reality is actively constructed – that is, created, maintained, and transformed – by human actors" (Lindlof, 2008, p. 944). This study explores VC fatigue from a social constructionist's perspective because users construct and negotiate the meaning of this mediated communication form as they participate in online video calls.

This study assumes that online learning can be as effective as face-to-face learning, and that pedagogy affects learning more than delivery mode. It is also assumed that VC fatigue is a negative feeling associated with the use of synchronous VC in online courses, and it adversely affects faculty and students. It is assumed that the use of a case study approach, while not generalizable to large populations, will provide valuable insights about how VC fatigue is experienced by faculty and students. This qualitative study assumes faculty and students who are interviewed will discuss their VC experiences honestly with the researcher.

Summary

Online education is reshaping higher education, and the proliferation of VC platforms is evident in online learning. While the digital tools provide benefits for interactivity, users often

report the mediated communication to be exhausting. This qualitative case study seeks to understand how VC fatigue occurs for faculty and students, so that higher education officials can determine how to use these technological tools more effectively in the future. VC platforms, such as Zoom and Microsoft Teams, promise to provide media richness to the integration of online learning in everyday life. A consequence of that use, Zoom fatigue, or the exhaustion people feel when using videoconferencing tools, is worthy of study.

Case study research allows qualitative researchers the ability to investigate one instance or case of a problem or issue in a detailed manner, illuminating how the case may offer valuable insights into the problem. VC fatigue is a specific problem that has been little studied, and a case study is an appropriate approach to learn about how faculty and students experience this complex issue. Understanding the use of synchronous online learning and VC fatigue are essential for the well-being of faculty, students, and higher education institutions.

This chapter provided an overview of the proposed study, including background, problem statement, significance, and research purpose. Also, research questions were stated. Definitions of relevant terms were provided, as well as assumptions, of the study. Chapter Two presents a review of the literature and contains a summary of research relating to distance education, online education, videoconferencing, videoconferencing fatigue. Explanations of media richness theory, self-presentation theory, and expectancy violations theory and their relevance to the study are presented. Chapter Three describes the methodology of the proposed study, including the research design, setting, participants, procedures, role of the researcher, data collection, data analysis, ethical considerations, and validation strategies. Chapter Four presents the findings from multiple sources of data that inform the case study, including document review, surveys, and interviews. Emergent themes are identified, and a model of Zoom fatigue is proposed.

Chapter Five provides a summary of findings, discussion, implications, delimitations, limitations, suggestions for future research, and a conclusion.

CHAPTER TWO: LITERATURE REVIEW

Overview

This chapter provides a review of the literature pertinent to studying the use of videoconferencing (VC) in the college classroom. First, a history of online education is considered. Then, a review of research about the use of VC in business and higher education contexts is provided. The problem of VC fatigue is discussed. Finally, media richness theory, self-presentation theory, and expectancy violations theory are presented as theoretical perspectives to understand how faculty and students are affected by the use of videoconferencing in the classroom.

The global health pandemic of 2020 disrupted daily life by closing all non-essential businesses and requiring broad shelter-in-place orders. After initial lockdowns were lifted and phased re-openings began, the virus continued to necessitate social distancing measures, which required people stay a safe distance apart to prevent further spread of disease (CDC, 2020). People responded to these requirements by rapidly transitioning to remotely working and studying, thanks to a number of communication technologies (Wiederhold, 2020), with the use of videoconferencing tools experiencing exponential growth in 2020 as a result (Ralph, 2020). While VC technology had played a role in business and education settings for years, individuals suddenly seeking a close substitution for face-to-face interactions turned to the technology in record numbers to work and learn, and VC quickly become an integral part of millions of people's everyday routine. In higher education, professors hastily transitioned lectures to VC platforms because existing research demonstrated that synchronous communication in college courses led to increased student engagement and improved student outcomes (Themelis & Sime, 2020; Watts et al., 2016). However, the technology, selected for its inherent media richness (Daft

& Lengel, 1986), came with disadvantages as well. VC users reported intense feelings of exhaustion, which caused problems for college faculty and students who were seeking to connect throughout the day in an online learning environment (Bailenson, 2021; Kobie, 2020; Lee, 2020; Supiano, 2020; Wiederhold, 2020).

The coronavirus pandemic dramatically changed day-to-day life, as individuals and families lived primarily in isolation while local, state, and national lockdown mandates were enacted, yet communication technologies provided a way for individuals to stay connected in a socially distant world. Remote working became normalized during the crisis with 42% of people working from home (Wong, 2020). Distance education also gained widespread acceptance as more than 90% of students of all ages (K-12 and postsecondary) turned to online learning (McElrath, 2020). Even after the crisis passes, experts predict remote working will retain a significant influence in the workplace as estimates predict 25-30% of employees will be working remotely multiple days a week (Lister, 2020). Online learning is also predicted to remain in high demand as college and universities will struggle to find the most efficient and affordable ways to deliver educational content during a forecasted post-pandemic recession (Chirikov & Chisilcec, 2020). Meanwhile, students, who are now accustomed to online learning, are planning to include online education in their future educational plans, with 22% of 2021 high school seniors prioritizing colleges with online classes (Fishman & Hiler, 2020). Remote working and online education seem likely to be relevant and widespread in the future, and VC technology will almost certainly play a routine role in those endeavors. Since VC's prevalence as a synchronous online instructional delivery method will likely continue, VC fatigue in higher education is worthy of further examination. An understanding of online education as part of the distance

education tradition is valuable in appreciating the significance of VC in today's online learning environment.

Online Education

Before its predominant role in higher education in 2020, online education experienced steady growth during the past 20 years, providing flexibility and greater access to a college education (Seaman et al., 2018). The increased numbers were fueled by technological advances, such as broadband internet, mobile devices, and a variety of learning applications, that made online education more affordable and easier to access. According to the Department of Education, as of 2018, more than 15% of higher education students enroll exclusively in distance education courses (Seaman et al., 2018). Adult students are attracted to online learning because they appreciate the opportunity to continue their education amid hectic work and personal lives, and universities eyed the adult population as a potential critical revenue stream to counter the predicted shrinking enrollments of traditional-aged college students, 18-24 years old (Bell & Federman, 2013; Muljano & Luo, 2019; Ortagus & Tanner, 2019; Renes & Strange, 2011). While, typically, most online learners have been adults, the convenience of online learning has been attracting more traditional-aged college students, 18-24 years old, in recent years (Lee, 2017), with more than one-third of all college students enrolling in at least one online course (Seaman et al., 2018; Muljano & Luo, 2019).

Further, the ability to switch from face-to-face to online teaching modalities is crucial for higher education institutions in an uncertain world. Lederman (2020b) reported that interruption to traditional face-to-face instruction has occurred in the past, and most definitely, will occur in the future for many reasons, whether man-made or natural, including hurricanes, forest fires, illness, and school shootings. Online education provides a proven means of continuing higher

education instruction during various crises. It is, therefore, advantageous for institutions to appreciate online education's flexible capacity to respond to emergencies by planning for short-term and potential long-term implementation of online instruction.

Background

Online education is a form of distance education, rooted in a 150-year tradition of remote learning, and comprises more than a third of all higher education students worldwide (Anderson, 2008; Lee, 2017; Roberts, 2019). Historically, the mission of distance education has been to provide educational opportunities to underserved populations or students who would otherwise be unable to attend traditional in-person classes (Bell & Federman, 2013; Harsim, 2017; Lee, 2017). Distance education provides accessible educational opportunities for learners who are unable to attend face-to-face classes (Lee, 2017). Moore (1972) first defined distance education in 1972 as instructional methods used when teaching and learning are separated, and “communication between the learner and the teacher must be facilitated by print, electronic, mechanical, or other device” (p.76). Scholars situate today's online education as part of a fifth phase of the distance education landscape, with previous phases categorized as correspondence, mass media, teleconferencing, and computer-mediated communication (Anderson, 2008; Lee, 2017).

Distance education began in the mid-nineteenth century with print media-based correspondence courses administered through postal communication (Anderson, 2008; Bernard, et al., 2004; Lee, 2017; Taylor, 2001). For more than a century, correspondence education allowed students to learn in a highly personalized way by sending and receiving written lessons through the mail (Moore, 2018). Distance education continued to evolve to include the use of electronic mass media, such as television and radio, during the 1970s and 1980s. The use of

multimedia instruction that consisted of TV, radio, telephone, audiocassettes, and videocassettes meant that speaking and listening skills could be addressed through distance education, adding to the reading and writing dimensions available in correspondence courses (Wang & Sun, 2001). However, the effectiveness of such educational broadcast programs garnered little academic research interest (Moore, 2018). As technology progressed, distance education included additional telecommunications advancements through synchronous video and audio teleconferencing. The equipment necessary for videoconferencing was cost prohibitive for many institutions, limiting its adoption. The large, expensive VC systems required to broadcast and receive signals meant that learners had to gather at a mutual site to receive instruction from a remote instructor (Lawson et al., 2010; Richards, 2016). While synchronous communication with visual and audio instruction was possible for the first time with these systems, their cost and inconvenience constrained their widespread use. During the latter part of the twentieth century, distance education progressed to integrate computer-mediated education. Asynchronous computer conferencing through email, CD-ROMS, and other computer-based instruction enhanced distance education, and after the introduction of the internet, computer-based education grew exponentially (Harasim, 2017; Wang & Sun, 2001), quickly establishing online education's dominance within distance education.

A pioneer in distance education research, Moore (2018) advanced the first learning theory that addressed distance learning, called transactional distance theory, to describe teaching and learning in remote contexts. The theory identified three essential factors in distance education programs: structure, dialogue, and autonomy. Structure includes dimensions of the course content, such as lesson plans, assignments, and assessments. Dialogue refers to the amount of interaction facilitated between the instructor and student while autonomy

characterizes the ability of students to manage their own learning. According to the theory, transactional distance increases as structure increases and as dialogue decreases. Moreover, there is an interplay between autonomy and transactional distance as greater autonomy is needed when transactional distance is higher (Moore, 2018). As the earliest theoretical explanation of how distance education functions, much of the distance education literature applies transactional distance theory.

Historically, the development of new media has fundamentally changed every major institution in the environment by shaping the culture's values and behaviors. In discussing distance education's history, Harasim (2017) identified the immense effect of four major socio-technological shifts that impacted society and human life, that included speech, writing, printing, and the internet. Each of these developments transformed the way people think and learn. Ong (2012) discussed oral and literate cultures, contrasting how knowledge is shared in them. Primary oral cultures share knowledge through stories told by their people. In this way, knowledge is known and personally shared by those who possess it. This active process is how wisdom is directly given from one generation to the next. Individuals may ask questions of the knower. Debate and opposing viewpoints may be discussed and argued. On the other hand, in literate cultures, knowledge is stored in manuscripts and books, written by the knowers, who are called authors, and read by audiences who are unknown to the knowers. In this way, knowledge is recorded, written down, and separated from the knower. Ong (2012) contended that technology and the ability to look up information creates weak-minded individuals who are incapable of thinking for themselves. As technology advances, digital communication is altering how knowledge is stored and shared, affecting the college classroom.

Throughout its history, distance education has primarily attempted to simulate face-to-face learning with the technology available at the time. Wang and Sun (2001) claimed education is “essentially a form of communication” (p. 539), discussing the significance of communication between teachers, learners, and content. Today, the state of distance education is highlighted principally by the use of the internet (Anderson, 2008; Bernard et al., 2004; Harasim, 2017; Taylor, 2001) as online learning quickly became the preferred delivery method of distance education in the latter part of the 1990s and early 2000s (Roberts, 2019).

An analysis of distance education and online education research follows the emergence of various technologies. As new technologies were advanced and adapted to educational environments, researchers sought to understand their impact on teaching pedagogy and student learning. This path of research included investigations of television broadcasts, teleconferencing, videoconferencing, computer-based instruction, and online instruction (Bell & Federman, 2013; Bernard et al., 2004). The distance education body of research has traditionally positioned face-to-face instruction as the automatic hallmark of quality education, and research compares various other delivery modes to in-person classrooms (Bell & Federman, 2013; Bernard et al., 2004; Wang & Sun, 2001), although some critics disagree with this approach. Clark (1983, 1994) argued that this focus is misaligned because the delivery media is not as essential to the educational process as the pedagogy and teaching practices are. Communication technologies are tools for educators to reach learners, and research should focus on how to employ them in pedagogically sound ways.

Evolution of Online Learning

While online education is framed as a part of the distance education tradition, it offers distinctive advantages over past forms of distance education. Harasim (2000) described early

online education as a new learning domain and contrasted it to other methods of traditional distance education, explaining that while it is remote as are other methods of distance learning, online education is more collaborative and group-based due to its reliance on computer conferencing. The use of computer networks for the purpose of education began as early as the mid-1970s when the invention of email and packet switching eventually led to the development of online education. Email enabled collaborative educational activities through computers and sowed the seeds for online education to grow as technology continued to advance (Harasim, 2000).

During the 1980s, computer-based instruction expanded. In 1981, the first totally online course began as a noncredit executive training mini-course in the business world (Harasim, 2000). Soon after, the first entirely online education program originated in California in 1982 at the Western Behavioral Sciences Institute (Feenberg, 2017). As the 1980s progressed, computer conferencing was implemented increasingly in distance education courses, and the 1990s witnessed even greater educational computer network opportunities for course delivery (Harasim, 2000). Computer technology continued to progress, and Harasim (2000) maintained, “As access to computers and networks continued to grow, educators recognized that cyberspace could be shaped for a wide range of uses” (p. 45). Computer-mediated instruction was on its way to transform education.

Initial programs that implemented computer-based education enjoyed early successes. Graduate students who were enrolled in an online program in the mid-1980s reported that online education was more social than face-to-face instruction, even though computer-mediated communication was widely regarded as impersonal and cold during this time period (Harasim, 2000). Other early online educators also found the mode of instruction to be productive.

Feenberg (2017) asserted that text-based online instruction was both effective and more interactive than other distance education. Harasim (2000) outlined online education's primary attributes were group communication, place-independence, asynchronous, text-based, and computer-mediated. Ally (2008) described online education as having the ability "to collapse time and space" (p. 16), providing flexible access to learning.

The advent of the Web in 1990 and its release to the public in 1993 further increased opportunities to use online tools for educational purposes (Anderson, 2008; Roberts, 2019). The internet changed everything, as institutions seemed eager to move their face-to-face instruction online (Anderson, 2008; Zhao et al., 2009). During the 1990s and early 2000s, online education mediated by web technologies led to online programs offered by traditional campus-based universities and the emergence of fully online higher education institutions (Larreamendy-Joerns & Leinhardt, 2006; Lee, 2017). The largest fully online universities are for-profit institutions that appeal to many traditionally marginalized students, such as women, people of color, non-traditional students who are over the age of 25, and individuals from families with lower income and less education (Jorissen, 2018). These for-profit institutions make up a quarter of all higher education institutions nationally, and they were quick to embrace the online learning model and market their programs to groups of students traditionally underserved by the public and private non-profit higher education sector (Jorissen, 2018). In 2018, three of the top five online education enrollment numbers were University of Phoenix-Arizona, Western Governors University, and Grand Canyon University, which are private, for-profit institutions (Seaman et al., 2018). In the past several years, however, public and private non-profit institutions have been increasing their share of the online education market with over half of all distance education students studying at public, not-for-profit institutions as of 2018 (Seaman et al., 2018). Online

education has moved from the periphery of higher education to its center as an increasing number of institutions added online courses and fully online programs in recent years (Larreamendy-Joerns & Leinhardt, 2006).

The internet further evolved in the early 2000s, reshaping education in the process. The emergence of social networks in 2004 created additional opportunities for online instruction that emphasized interaction and dynamic content (Harasim, 2017). Blogs, social networking applications, and search engines drive today's web traffic. Roberts (2019) found that through such tools, online learning can also effectively teach soft skills. According to scholars (Bell & Federman, 2013; Harasim, 2017; Talan, 2020), the impact of technology on higher education is continually evolving and expanding to include a variety of tools, platforms, and devices. Online education consists of a breadth of technologies and resources used to deliver instruction to students remotely, including video lectures, learning management systems (LMS), online collaborative tools, and artificial intelligence designed to customize learning content (Bell & Federman, 2013). Future technological developments that may influence tomorrow's online teachers and learners include virtual reality, personal assistants, games, simulations, and increased use of artificial intelligence (Themelis & Sime, 2020).

Status of Online Education in Higher Education

The presence of online education has steadily increased over the past 20 years. As of 2018, the Department of Education reported 6.6 million college students were studying online in the U.S. (Seaman et al., 2018). Online education democratizes the educational process by providing educational opportunities to more potential students, thereby expanding access to higher education (Bell & Federman, 2013; Larreamendy-Joerns & Leinhardt, 2006; Lee, 2017; Ortigas & Tanner, 2019; Osipova & Lomonosova, 2019). Goodman et al. (2019) maintained

online education drastically affects the number of students pursuing degrees, transforming higher education by lowering costs and increasing access. Students cite convenience, flexibility, and accessibility as reasons for online education's increased popularity (Bell & Federman, 2013; Clayton et al., 2010; Vlachopoulos, 2016).

The face of online education is changing. Historically, the typical online learner has been non-traditional and female (Seaman et al., 2018). However, as online education became more mainstream, its student-base expanded. Lee (2017) described the progression of online learners from traditional adult distance education learners to today's online learners who represent a diversified group of students with increasing demands for online higher education and its instructors. "While traditional distance students tended to be grateful for the educational opportunities provided, deferential to the providers, and compliant with the systems set in place, current students are client service-oriented, resources-stressed, and credential-oriented" (Lee, 2017, p. 19). Today's online learner is more of a consumer who brings higher expectations for their tuition dollars.

Colleges and universities also view online education from a business standpoint. For higher education institutions, online education offers definite financial advantages. Enrollment growth is not tied to the physical buildings an institution possesses. The physical infrastructure is not required to increase the number of students served, and the costs that accompany it to decrease (Ortagus & Tanner, 2019; Tellakat et al., 2019). Institutions must scale the online programs to be cost-effective as online education requires fixed technological costs. Also, institutions must add student service support systems to attract and maintain online students (Ortagus & Tanner, 2019).

Online education is not without its challenges. While more than a third of all higher education students enroll in at least one online course, completion and graduation rates are lower for online learners than traditional in-person learners. Research demonstrates 10-20% fewer students complete online courses, and the graduation rate for online undergraduate students is between 35-56% (Muljano & Luo, 2019; Simplicio, 2019). In contrast to these findings, Ortagus (2018) determined that first-year students who enroll in some online courses experienced improved long-term academic success. Other research related to student online learning and persistence identifies a number of strategies institutions may use to increase student retention and completion in online programs. Muljano and Luo (2019) explained, “[I]nstitutional support—such as student services, entry orientation, technology support, and outreach programs—is shown to be a top factor impacting student retention in online learning environments” (p. 35).

Instructors, coupled with the curriculum’s level of difficulty, also contribute to drop-out rates. Professors may counteract the retention problem and influence online learners’ persistence by facilitating student engagement within their courses and using effective course design (Muljano & Luo, 2019). Students also desire a sense of belonging, so collaborative assignments further encourage them to continue their studies (Muljano & Luo, 2019; Simplicio, 2019). Effective personal communication between students and instructors also leads to increased online retention (Muljano & Luo, 2019). Student interest and motivation are key indicators of student persistence in online courses and programs (Simplicio, 2019). Successful online students are motivated and have positive perceptions of online learning prior to enrollment (Muljano & Luo, 2019). Finally, Muljano and Luo (2019) contended that many online learners who complete programs do so in a non-typical fashion, and thus, retention and completion rates, which are

based on traditional learning environments, may not accurately reflect what is happening in online education.

Online Education, Student Attitudes, and Achievement

Although online enrollment numbers continue to grow, the value and legitimacy of online education has remained a primary concern of scholars who study online learning in relation to other instructional delivery methods. The extensive body of research that compares the effectiveness of online learning to face-to-face classroom instruction consistently finds both methods of instruction meet learning outcomes effectively (Bell & Federman, 2013; Bernard et al., 2014; Wang et al., 2013; Zhao et al., 2009). The research clearly demonstrates online education is an effective, viable alternative to face-to-face instruction, and in some cases, proves to be more effective than the traditional classroom (Bell & Federman, 2013; Bernard et al., 2014; Soffer & Nachmias, 2018). For instance, Sitzmann et al. (2006) determined that online instruction is more effective than face-to-face teaching for learning declarative knowledge that includes facts and principles while traditional classroom instruction is more effective for learning procedural knowledge. In comparing the effectiveness of face-to-face and online courses, Soffer and Nachmias (2018) found students in the online courses reported they understood the course structure better, communicated better with instructors, watched more video lessons, experienced higher engagement, increased their satisfaction, and performed better. In general, the online education literature establishes online learning as an effective method of instructional delivery.

However, significant differences between the two instructional modalities exist as determined by many studies that have investigated student attitudes, student achievement, and retention in online courses (Bell & Federman, 2013; Bernard et al., 2014). For example, students have more negative attitudes toward synchronous online learning than classroom instruction, and

they drop out of asynchronous online courses at a higher rate than face-to-face instruction (Bell & Federman, 2013; Bernard et al., 2004). Bernard et al. (2004) also found asynchronous online education yielded more positive achievement outcomes than did synchronous online education. Conversely, Abrami et al. (2011) determined there was no difference between asynchronous and synchronous online education and retention. Overall, students still consistently prefer face-to-face to online instruction (Clayton et al., 2010).

Distance education research began in the 1970s, and the literature has followed the development of new technologies and their integration (Moore, 1972, 2018). Much of the existing research on distance education and online learning is based on Moore's (1989, 2018) theory of transactional distance and emphasizes interactions between student-instructor, student-student, and student-content (Bell & Federman, 2013; Bernard et al., 2014; Vlachopoulos, 2016). In online courses, student achievement is improved significantly more by student-student and student-content online than through student-teacher interactions online (Bell & Federman, 2013; Bernard et al., 2014). Lafave (2016) determined students valued course transparency and consistent feedback in online classes. For student-instructor interaction, email is considered the preferred method of communication by students and instructors (Chromey et al., 2016; Zhao et al., 2009). Subsequently, interaction is a key component in the online education body of research.

More recently, online education research emphasizes the concept of engagement, which is defined as learning that actively involves students in their instruction (Bell & Federman, 2013; Clayton et al., 2010). The assumption is building community is essential in promoting effective online learning, and previous research has determined the use of social networking tools in coordination with direct personal communication between student and instructor contribute to

online learning success (Abdelemak, 2015; Cole, 2016; Cunningham, 2017; Hamid et al., 2015; Muljano & Luo, 2019). Interactivity is also still viewed as vital to achieving learning outcomes (Bell & Federman, 2013; Lafave, 2016; Vogel et al., 2006). Other factors also relate to student engagement. Abrami et al. (2011) contended that online course design needs to focus on student motivation, student-student interaction, and individual student self-regulation to be successful.

The concept of student motivation is a vital component of engagement. Clayton et al. (2010) found that students' motivation and instructional delivery preferences were related to their achievement goals, self-efficacy, and learning strategies. As an illustration, students who prefer online learning have higher self-efficacy and confidence levels. As another example of this interplay between motivation and outcomes, Wang et al. (2013) found student with online learning strategies had higher self-efficacy, which led to greater motivation for online learning and increased online course satisfaction. Finally, Lafave (2016) linked student motivation to positive instructor behaviors that included interaction, immediacy, and social presence. Student motivation is an essential dimension related to student goals, self-efficacy, course outcomes, and instructor behaviors. Little research examines whether delivery method, such as synchronous VC, interacts with student motivation.

In contrast to the literature that validates the effectiveness of online education, some studies found online courses led to worse learning outcomes for particular groups of students, such as financially-disadvantaged students, community college students, or academically underprepared students (Bell & Federman, 2013; Bettinger & Loeb, 2017; Goodman et al., 2019). While online education promises to open new opportunities for those who are not typically well-served by traditional higher education classes (Renes & Strange, 2011; Vlachopoulos, 2016), others have expressed concern that those same students seem to be the

least prepared to succeed in online courses, and this increases the likelihood that they drop out (Bettinger & Loeb, 2017; Morton, 2016). Bettinger and Loeb (2017) challenged online education's ability to serve underserved populations, stating, "These students' learning and persistence outcomes are worse when they take online courses than they would have been had these same students taken in-person courses" (p. 1). Morton (2016) agreed, fearing that online education does not provide low-income and minority students the social and emotional capacities they need to be successful in their courses and complete their programs. In other words, the democratizing function of online education may be overstated if underserved student populations fail to complete online courses and programs.

To address these inequities, online education must turn its attention from the primary concern of access to an emphasis on quality (Lee, 2017). The thinking is that quality teaching and learning will best address the needs of underserved students. Bernard et al. (2014) called for increased research to determine how to best address online learning pedagogy. Clark (1983, 1994) argued that various media do not create the value in education because technology is simply a tool for instructors to use in their course design, pedagogy, and practices. With this in mind, Lee (2018) recommended that educators make online education more authentic for learners by contextualizing it with their everyday lives. Likewise, Devine and Gibbons (2015) claimed that although education is being taught at great speed, true education depends on time as well as a physical and emotional experience. To this end, Renes and Strange (2011) encouraged faculty members to be innovative in their use of technology in online education. Enhancing the quality of online education will better serve its students, encouraging their retention and persistence. Research about the role of synchronous VC in quality online course design, therefore, needs addressed.

Today's college students, the first digital natives on college campuses, expect to use technology in their college courses, yet they have preferences in how much technology and which applications to use. To illustrate, Ledbetter and Finn (2018) determined that although today's students are plugged in and online often, they actually favor moderate use of technology in their college courses. More significant to the current study, these digital natives would rather make the decisions to determine which online tools to use in their courses than have instructors force them to use specific applications (Abdelmalak, 2015; Jang, 2015; Gutierrez-Porlan et al., 2018; Ledbetter & Finn, 2018; Palmer et al., 2014; Volvanta & Avraamidou, 2018). With numerous online communication channels available for online faculty and students to use, including VC, collaborative tools, chat, email, social networking sites, and LMS functions, it is essential that faculty members understand student preferences and needs as they design online courses (Abdelmalak, 2015; Gutierrez-Porlan et al., 2018; Hamid et al., 2015; Jang, 2015; Supiano, 2020). Although today's college students have much personal experience with the use of technological devices and online tools, they do not desire to be inundated with technology while they learn. Moreover, their course satisfaction increases when they have more autonomy to select which online learning tools to use (Abdelmalak, 2015; Jang, 2015; Gutierrez-Porlan et al., 2018; Ledbetter & Finn, 2018; Palmer et al., 2014; Volvanta & Avraamidou, 2018).

Part of students' preferences with media and technology selection is related to their perceptions about the media's function. In particular, Chromey et al. (2016) determined students view some communication channels as educational and professional while other communication channels, such as social media, they see as social and personal. Since, today's college students prefer a clear delineation between their personal and academic lives and spaces, they tend to select and prefer to use media applications that they perceive as educational and professional

when communicating, collaborating, and learning in their courses (Aaen & Dalsgaard, 2016, Chromey et al., 2016). Synchronous VC typically takes place at home, which violates students' expectations and preferences to keep their professional and personal lives separate. Further study concerning VC and this view of personal and professional space is needed.

Other research has found technology has a positive effect on student learning (Tamim et al., 2011; Zhao et al., 2009). LMS, email, digital calendars, and VC are everyday tools in the arsenal of today's educator and student. However, these tools must be applied in thoughtful ways to encourage learning and achievement. Vlachopoulos (2016) explained quality online education is a complex construct that includes many dimensions, including technological infrastructure, administrative support, student services, course design and pedagogy, instructors, academic services, assessment, and student motivation and self-regulation. Bell and Federman (2013) concluded that pedagogy, not media delivery, drives student learning, which is what Clark (1983, 1994) argued thirty years earlier. Abrami et al. (2011) explained, "...instructional practices, independent of the medium, are critical to all forms of educational practice, including and perhaps especially DE [distance education]" (p. 411). With these factors in mind, it is crucial that online instructors consider larger pedagogical concerns in selecting which technologies and digital tools to integrate in their courses.

While a great deal of research has been conducted about a variety of online educational tools, such as wikis, blogs, social networking sites, and collaboration tools (Abdalmalak, 2015; Hamid et al., 2015; Ledbetter & Finn, 2018), less research is available about the use of video in online courses. While some research has found the use of video technology may increase learning and student-instructor interaction (Scagnoli et al., 2019; Al-Samarraie, 2019), other research determined VC might not provide the most effective method of online instruction (Al-

Samarraie, 2019; Supiano, 2020). More research is needed to better understand the use of synchronous VC in online courses.

Videoconferencing

While videoconferencing technology has existed for about 50 years, its integration into educational contexts occurred much later. More recent web VC applications deserve renewed research attention. Early distance education research considered televised broadcasts and large VC systems that required site-to-site operation, but over time, technology advanced and distance educators used broadcast media less and integrated computer-mediated instruction more. Likewise, researchers concentrated their consideration more on distance learning through computer-based instruction and online education, rather than VC (Bell & Federman, 2013). This shift in focus caused a gap in the literature about VC in higher education. More recently, affordable, convenient web VC platforms renewed instructors' interest in VC as a way to increase presence and engagement in their online courses. With VC attracting more prevalent use in online education, the digital communication method requires further examination of its effects on faculty and students.

Background

The ability to transmit visual and verbal communication simultaneously over long distances was dreamt about for years before science made it a reality. Soon after the introduction of the telephone in the late nineteenth century, the idea of a videophone was first imagined (Dewal, 2016). The desire of businesses to better collaborate and communicate over long distances primarily fueled the development of the technology throughout the twentieth century. Mass adoption of VC technology occurred in the 21st century after computers and networks advanced to become more accessible and affordable for consumers. The availability of current

user-friendly VC platforms is primarily due to the convergence of VC, computer, and networking technologies that developed over time, leading to the affordability of the necessary hardware, software, and bandwidth (Richards, 2016). According to Dewal (2016), “Today, the act of placing a video call is as simple as pressing a button. However, the systems we know and use have evolved after about a century of research in the field” (p. 1). As is the case with many technologies, the initial scientific innovation to bring VC to a screen took extensive time as did the adoption of its use to a mass audience.

Videoconferencing technology was the culmination of decades of innovative scientific research by the Bell System’s Lab. The first functioning ikonophone was built in 1927 and used a television signal broadcast over a telephone line, but that technology was not scalable, meaning it was not feasible to implement it to a mass audience (de Vasconcelos Filho et al., 2009; Dewal, 2016). Decades later, the public was awed by the introduction of the Bell System’s experimental “picturephone” at the 1964 World’s Fair in Queens, NY (de Vasconcelos Filho et al., 2009; Lawson, et al., 2010). Afterwards, three picturephone booths were placed in Washington, D.C., New York, and Chicago, but the devices could only communicate with each other and for a steep price. In 1970, the Bell System launched the first commercial picturephone service in Pittsburgh. Few businesses nationwide adopted the expensive service, but it paved the way for future videoconferencing technology and use by businesses, education institutions, and consumers (AT&T, 2012).

VC evolved during the 1970s and 1980s as a result of corporate demand. Business organizations recognized the benefits of VC to collaborate and communicate over geographic distances, saving travel time and costs while enabling organizational members to conduct efficient meetings in dispersed locations (Lawson et al., 2010; Richards, 2016). The significant

expenses required to use the technology restricted the extent of VC's adoption. Costly equipment and specialized systems reserved the use of the technology to the wealthiest of companies and their upper-level executives and stakeholders (Lawson et al., 2010).

As technology advanced and costs decreased somewhat in the 1990s, VC gained momentum within organizations who adopted the technology to enable virtual meetings that included visual and verbal communication through computer conferencing. Although substantial cost and effort were still required, with systems costing \$70,000-\$90,000 (Richards, 2016), more organizations, including higher education institutions began to implement VC by the late 1990s (Lawson et al., 2010). During this time, the emergence of the Web also spurred consumer interest in VC, but the average computer system with its dial-up modem and internet service couldn't yet handle the technical demands of VC. Prohibitive high costs didn't allow for widespread adoption of VC until the availability of broadband internet and competitively priced devices flooded the marketplace (Lawson et al., 2010; Richards, 2016).

Technological advances spurred the growth of VC services in the late 1990s and early 2000s, expanding VC's focus to include individual consumers. The development of the webcam in 1998 and increased internet transmission speeds led to consumer-based VC products and services, such as Skype in 2003, a pioneer in desktop computer-based VC (Richards, 2016). Consumer demand soon drove technological progress. Lawson et al. (2010) traced the impact of widespread VC to the introduction of 3G technology and smartphones as they provided synchronous and immediate video sharing possible for consumers worldwide. Further, Apple played a major role in the proliferation of VC with its introduction of FaceTime in 2010. These advancements caused a major shift in focus from business-centered products and services to consumer-centered VC (Richards, 2016).

Today, continued technological enhancements allow individuals to connect on video calls and videoconferences through a variety of platforms and personal devices, providing a rich communicative experience. The advent of cloud computing makes the organizational infrastructure required to utilize VC more affordable because large capital expenses are no longer necessary. The current technical focus is on improving the quality, convenience, and ease of VC for organizations and individuals. VC has become an expectation in a number of settings as more and more people apply VC in business, health, and educational settings (Richards, 2016). Telemedical visits and virtual job interviews were becoming more prevalent even before the pandemic of 2020.

As video technology advanced, its use in educational settings also expanded. Lawson et al. (2010) predicted the increased practice, explaining, “In a society saturated with the visual image and in which digital video is penetrating the personal mobile market, the future of videoconferencing as a medium of communication in both commerce and schooling would seem to be assured” (p. 296). Yet, the literature on the use of VC in higher education is limited in scope and depth, presented as a byproduct of distance learning research from an educational perspective.

Asynchronous and Synchronous Online Learning

Limited research considers the use of synchronous VC in online courses. Much of the distance education research literature that compares synchronous and asynchronous instructional deliveries is based upon early site-to-site VC technology that required students to attend sessions together at remote locations and connect with instructors through VC (Bernard et al., 2004). Today’s synchronous online learning sharply contrasts the synchronous distance education of the past, creating a need for additional reexamination of VC use in online education. The expanded

use of VC is only recently beginning to encourage researchers to compare asynchronous and synchronous course delivery modes in online learning (Francescucci & Rohani, 2019; Kobayashi, 2017; Koenig, 2010; Watts, 2016).

VC appears in the distance learning literature in comparison to face-to-face instruction (Altiner, 2015; Blau et al., 2017; Francescucci & Rohani, 2019; Koenig, 2010; Umphrey et al., 2008) or in opposition to asynchronous online education (Clark et al., 2015; Kobayashi, 2017; Skylar, 2009; Watts, 2016). Comparing various instructional delivery modalities, Koenig (2010) found faculty and students prefer synchronous face-to-face instruction, asynchronous online instruction, and then, synchronous online VC instruction. In terms of student performance, synchronous VC courses online achieve the same student learning outcomes as face-to-face courses (Francescucci & Rohani, 2019); however, students rated synchronous VC courses lower than face-to-face courses in terms of instructor presence, communication, and interaction (Altiner, 2015; Umphrey et al., 2008).

Synchronous VC is viewed as a way to increase the interaction, communication, collaboration, and presence in online courses, which higher education institutions assume will lead to improved online retention rates (Watts et al., 2016). Synchronous media offer viable alternatives for online education that had predominately relied on asynchronous communication. Asynchronous interactions in online education include discussion boards, email, and use of recorded video with flexibility key to asynchronous learning (Skylar, 2009; Watts et al., 2016). Online synchronous learning includes live-streamed VC, with its defining characteristics being immediate, real-time, and allowing for instant feedback (Skylar, 2009; Watts et al., 2016). While both asynchronous and synchronous learning environments can effectively engage students with course material (Skylar, 2009), motivation is a determining factor in students' preferences

(Kobayashi, 2017; Watts et al., 2016). Kobayashi (2017) determined students preferred asynchronous learning to synchronous learning online. In contrast, Skylar (2009) found students reported they preferred synchronous online learning to asynchronous learning and that student performance improved in synchronous online environments. Students' sense of connection increases in synchronous online learning compared to asynchronous online environments because there is instant feedback and interaction (Bensching, 2020; Francescucci & Rohani, 2019). Combining asynchronous and synchronous instruction in online courses may lead to greater engagement and retention. Coffey (2010) advocated for a hybrid online learning model that includes both asynchronous and synchronous components. Contrasting research results indicate further study about the use of synchronous VC in online courses is appropriate.

Videoconferencing, Interaction, and Engagement

Adding synchronous interactions to online education is a method for instructors to closely approximate face-to-face courses by including a real-time, verbal and non-verbal communication component with students in geographically dispersed locations (Andrews et al., 2008; Basaran & Yalman, 2020; Blau et al., 2017; Francescucci & Rohani, 2019; Gillies, 2008; Themelis & Sime, 2020). While outcomes are similar in online courses delivered through videoconferencing and face-to-face courses, students rate videoconferencing courses lower than in-person courses in presence, interaction, and communication (Clark et al., 2015; Doggett, 2008; Francescucci & Rohani, 2019; Umphrey et al., 2008). In comparing VC to asynchronous online courses, VC improves immediacy and social presence (Clark et al., 2015; Gillies, 2008; Themelis & Sime, 2020). Student motivation, interaction, and collaboration are encouraged by the implementation of VC in online courses (Basaran & Yalman, 2020; Clark et al., 2015; Hudson et al., 2012; Sobko et al., 2020). Diverging from other studies, Peterson (2019) did not find VC increased

student satisfaction nor decreased transactional distance in online learning. Conflicting studies on the use of VC in higher education and student outcomes reflect a need for further research.

Teaching through Videoconferencing

While VC can be transformative for online education (Martin, 2005), the literature indicates that instructors must tailor their teaching to use the tool effectively. Re-envisioning pedagogy requires significant time commitment on the part of faculty as well as institutional support through training (Andrews et al., 2008; Fitzgibbon, 2003; Hudson et al. 2012; Knapp, 2018; Liu & Alexander, 2017; Martin, 2005). VC is merely a delivery tool for instruction, and its successful implementation requires instructors to be innovative and creative in their course design (Basaran & Yalman, 2020; Martin, 2005). Scholars have suggested a variety of pedagogical structures to increase student satisfaction in online courses through VC, including the use of break-out groups, virtual poster sessions, show-and-tell, whole group discussions, polling features, chat, virtual hand raising, and small group meetings (Bensching, 2020; Hudson et al., 2012; Knapp, 2018). Conversely, long lectures do not transition well to VC (Andrews et al., 2008; Miscenich, 2020). Instructors instinctively apply the same teaching methods in the new media rich, VC environment, and this practice is not pedagogically sound (Andrews et al., 2008; Liu & Alexander, 2017; Martin, 2005). Other researchers recommend instructors increase their presence during VC instruction through specific immediacy behaviors, including the use of more gestures, vocal variety, eye contact, smiles, informal speech, humor, self-disclosure, present tense verbs, and inclusive pronouns (Rehn et al., 2016; Umphrey et al., 2008). Through careful, planned course design and implementation, instructors can use VC to better engage students in their online courses. Colleges and universities must support these efforts through relevant training and infrastructure. Perhaps prophetically, Andrews et al. (2008) called for the need for

higher education institutions to implement VC in a scalable, sustainable way to meet the demand for increased access in online education. Although VC can be a tool to add synchronous communication to better engage students, its use also leads to further challenges.

Videoconferencing and Fatigue

Business demands drove the initial development of VC technology, so corporate organizations could save time and money by virtually meeting over geographic distances to collaborate and achieve organizational outcomes. Globalization efforts in the late 1990s and 2000s intensified the desire and need for such remote technological solutions. Educational institutions realized the potential benefits of VC once the capital costs associated with such systems became feasible for them to incur (Lawson et al., 2010). When affordable web conferencing was introduced, higher education embraced VC as a method to increase online retention by improving interaction and engagement in online education (Themelis & Sime, 2020). In business and higher education contexts, VC was limited in use to supplement organizational activities and bring together small groups of remote audiences for brief goal-centered encounters. Early VC research by Williams (1978) determined VC was adequate to complete tasks with low interpersonal involvement, including information transmission, problem solving, and generating ideas, but cautioned it was not effective for tasks requiring high interpersonal involvement.

In 2020, remote workers and learners experienced a significant, abrupt paradigmatic escalation in the use of VC driven by the COVID-19 global pandemic. Forced into home lockdowns by local, state, and federal policies, people suddenly flocked to VC platforms as a substitute for face-to-face experiences in work, school, spiritual, and social activities. Zoom, one of the most popular of the VC platforms, increased thirtyfold as the use of its service from

December 2019 to March 2020 jumped from 10 million daily users to 300 million daily users (Kobie, 2020; Wiederhold, 2020). In higher education, professors rapidly transitioned their previously face-to-face courses to fully online instruction in a matter of days, and the majority of them used VC to continue to lecture to their classes (Mukherjee & Rana, 2020; Ralph, 2020). Whereas web VC platforms had fulfilled niche needs for remote meetings prior to the pandemic, the technology's use abruptly became normalized as a way for people to work, learn, and socialize during the widespread lockdowns caused by the pandemic, and users began spending hours on the VC tools.

The massive pivot to online instruction and exponential growth of VC quickly presented new challenges for its users (Quintana, 2020). While Ralph (2020) reported about 80% of faculty members used VC tools in their courses during spring 2020, Supiano (2020) found that early into the transition to online learning, both faculty and students described Zoom as exhausting. For all videoconferencing's benefits, the increased use of video calls in people's daily lives also led to intense feelings of tiredness. The mediated alternative to face-to-face interactions drained users because communicating through VC takes more effort and energy than in-person communication (Bailenson, 2021; Lee, 2020; Storck & Sproull, 1995). A new phenomenon that emerged from the overuse of VC platforms is commonly known as "Zoom fatigue," although the same feeling occurs with other such platforms, including Microsoft Teams and Skype (Bailenson, 2021; Fosslien & Duffy, 2020; Kobie, 2020; Lee, 2020; Sander & Bauman, 2020; Wiederhold, 2020). Zoom fatigue posed previously unknown difficulties for VC use.

Fatigue. Fatigue is approached differently by various disciplines, such as psychology, medicine, occupational health, and information technology (Lee et al., 2016; Luo, 2009). The problem with much of the fatigue research is that the concept is often studied without defining it

(Luo, 2009). “In practice, there are no medical criteria for fatigue,” criticized Luo (2009, p. 196). Further complicating the study of fatigue is whether fatigue is a chronic condition or a temporary state (Luo, 2009). Health professionals also differentiate between subjective physical fatigue, subjective mental fatigue, physical fatigability, and mental fatigability, with fatigability referring to difficulty in maintaining preferred levels of activity (Luo, 2009). Overall, most literature considering fatigue considers issues related to mental and physical effects. Physical fatigue includes such concerns as muscle and eye strains, while mental fatigue includes psychological impacts, such as tiredness, stress, and burnout (Dhir, 2018; Zhang et al., 2016).

Existing research on fatigue and new technologies has found both physical and psychological effects. For instance, Chao et al. (2019) determined type of VR display technology did not affect visual fatigue, but time was significantly associated with visual fatigue. Salanova et al. (2012) discussed fatigue as a component of technostress in describing technostress, maintaining that fatigue is a common negative psychological experience from using communication technologies.

Social Media Fatigue. Recent research has considered the use of online social networking tools and their association with feelings of fatigue (Bright et al., 2015; Dhir, 2018; Lee et al., 2016; Zhang et al., 2016), so Zoom fatigue may be considered as a form of social media fatigue. Dhir (2018) defined social media fatigue as a form of fatigue that is marked by “the mental exhaustion after experiencing various technological, informative and communicative overloads” (Dhir, 2018, p. 141) through participation and interaction on various social media platforms. Other research has determined social media fatigue can lead to both physical and psychological effects (Lee et al., 2016). Lee et al. (2016) described social media fatigue is “a subjective, self-evaluated feeling of tiredness and an outcome of stress” (p. 52). Social media

fatigue leads some users to refrain from social media use either temporarily or permanently because they feel overwhelmed by information overload (Bright et al., 2015). While social media fatigue is weariness related to the voluntary use of social media for entertainment and leisure purposes, Zoom fatigue is different because it is the result of the required use of videoconferencing for work and educational purposes. Whereas users may unplug and refrain from the information overload associated with social media fatigue by refraining from social media for a period of time, that solution is not viable for VC users who are mandated to participate in the platforms for school or work. Therefore, specific research related to Zoom fatigue is both needed and valuable.

Zoom Fatigue. Attempts to explain Zoom fatigue have primarily been reported in the popular press and discuss the communication problems with VC from a psychological perspective that emphasizes the increased cognitive load associated with VC. Lee (2020) observed that the fatigue may be explained from a neuropsychological perspective, claiming the fatigue is related to reward assessment and how the brain responds to costs and rewards. Other scholars asserted the fatigue is attributable to the increased mental and emotional effort it takes to participate in online meetings due to a number of factors (Bailenson, 2021; Miller, 2020; Sander & Bauman, 2020; Storck & Sproull, 1995). It takes more effort to process nonverbal communication cues on video than it does in person because even small delays in transmission create dissonance for viewers to interpret (Bailenson, 2021; Jiang et al., 2020; Schroenenberg et al., 2014). An emphasis on facial cues (Bailenson, 2021; Ferran & Watts, 2008; Sander & Bauman, 2020) and the ability to see oneself, at a hyper-awareness level, further increase the stress-level and cognitive fatigue (Bailenson, 2021; Ferran & Watts, 2008; Fosslien & Duffy, 2020; Kobie, 2020; Sander & Bauman, 2020). Fosslien and Duffy (2020) added that it's easier to

lose focus in video meetings due to the constant barrage of visual cues and distractions.

Bailenson (2021) proposed a theoretical argument for Zoom fatigue that attributes the phenomenon to prolonged eye gaze, cognitive load, mirror feedback, and reduced mobility; however, his argument is not based on empirical evidence or research. Zoom fatigue appears to be a multi-dimensional phenomenon that requires a communication perspective to understand.

While psychologists explain Zoom fatigue through a consideration of cognitive load, many of the problems are founded within the distinct differences in how the communication process operates through VC compared to in person communication. VC is viewed as a substitute for face-to-face interactions, but the two media are not the same. Although VC offers both verbal and nonverbal information in real-time, those cues are mediated, and the time is not, in fact, real; there are slight delays in transmission (Morris, 2020). Even short delays of 1.2 seconds produce negative perceptions of individuals on VC, causing viewers to perceive them as less friendly or focused (Schroenenberg et al., 2014). These seemingly minor differences from VC environments and in-person environments create some intense interpersonal challenges for VC users to overcome (Morris, 2020; Tufvesson, 2020). Little nonverbal and real-time feedback prevents seamless communication (Morris, 2020). VC presents itself as an alternative to face-to-face communication, but the interpersonal communication behaviors exhibited through VC are unnatural and disconcerting for many users (Bailenson, 2021; Miller, 2020). The technology that allows for synchronous verbal and nonverbal communication also impedes that communication through its channel transmission.

The mediated communication through VC is different than face-to-face interactions. Cognitively, it is easier to process in-person verbal and nonverbal cues because they aren't being filtered through low-quality cameras or intermittent internet connections. Kobie (2020)

explained, “We can’t see people well enough to discern such information as easily as we could if they were sitting across a table from us, but we can’t help but try. Communicating is both more difficult and less successful” (Kobie, 2020, p. 23). The whole conversational framework is lost through the virtual channel. In Tufvesson (2020), psychologist Jocelyn Brewer maintained:

With video, we’re monitoring for non-verbal cues and information with much less stimulus. We get tiny 2D thumbnails of faces, often at weird angles with people looking in different directions and not at the person speaking. So, the brain goes into “scanning mode,” trying to fill in the gaps to get enough information to make sense of what’s happening and receive the communication, ideas, or actions. (p. 50)

A number of interpersonal communication behaviors are negatively affected through the mediated VC. Listening is different on VC than in face-to-face conversations because there is a need for constant gaze to demonstrate you're listening on video calls, which differs from listening in person, and the intense eye contact feels unnatural (Bailenson, 2021; Fosslien & Duffy, 2020; Miller, 2020). The mediated technology makes it more difficult for communication partners to analyze pauses and facial expressions, disrupting the natural rhythm of conversational patterns (Feder, 2020; Ferran & Watts, 2008; Jiang, 2020; Morris, 2020; Tufvesson, 2020). Common conversational patterns, such as overlapping, are not practical on VC (Feder, 2020). Silence presents another issue in VC because silence creates anxiety about whether the technology is working (Jiang, 2020). VC limits normal conversation patterns, resulting in more formality in VC interactions (O’Connell et al., 1993; Storck & Sproull, 1995). Interpersonal communication feels less natural when it is mediated through VC.

The arrangement and features of the online VC display also produce challenges for users. VC creates a simulated, mediated stage in which users perform for the others on the call,

typically appearing as a square box that emphasizes the head and upper torso, increasing the salience of facial features in VC compared to face-to-face interactions (Storck & Sproull, 1995). Users view a gallery of faces, including themselves, during VC, contributing to the mental and emotional exhaustion (Bailenson, 2021; Miller, 2020; Nicandro, 2020; Tufvesson, 2020). “It’s this pressure to really be on and be responsive,” according to Vaile Wright, the director of clinical research and quality for the American Psychological Association (Miller, 2020, para. 6). This pressure results from the extreme closeness of people’s faces presented on the screen. This up-close view is meant to permit users to better distinguish facial expressions and other nonverbal cues, but the unintended consequence is a scrutiny on faces, which is almost unnerving after a prolonged time. It is also difficult to maintain eye contact with a matrix of faces (Bailenson, 2021; Beck, 2020; Tufvesson, 2020).

Others discuss the stress from staring at oneself on the camera (Bailenson, 2021; Davis, 2020; Dewal, 2016; Jiang, 2020; Morris, 2020; Nicandro, 2020). One student writer called this aspect of VC the “mirror squared” experience and claimed it adds to the unnaturalness of the VC environment (Nicandro, 2020). In Jiang (2020), Marissa Shuffler, an associate professor at Clemson University who studies workplace wellbeing, stated, “When you’re on a video conference, you know everybody’s looking at you; you are on stage, so there comes the social pressure and feeling like you need to perform” (para. 6). Davis (2020) speculated that the effect is greater for women because they are taught that their appearance determines their worth. The online display screen generates a hyper-awareness of the self.

Several issues may result from the intense focus on the self during VC. Dewal (2016) described the self-presentation feedback on VC as a continuous loop, and this feedback increases self-consciousness, self-awareness, and may affect self-esteem. The effect seems to be greatest at

the start and end of video calls. Research demonstrated that participants look at themselves often during the beginning and end of VC sessions, but they gaze at themselves less when they are working on a task (deVasconcelos Filho et al., 2009). However, VC users reported they are concerned about their appearance, and this can lead to uncomfortable feelings and distractions, contributing to the sense of VC fatigue (deVasconcelos Filho et al., 2009; Dewal, 2016).

Gender may be a contributing factor in how VC is experienced by users. Teoh et al. (2012) studied how people present themselves and are perceived while they participate in VC environments. The gender of the participant, task, and initial body language availability affect the perceptions of trust, social presence, dominance, impression management, and user-defined body language availability. Women felt more dominant when body language was not available while men felt more like a dominant partner when body language was available. Conversely, women preferred to show a wider field-of-view on camera than men. Social presence was higher for both men and women participants when their VC partner was a woman (Teoh et al., 2012). This study indicates that gender may be a significant dimension in how VC is experienced by users.

Many users participate in VC at home which causes a range of distractions (Ferran & Watts, 2008; Fosslie & Duffy, 2020; Jiang, 2020; Sander & Bauman, 2020; Tufvesson, 2020). Potential environmental distractions and disruptions add to the emotional fatigue level. Students typically prefer to keep their professional (academic) spaces separate from their personal (social) spaces (Chromey et al., 2016; Nicandro, 2020), and VC blends the two spaces. This blurring of the personal and professional realms may contribute to students' dissatisfaction with synchronous VC instruction. Distracted by their environments, students in VC classes also reported they often turn off their video and microphone feeds during lectures to multi-task

(Benschling, 2020; Gilbert 2015). Finally, a range of technical issues occur during VC meetings as users struggle with connection speeds, the mute button, camera angles, and lighting (Tufvesson, 2020). A variety of environmental factors potentially contribute to feelings of VC fatigue.

VC is commonly viewed as a close alternative to in-person meetings, and when remote working and learning became prevalent in 2020 in response to a global health pandemic, VC platform use exploded within a variety of contexts. VC has been widely accepted in higher education when face-to-face instruction is not possible. Pedagogically, college faculty embraced videoconferencing in spring 2020 because it intuitively felt like the best alternative to face-to-face instruction (Supiano, 2020). The sudden shift to VC allowed people to connect with verbal and non-verbal cues present; however, those cues are presented differently through the VC channel. Challenges to the predominate use of VC include a sense of exhaustion, known as Zoom fatigue. While the popular press has discussed the problems with Zoom fatigue, the topic has generated little scholarly attention and is worthy of further investigation from a communication perspective.

Theoretical Frameworks

Theory is a way of seeing, a way of describing an aspect of the world around us. Littlejohn et al. (2017) defined theory as “any organized set of concepts, explanations, and principles that depicts some aspect of human experience” (p. 7). Theories help explain and describe phenomena by providing conceptual frameworks for building knowledge. Lindlof and Taylor (2019) defined communication theory as “any systematically developed account of communication that seeks to explain what it is and how it works.”

This study is situated in the sociopsychological tradition of communication theory, which is primarily interested in how individuals interact and influence behavior and seeks to explain social behavior (Craig, 1999). Its focus is supplemented by the cybernetic tradition, which views communication as part of a complex system and seeks to understand how that system functions or malfunctions (Craig, 1999). Behavior can be influenced by context, and that is the central concern in the proposed study as it seeks to understand how students and faculty experienced VC fatigue in online education. The concept of VC fatigue may be understood by an awareness of three established media theories, media richness, self-presentation, and expectancy violations. Each of these theories will be presented along with a discussion of background, current research, and application to VC fatigue.

Media Richness Theory

Media research is heavily influenced by Daft and Lengel's (1986) media richness theory. The theory contends that media can be evaluated along a continuum of how rich or lean they are and outlines criteria, including timeliness of feedback, message personalization, language variety, and the number of communication cues and channels to indicate the leanness and richness of media. Daft and Lengel (1986) posited that face-to-face communication is the richest medium because it includes immediate feedback and a variety of nonverbal communication cues, including facial expressions, body language, and tone of voice. When faced with a choice, individuals prefer to use richer media because they include more cues. Richer media is also recommended in equivocal contexts.

Background of Media Richness Theory. Media richness theory was developed by Daft and Lengel (1986) from the information processing literature as a way to understand the differences of how messages delivered through various media channels are processed by

individuals in organizations, based upon the cybernetic communication theory tradition. The cybernetic tradition is founded on the transmission model of communication and emphasizes information flow (Craig, 1999). Daft and Lengel (1986) derived the theory to explain how managers select appropriate media to communicate ambiguous messages to subordinates. Their research in media richness expanded upon scholarship related to uncertainty and equivocality and applied them to organizations to understand how managers and subordinates process information.

From its inception in the information processing literature, communication scholars realized the potential of media richness theory to describe media selection in various communication contexts (King & Xia, 1997; Rice, 1992; Webster & Trevino, 1995). Dennis (2009) maintained media richness theory is the “most influential media theory, at least for new media” (p. 642). Empirical research demonstrated individuals choose media by matching the media richness to the characteristics of task conditions (King & Xia, 1997; Rice, 1992). Hinds (1999) explored the relationship between impression management and media richness. Richer media lead to more judgmental social bias, and this is explained by the increase in cognitive load. VC increases cognitive load because it adds social information, and the increase load leads to more biased judgments (Hinds, 1999). Media richness theory presents an understanding of why faculty members select to use VC in their courses when face-to-face interactions are not possible (Andrews et al., 2008).

Current State of Media Richness Research. Media richness theory continues to be prominent in media research. As technologies have been developed, media richness describes them in terms of their channel capacities. Current media richness research focuses on how mobile and digital media are evaluated, selected, and preferred by users (Fan-Chen et al., 2019;

Hsieh & Tseng, 2017; Tang & Hew, 2019; Tanupabrungsun & Hemsley, 2018). For instance, users who perceive higher media richness in online interactions have increased satisfaction with their participation in the interactions (Fan-Chen et al., 2019). Stork and Sproull (2018) found people tend to form more positive impressions of others in face-to-face rather than VC interactions. Research also demonstrated that the use of emoticons increased perceived media richness in digital media (Hsieh & Tseng, 2017; Tang & Hew, 2019). Social media, such as Twitter, has also been analyzed from a media richness perspective. Tanupabrungsun and Hemsley (2018) developed richness scores based on the interplay of media richness and Twitter features.

Other studies have not found support for media richness principles. Online students may prefer leaner media, such as email, due to their flexibility. Kobayashi (2017) reported students preferred recorded lectures with slides and audio to synchronous video lectures. They also preferred online collaboration tools, such as Wiki and Google Docs, to online discussion boards and chat groups.

Organizational research continues to support the principle that richer media are evaluated more positively than leaner media in organizational settings (Medina & Srivastava, 2016; Kinglsey Westerman et al., 2018; Salustri, 2016). When teams communicate on projects, face-to-face communication is preferred more than digital communication, leading to increased individual satisfaction (Medina & Srivastava, 2016). Salustri (2019) recommended managers intentionally select media based on the message's complexity. Face-to-face communication is preferred for building trust and communicating complex messages, while email is recommended when a written record is necessary (Salustri, 2019). Media selection also sends a meta-message

with media-rich channels conveying a closer relationship between supervisors and subordinates (Kingsley Westerman et al., 2018).

Media richness is instrumental in education research related to online learning environments (Bagley & Olsen, 2016; Bailie, 2017; Cole, 2016; Oregon et al., 2018). Research demonstrates students prefer face-to-face courses and face-to-face communication with instructors as media richness prescribes (Cole, 2016). Other scholars have suggested that instructors apply media richness as they design online courses. Using media richness as a foundation for online course design increases program retention (Bagley & Olsen, 2016; Oregon et al., 2018). In communicating with instructors, online undergraduate students preferred using email, while they preferred text messaging for communicating with peers (Bailie, 2017).

Applying Media Richness to Videoconferencing in Online Education. Media richness theory provides an understanding of media on a richness continuum with face-to-face labeled as the richest (Daft & Lengel, 1986). According to the principles of the theory, VC is viewed as the next richest media allowing participants to enjoy many of the same characteristics of face-to-face communication that include multiple verbal and nonverbal communication streams (Andrews et al., 2008; Ferran & Watts, 2008). Media richness considers the following factors in evaluating a medium's richness: timeliness of feedback, message personalization, language variety, and the number of communication cues and channels (Daft & Lengel, 1986). VC allows for immediate feedback, direct message personalization, language variety, as well as verbal and nonverbal cues. However, Campbell (2006) maintained that VC is less sociable than face-to-face meetings because it is less spontaneous. Since VC platforms allow for text-based instant messages during the conference, VC offers enhanced written cues that are not allowed during typical face-to-face interaction. According to the principles of media richness theory, if in-person classes are not

possible, then VC classes should be preferred by students and faculty. Smyth (2005) claimed VC presents rich visual cues, language naturalness, synchronicity, immediacy, and synchronicity, which provides an interactive learning experience. Media richness theory presents a framework for understanding how and why faculty members use videoconferencing platforms for online instruction.

Self-Presentation Theory

Sociologist Erving Goffman (1959) developed his theory of self-presentation, a dramaturgical approach to understanding human behavior in social situations, as an extension of a theatrical metaphor. Goffman (1959) argued that individuals (actors) rationally manage the impressions that others have of them by intentionally performing roles in the front stage. Goffman (1959) discussed the front stage and backstage, as well as the personal facade, which includes appearance and manner. Through these elements, individuals present their idealized self to others on the front stage, while their true self remains private on the backstage. The sociological theory provides the foundation for impression management scholarship, is influential in many social science disciplines, including communication, and remains actively studied (Manning, 2011).

Background of Self-Presentation Theory. Outlined in the seminal text, *The Presentation of Self in Everyday Life*, Goffman advanced his ideas of impression management and theatricality of everyday life, building on the work of Nicolas Evreinov, a Russian playwright, and Kenneth Burke, a dramatist (Shulman, 2017). Self-presentation theory forms the basis of impression management and identity research. Goffman (1959) explained how essential the impression-making process is to identity formation. “[T]he very structure of the self can be seen in terms of how we arrange for such performances” (Goffman, 1959, p. 252). Littlejohn et

al. (2017) claimed Goffman's work is crucial to understanding theories of identity that have been developed within the communication field.

Current State of Self-Presentation Research. Self-presentation theory continues to be instrumental in understanding an individual's behavior in social interactions. Communication researchers apply the theory to understand how people communicate their self-identity to others in various communication contexts with current scholarship emphasizing the use of self-presentation strategies in digital communication (Lin et al., 2017; Oiu et al., 2012; Riu & Liu, 2020; Walther, 2007; Wang, 2015). Virtual environments provide mediated stages in which users present themselves to others.

Computer-mediated communication promotes the development and potential exaggeration of impressions and relationships online (Walther, 2007). Individuals maintain their roles by strategically creating profiles and posts on social media that display intentional behaviors mediated through social norms. Social media users are more likely to present positive emotions and a sense of well-being on Facebook than they do in reality (Oiu et al., 2012). Research has determined that self-presentation is a primary reason people use Facebook, with friends' lists strongly connected to a user's self-identity (Wang, 2015). Self-presentation theory is also useful in understanding how users share political content online. Social costs increased self-presentation concerns in sharing political content (Rui & Liu, 2020).

The theory has applicability to a variety of contexts. Researchers are concerned with how parents post about their children on social media to fulfill their self-presentation needs in defining "sharenting" (Blum-Ross & Livingstone, 2017; Holiday et al., 2020; Verswijvel et al., 2019). Other scholars use self-presentation theory to examine how news media professionals balance their front stage and backstage selves (Brems et al., 2017; Carpenter et al., 2017). Self-

Presentation theory is valuable to studying online dating as effective impression management is essential in that setting (Ellison et al., 2006; Markowitz & Hancock, 2018; Porter et al., 2017). Online daters reported the need to balance presenting an ideal self and an authentic self in their online dating profiles (Markowitz & Hancock, 2018; Porter et al., 2017).

Applying Self-Presentation to Videoconferencing in Online Education. Goffman's self-presentation theory offers an insightful analysis of social behavior in contemporary contexts, especially through mediated communication. The theory's basic dramaturgical concepts enhance the understanding of individual behaviors online (Merunkova & Slerka, 2019; Walther, 2007). Bullingham and Vasconcelos (2013) stated, "[T]he online environment, with its enhanced potential for editing the self, can offer opportunities to contribute to the further development of the Goffman framework" (p. 101). Online, users may manage their identity through careful and systematically presenting themselves through profiles, photographs, videos, posts, and comments, developing and crafting the idealized sense of self they desire to present to the digital world. Within education contexts, Jaber and Kennedy (2017) applied Goffman's theory within online education and found student identity was a critical component of student performance.

Goffman's theory of self-presentation provides a framework for understanding how students and faculty present themselves in online courses through VC. One of the unique characteristics of VC is that users see themselves in addition to the faces of others participating on the call (deVasconcelos Filho et al., 2009; Fosslien & Duffy, 2020; Kobie, 2020; Sander & Bauman, 2020). This creates a constant awareness of one's self-presentation. Described according to Goffman's theory, VC participants are actors constantly on the front stage, managing the impressions of the audience by relentlessly monitoring their own performance. VC users are concerned about their appearance, and this concern can be a source of distress,

distracting the user from the purpose of the communication and contributing to lower self-esteem (Davis, 2020; deVasconcelos et al., 2009).

The video call can be seen as a long performance, and when multiple videoconferencing meetings are held in one day, the work is compounded. The effort required to remain on front stage, in front of oneself, is cognitively difficult, leading to feelings of Zoom fatigue. Olga Goldenberg, an assistant professor in Columbia's Humanities, History and Social Sciences Department, explained, "[Students] feel self-conscious. They don't want everybody staring at them.... That takes some energy, especially out of people who are maybe a little bit more self-conscious or a little bit more introverted" (Leazenby, 2020, para. 13). Self-presentation theory is a lens to view how users experience VC in higher education contexts.

Expectancy Violations Theory

Expectancy violations theory significantly contributes to understanding how people respond to violations of their expectations (Burgoon & Hale, 1988). The theory emerged to describe how individuals respond to unexpected nonverbal communication behaviors that violate social norms and includes essential factors, such as expectancy violations, arousal, communicator reward valence, behavior evaluation, and violation valence. Expectancies are nonverbal behavior preferences individuals develop about others based upon social norms, and when these expectancies are violated, individuals evaluate the behavior. Individuals assign meaning to the behavior and whether it is desirable or undesirable, positive or negative. The theory posits that a positive violation is sometimes more desirable than a confirmation or doing what is expected. This critical distinction is significant in providing a more complex understanding of the expectancy violations process because previous theories asserted that confirmations were always more desirable (Burgoon & Hale, 1988).

Background of Expectancy Violations Theory. Expectancy violations theory was developed from the proxemics scholarship of the 1970s and 1980s by Judee Burgoon and several colleagues (Burgoon, 1983; Burgoon & Aho, 1982; Burgoon et al., 1984; Burgoon et al., 1982; Burgoon et al., 1979; Burgoon & Hale, 1988; Burgoon & Jones, 1976). Expectancy violations theory is an attempt to understand individual behavior in terms of social norms and follows from a foundation in social psychology. Burgoon (2009) traced the theory to similar work in Michael Burgoon's linguistic-based expectancy theory and Robert Rosenthal's expectancy signaling work. In the late 1970s, Burgoon sought an explanatory and predictive way to analyze violations of proxemics norms (Burgoon & Jones, 1976). She introduced a comprehensive theory about a decade later (Burgoon & Hale, 1988). Although originally derived as part of interpersonal proxemics research, the theory has been expanded to various communication contexts.

Current State of Expectancy Violations Research. Expectancy violations theory was posed to better understand nonverbal communication contexts, but its applicability has been expanded to include diverse communication contexts, including persuasion, intercultural communication, deception, group decision making, and computer-mediated communication (Burgoon, 2009). According to Walther-Martin (2015), expectancy violations theory bridges interpersonal and mass communication. Its versatility contributes to the theory's application to explain expectations and behavior in areas of research that include education, social media, relationships, and organizations.

Expectancy violations theory remains vital in interpersonal communication research (Bennett et al., 2020; Roberts & Norris, 2016; Wright & Roloff, 2015). Interpersonal feedback and emotional responses can be explained through expectancy violations theory, with anger and hurt demonstrated to cause relational damage (Bennet et al., 2020). Roberts and Norris (2016)

applied expectancy violations theory to interpersonal responses and determined that women are expected to be more agreeable in conversations. Mind reading expectations during interpersonal relationship problem situations can also be described through expectancy violations theory (Wright & Roloff, 2015).

Expectancy violations theory is also applicable to virtual environments (Burgoon et al., 2016; Tandoc et al., 2020; Wadell, 2020). Burgoon et al. (2016) used the theory to understand better human-to-embodied agent communication (htEAC) and how individuals make decisions when they interact with virtual assistants or embodied agents (EA). The theory maintains that positive violations may be perceived as preferential to expected behavior, and this principle was confirmed in virtual environments with EAs (Burgoon et al., 2016). The theory is also demonstrable in understanding machine authorship of news (Tandoc et al., 2020; Waddell, 2020). Readers perceived machine writing as less credible than human journalists because machine writers violated readers' expectations for quality news writing (Waddell, 2020). Objectivity was also found to be a significant factor in news credibility of automated news writing (Tandoc et al., 2020).

Expectancy violations theory is prevalent in studies related to cell phone use, especially about phubbing (phone snubbing) (Johnson et al., 2019; Kelly et al., 2017; Miller-Ott & Kelly, 2015). From an expectancy violations theory approach, Johnson et al. (2019) determined smartphone use during face-to-face interactions is viewed negatively. Individuals in romantic relationships perceived cell phone usage as a negative violation of expectations in certain settings, such as during first dates, dates at restaurants, and intimacy, while individuals responded more favorably to cell phone use at other times (Miller-Ott & Kelly, 2015). Type of

cell phone use also significantly contributed to perceived violations with playing games determined to be more of a violation (Miller-Ott & Kelly, 2015).

Similarly, expectancy violations theory is considered in examining behavior on social media (Bullock & Hubner, 2020; Carr et al., 2017; Lee, 2015; McLaughlin & Vitak, 2012; Niehuis et al., 2020). McLaughlin and Vitak (2012) studied how violations of social networking norms impact friendships. Niehuis et al. (2020) explored how dating app users approached unexpected sexual content and found such expectancy violations contributed to the users' disillusionment with the dating platform. The theory was instrumental in analyzing paralinguistic digital features on social media (Carr et al., 2017). It is useful in explaining how individuals' behavior on social media contributes to perceptions of credibility and professionalism (Bullock & Hubner, 2020; Lee, 2015). News media professionals are perceived as less professional based on their self-disclosure and social media interactions (Lee, 2015). Comparably, social media users perceived political candidates who use of informal language on social media as less credible (Bullock & Hubner, 2020).

Research about teaching, learning, and the use of technology in the classroom is also informed by expectancy violations theory (Chromey et al., 2016; Froment et al., 2017; Ledbetter & Finn, 2018; MacArthur & Villagran, 2015; Sidelinger & Bolen, 2016). Instructor credibility and student satisfaction are explained from an expectancy violations theory perspective (Sidelinger & Bolen, 2016). Student expectations are also relevant in communication with instructors (Broeckelman-Post & MacArthur, 2018; Chromey et al., 2016) and use of technology in the classroom (Broeckelman-Post & MacArthur, 2018; Ledbetter & Finn, 2018). Students prefer a moderate use of technology in their classes that confirm their expectations (Ledbetter & Finn, 2018). Likewise, students prefer to communicate with instructors in what they perceive as

professional communication channels, email, and LMS. Incompetent online communication does not deter future interaction with students, but offensive expectancy violations prevent future digital communication with the instructor (MacArthur & Villagran, 2015). Students evaluated instructor credibility significantly lower if they perceived that the instructors' social media profiles violated their expectations (Froment et al., 2017).

Developed in the 1970s as part of nonverbal communication research within the sociopsychological tradition (Craig, 1999), expectancy violations theory expanded its reach and maintains an influential role in communication research. It describes how and why individuals behave when confronted with violations of their expectations in a variety of communication settings. The theory continues to contribute to communication research in a number of areas, including interpersonal communication, digital communication, and education. Expectancy violations theory remains relevant to communication researchers and their desire to understand social expectations and their violations better.

Applying Expectancy Violations to Videoconferencing in Online Education.

Expectancy violations theory provides a way to understand how students experienced an unprecedented shift to online learning. College students have expectations about their college classes, online education, and appropriate communication with faculty members (Ledbetter & Finn, 2018). From this perspective, when courses transitioned from face-to-face to online, courses that shifted according to students' expectations were viewed as more successful. The use of VC is synchronous, and many students expect online learning to be asynchronous and self-paced. Faculty who required students to log in to live VC lectures may have violated student expectations for online courses. Moderate levels of technology use by instructors lead to higher levels of instructor satisfaction, credibility, and increased student affective experiences

(Ledbetter & Finn, 2018), and how students perceived VC along the technology continuum is not understood. Students who attended lectures via VC may have also had expectations violated in terms of location. Students prefer to keep their personal lives and academic lives distinct (Chromey et al., 2016). Attending synchronous VC meetings from home with numerous distractions (such as siblings, parents, and pets) may have violated students' expectations for their learning environment and contributed to feelings of Zoom fatigue. According to expectancy violations theory, students likely had higher satisfaction in courses that managed the online shift according to their expectations.

Expectancy violations theory also explains the dissonance and increased cognitive effort VC users experience. Since the VC environment resembles face-to-face communication, users expect interactions to follow the same conversation framework. However, the nuanced differences between VC and in-person interactions violate users' expectations. Awkwardness due to a number of factors, including constant eye gaze, intense facial attention, pauses, and formalized communication adds to users' feelings of VC fatigue (Storck & Sproull, 1995).

Summary

Online education is reshaping higher education. The acceleration of online learning in 2020 created an urgency to implement VC platforms, such as Zoom and Microsoft Teams, because they promised to provide media rich interactions within the virtual learning environment. The use of VC in online education is considered a way to increase interactions and engagement in online education; however, as an online learning delivery method, VC is under-researched (Al-Samarraie, 2019; Lawson et al., 2010). An emerging new phenomenon, Zoom (VC) fatigue, or the exhaustion people feel when using VC tools, resulted from the massive shift to remote learning in 2020. Little is known about how VC fatigue impacts faculty and students

within higher education. While psychologists explain VC fatigue in terms of cognitive load, they often rely on communication concepts to explain the increased mental requirements of VC communication. Since remote teaching and learning will continue to proliferate in higher education, it is valuable to examine how VC fatigue is experienced within this context from a communication perspective.

This chapter presented a review of relevant literature to studying videoconferencing fatigue in higher education. Historical information about distance education, online education, and videoconferencing was shared. Existing research about online education and videoconferencing was summarized. A new phenomenon, known as Zoom (or VC) fatigue, was presented and discussed. An explanation of how media richness theory, self-presentation theory, and expectancy violations theory may contribute to understanding VC fatigue was provided. The next chapter presents an appropriate methodology to investigate VC fatigue in higher education.

CHAPTER THREE: METHOD

Overview

The purpose of this qualitative study was to explore how videoconferencing and Zoom fatigue are experienced by faculty and students in a higher education context. Zoom fatigue is a newly identified phenomenon, and therefore, it is crucial for higher education leaders and instructors to understand how it affects the online learning environment. Continued research about synchronous online instructional delivery is necessary because the number of students learning online continues to grow (Seaman et al., 2018). Research about videoconferencing and Zoom fatigue is valuable to online instructors to consider as they design their future courses.

This chapter will provide details about the research design, including a rationale for the qualitative approach. Information about the role of the researcher, setting, artifacts, and participants is provided. In addition, the procedures that were followed with details regarding data collection and analysis are outlined. Ethical considerations and strategies for validation are discussed.

Qualitative Paradigm

This study explored a highly contextual, situational understanding of videoconferencing and Zoom fatigue in higher education. This understanding can only be gained through close interactions with faculty members and students who use videoconferencing in their online courses. Exploratory research about the use of this communication technology and its effects calls for close collaboration between these faculty and students with the researcher (Creswell & Poth, 2018). Therefore, this study called for a qualitative approach to adequately answer the research questions.

This study used a qualitative, interpretive approach to investigate videoconferencing and Zoom fatigue. A qualitative approach is designed to privilege the subjective experience of individuals to assist researchers in better understanding social phenomena. Stake (2010) described qualitative research as “interpretive, experience based, situational, and personalistic” (p. 31). Qualitative inquiry is valuable in exploring new, contextualized phenomena, which makes it appropriate for the current study. Further, qualitative researchers seek to study the ordinary to understand what it means (Stake, 2010). Videoconferencing and the fatigue that accompanies it have become an ordinary, everyday occurrence for many users, so approaching it is relevant to investigate its impact from a qualitative approach.

Since Zoom fatigue is a recent phenomenon, the nature of this study was exploratory. Creswell and Poth (2018) explained that qualitative research is useful when a problem needs to be explored and “a complex, detailed understanding of the issue is needed” (p. 46). This exploratory study on videoconferencing and Zoom fatigue required a qualitative approach to provide an in-depth explanation of how it functions in online education.

Qualitative research is interpretive, experiential, situational, and personalistic (Stake, 2010). This study adhered to the characteristics of qualitative research as identified by Creswell and Poth (2018) as it was conducted in a natural setting and relied on the researcher as a key instrument in data collection. Stake (2010) explained that qualitative research is interpretive in nature, and therefore, the researcher is viewed as the instrument because interpretation is dependent on the researcher’s defining and redefining the data to locate meaning. The research featured emergent design, which means that data collection and analysis methods were flexible and evolved as the study took place and the researcher interacted with participants, resulting in richer data (Creswell & Poth, 2018; Stake, 2010). Multiple methods of data collection were used

to gain an understanding of participants' perspectives situated within the context of higher education because triangulation increases the confidence that the interpretations are correct (Stake, 2010). The research reflected the researcher's background and influences as is characteristic of qualitative research (Creswell & Poth, 2018; Lindlof & Taylor, 2019). Finally, the study resulted in a holistic, complex picture of how videoconferencing and Zoom fatigue is experienced in online courses at the case site (Creswell & Poth, 2018; Yin, 2018).

Existing research on videoconferencing in higher education primarily used quantitative methods, so a qualitative approach filled a gap in the literature (Peterson, 2019). Other studies on videoconferencing in educational contexts have relied upon quasi-experiments or quantitative surveys. This qualitative study provided deeper understanding of how the technological tool operates within online courses.

Design

Because this study investigated a problem in a bounded environment, a single-site holistic case study was employed to explore how videoconferencing and Zoom fatigue are experienced in a higher education context (Creswell & Poth, 2018; Yin, 2018). A case study, which provides an in-depth examination of a specific case, was appropriate because this study was interested in exploring users' stories about videoconferencing and the phenomenon of Zoom fatigue. Yin (2018) explained that a single-case study is appropriate for a common case in which the goal is to understand the conditions of an everyday situation. The current study sought to understand the everyday experience on videoconferencing and Zoom fatigue in higher education, so the selection of a single site provided valuable insights into the issue. The single-site case study design led to an understanding of how to address the problem of videoconferencing fatigue in online courses.

A case study research design was consistent with the purpose of this study. Creswell and Poth (2018) define case study research as the specific analysis of a case that is situated “within a real-life, contemporary context or setting” (p. 96). Yin (2018) further elaborated on the characteristics of a case study, describing it as “an empirical method that investigates a contemporary phenomenon (the ‘case’) in-depth and within its real-world context” (p. 15). Case study research highlights several features, including the bounded nature of the identified case and its intent. This type of research is detailed in nature, and the analysis of the case results in a comprehensive description that yields assertions or conclusions (Creswell & Poth, 2018). Within the case study, researchers collect and interpret multiple sources of data that may include interviews, documents, records, and observation. According to Terrell (2016), a case study is relevant to use when researchers seek to report on the experiences of an individual or group of people at a particular point in time. The case study was situational and illuminated a common experience (Stake, 2010; Yin, 2018).

This study examined the specific case of faculty and students at a small, private liberal arts university to understand better how videoconferencing and Zoom fatigue function in online courses. Several characteristics of case study research align the qualitative strategy with the goals of this study. This real-world case was bounded by the parameters of time and context. An understanding of videoconferencing and Zoom fatigue was gained through the collection of multiple sources of data, including surveys, interviews, and document review. According to Yin (2018), case study research asks how and why, intending to provide a contextual understanding of a real-world case. With its situational focus on a contextualized group of individuals, and through the analysis of different data sources within bounded parameters, the case study research design strategy was used to analyze and better understand videoconferencing and Zoom fatigue.

The study's site was indicative of comparable institutions whose faculty and students also recently experienced increased use of synchronous online instruction through videoconferencing.

Research Questions

The research questions guiding this study were:

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?

RQ3: How does mediated communication through videoconferencing affect college students as they learn online?

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?

Setting

This single-site case study was conducted at a small, private liberal arts university in a rural area. Nestled in the foothills of the Appalachian Mountains, the institution is viewed as the educational center of the region. With 1,100 undergraduates and 850 graduate and professional students, the university is accredited by the regional accrediting agency and is well-established, serving the educational needs of the surrounding community since 1889. The institution offers 26 undergraduate programs as well as three graduate programs and two professional schools (Sidle, 2020). The university is representative of other small, private independent higher education institutions across the country, providing a common case for understanding. There are more than 1,700 independent colleges and universities in the U.S. that enroll more than 5 million students.

The average student population size is 2,300 (NAICU, 2019). Therefore, the site is comparable to a large population of other students at institutions across the country.

Independent colleges and universities are typically characterized by personal attention to students, and this exemplifies the site. The campus emphasizes personal relationships with faculty and students, and it offers a traditional residential experience. As of fall 2019, 86% of undergraduate courses were traditional classroom, 4% were hybrid, and 10% were fully online. Web-enhanced learning, defined as the utilization of technology in class in the form of the Internet or World Wide Web for any portion of their lectures and interactive learning experiences with students, was used in 99% of courses (Sidle, 2020). In March 2020, the campus shifted its face-to-face courses fully online, which was common to 90% of colleges and universities throughout the country (Ralph, 2020). At that time, instructors at the case study site were able to offer synchronous online instruction through the use of BigBlueButton, an open source videoconferencing platform that was already integrated into the university's LMS. The university quickly expanded its license for Zoom to increase instructors' ability to offer synchronous online instruction more effectively. Many colleges and universities also implemented Zoom to accommodate synchronous online learning, so this was a typical response.

In fall 2020, the university implemented a HyFlex learning model, which featured two eight-week blocks and hybrid courses that included the ability to pivot to online learning when necessary. In both blocks, such a shift occurred, so the flexibility offered by the model was effective in confronting the uncertain circumstances during the fall terms. *The Chronicle of Higher Education* reported that 65% of colleges and universities were fully or primarily online in fall 2020 (Elias et al., 2020), so the site's decision is typical of what other college faculty and students experienced. The university responded to the pandemic in other ways as well in the fall,

requiring masks and social distancing during face-to-face class sessions, requiring daily online health screenings for faculty, staff, and students, and altering campus dining and student services. These healthier alternatives were typical and comparable to measures taken at many colleges and universities.

Artifacts

Existing university documents and reports were reviewed to provide context for how videoconferencing functions in the institution's online courses. Such artifacts can provide physical evidence to support perspectives that are expressed in the interviews (Yin, 2018). In this study, the documentation review informed the construction of the preliminary survey instruments. Preliminary qualitative surveys were administered to faculty and students first. Then, individual semi-structured interviews were conducted with faculty members and students. With permission of the participants, the interviews were electronically recorded, and the researcher transcribed the interviews through NVivo. The transcripts served as the primary artifacts for the study, and they were examined for common themes relating to the use of videoconferencing in the classroom, and specifically, Zoom fatigue.

Qualitative and quantitative artifacts expanded the overall case study analysis. Qualitative data from student comments in end-of-course evaluations about the use of videoconferencing in courses were considered, and quantitative data from existing institutional reports about the use of videoconferencing on the campus were examined. Triangulation of data from multiple sources provides a more robust case study (Yin, 2018). The multiple sources of data, including a qualitative survey, interviews, and documents, provided a comprehensive description of how videoconferencing and videoconferencing fatigue was experienced by faculty and students within the case site.

Participants

The single-site case study included faculty members and students at a small, private liberal arts university in Appalachia. Most distance education research considers only student perspectives, creating a gap in the research of faculty experiences. Communication is a two-way process, so it was essential for the perspectives of both faculty and students be explored in this case study about the use of videoconferencing in online courses. To provide information related to a common experience, the case study focused on a purposeful sample of ten undergraduate faculty members and eleven undergraduate students at the university.

The university is home to students from 13 countries and 43 states. Primarily, enrollment is 77% from Kentucky with 85% from Appalachia. With 53% residential, on-campus students and 47% commuter students, the average age of the undergraduates is 21 years old. There is an equal distribution of male and female students (50%-50%). There is less diversity with 82.94% of students white; 12.45% Black, non-Hispanic; and 1.26% Hispanic. As a school of opportunity, 38.2% are first-generation college students, and 57.6% are from poor or near-poor families (Sidle, 2020).

Faculty members are 54% female and 46% male with 66% holding a terminal degree. There is a fairly equal distribution of faculty members across rank, with 34% full professors, 34% associate professors, 30% assistant professors, and 2% instructors. The majority of courses, 84%, are taught by full-time faculty members. The student-to-faculty ratio was 15.4 (Sidle, 2020).

While the case site is not generalizable to all college students and faculty, the experiences of these students and faculty are indicative of those at other institutions, especially comparable

independent institutions. Many similar-sized independent colleges and universities share characteristics with the case study site, offering transferability of the findings to 1,700 independent institutions and their 5 million students. The insights of the case study's faculty and students about videoconferencing and Zoom fatigue provided worthwhile information about the factors that affect such fatigue in online courses, as their everyday experiences were typical and common of other college faculty and students during 2020. According to Yin (2018), case study research provides an examination of a specific case that is common of other cases and provides important insights from which others may learn, and this case study site is representative of other similar institutions. Gagnon (2010) explained that transferability and external validity of case study research is assured by selecting cases that are representative of the phenomenon being studied, and by presenting the study's procedures and data in a transparent manner. This study's procedures are outlined below, and its data are shared authentically.

Procedures

Case study research benefits from multiple sources of evidence (Yin, 2018). This study employed multiple data sources, including document review, qualitative surveys, and semi-structured interviews. After conducting a thorough review of existing literature, site permission was approved, and IRB approval was secured (see Appendix A). Existing documentation of student narrative comments from course evaluations were examined. Based upon this review and guided by the research questions, preliminary survey questions were written. Potential participants were emailed consent forms (Appendix B and Appendix C) and recruitment letters (Appendix D and Appendix E) for a preliminary online survey administered to faculty and students through SurveyMonkey (see Appendix F and Appendix G). Survey participants were asked to volunteer for a follow-up interview, and if they agreed, a purposeful sample were sent a

recruitment letter to schedule an interview (see Appendix H and Appendix I). Further, analysis of the survey data directed the interview protocols for faculty and students (see Appendix J and Appendix K). In this manner, the qualitative study followed an emergent design, with one data source informing the data collection of the next source.

Institutional document review included written comments from student course evaluations in spring and fall 2020. All names and identifying information were removed. The written comments were analyzed through NVivo, a qualitative data analysis software tool, to conduct word frequency counts. Sentiment and thematic analysis were also conducted.

After the document review, a preliminary faculty survey instrument and preliminary student survey instrument were administered online through SurveyMonkey. To recruit survey respondents, an email was sent to 67 undergraduate faculty requesting those who had used videoconferencing in their courses during 2020 to complete the survey (see Appendix D). Likewise, a recruitment email was sent to 654 undergraduate students also requesting volunteers to participate in the study (see Appendix E). The email linked to the survey with an informed consent form required to participate. No monetary or other incentives were introduced, so participants did not feel pressured to participate. The last question of each survey asked for volunteers willing to be interviewed about their videoconferencing experiences. Those who were interested were redirected to a page where they could enter their email addresses. In this way, the anonymity of the survey responses was maintained.

Interview questions were written based on the insights gained from the document analysis and survey results. After the survey closed, 10 faculty members and 11 students were purposefully recruited to participate in in-depth interviews through an email request (see Appendix H and Appendix I). A stratified sampling technique was used to select interview

respondents from the pool of survey participants who volunteered. The stratified sample was employed to ensure a diversity of viewpoints with faculty and students representing various disciplines. Additionally, there was an effort made to include male and female respondents. Faculty members were selected from all ranks, and students included sophomores, juniors, and seniors. Freshmen were not included in the interviews because the researcher wanted to ensure students had experiences in both the spring and fall terms. Interviews were scheduled on Zoom with the faculty and the students on an individual basis. The researcher obtained consent from each participant before conducting the interviews (see Appendix L and Appendix M). All participants granted permission for the interviews to be recorded. Interviews took place during a two-week period, and then, the recordings were transcribed for analysis through NVivo. After computer transcription, the researcher read through the transcripts and cleaned the data. Member checks were sent to the participants as well to ensure accuracy of the transcripts. The researcher then coded the transcripts through thematic analysis.

Stake (2010) recommended that researchers consider multiple data collection sources during the research process. Triangulation of data from document review, surveys, and interviews ensured the researcher gained a full understanding of the site (Lindlof & Taylor, 2019; Stake, 2010; Yin, 2018). This qualitative research study benefited from a flexible research plan that was adjusted and emerged during time, allowing the data and stories they told to lead the research process (Creswell & Poth, 2018; Yin, 2018).

Role of the Researcher

In qualitative research, the researcher is not an objective observer removed from the research process but instead can be seen as a key instrument in the research process as the researcher gathers the data and interprets it (Creswell & Creswell, 2018; Creswell & Poth, 2018;

Lindlof & Taylor, 2019; Stake, 2010; Yin, 2018). Lindlof and Taylor (2019) explained the role of the researcher in qualitative research is involved and subjective. Qualitative researchers work closely with their participants in natural settings and seek to interpret what they find in meaningful ways.

Reflexivity is paramount to qualitative study as the researcher's personal background will influence and shape their interpretations (Creswell & Creswell, 2018; Creswell & Poth, 2018). The researcher has extensive college teaching experience as a faculty member for 25 years. In this study, the researcher's background is connected with the participants as the researcher has been a long-time member of the institution in which the data was collected. As both a faculty member and a current graduate student, the researcher has relevant experience with videoconferencing use in higher education and has a vested interest in learning how to address the problem in the future. However, the researcher has limited experience with the use of videoconferences within courses for instructional delivery. Since the researcher has not used synchronous instructional delivery methods, personal bias was minimized in analyzing the data, allowing themes to emerge from the personal stories of the faculty and students surveyed and interviewed.

Data Collection

This study used multiple data collection sources, including document review, qualitative surveys, and semi-structured interviews. Multiple methods of data collection allowed for the triangulation of data, substantiating the findings and ensuring a more dependable analysis (Yin, 2018). Data was collected from faculty members and students, so the study provides a comprehensive examination of videoconferencing and Zoom fatigue from multiple perspectives.

Documents

Existing institutional documents and reports were collected from appropriate institutional officials that contained qualitative data from student evaluations in spring and fall semesters 2020. No identifying information was included in the documentation, and only comments related to the use of online instruction, such as videoconferencing, were used in the study. The documents included 4,348 qualitative, narrative comments from which comments relevant to technology use in online courses for the spring and fall semesters were pulled, yielding a total of 1,358 relevant comments across the terms that were used in analysis. Additionally, statistical data related to institutional use of videoconferencing was obtained to demonstrate the overall impact of such tools on the campus.

Surveys

Preliminary qualitative surveys were distributed online and gathered qualifying information that was used to screen faculty and student interview respondents. The full survey instruments for faculty and students are presented in Appendix F and Appendix G, respectively. Singleton and Straits (2012) describe such a survey as a computer-assisted self-interview because it allows participants to respond to a self-administered form online. The pre-screening survey asked for demographic and contextual background information related to the individuals' experience with online courses. The surveys explored participants' level of experience with online education and videoconferencing, allowing for a purposeful sample to be drawn to more deeply probe beliefs, values, and perceptions during the interview phase. In all, 35 faculty surveys and 67 student surveys were completed.

Online surveys present several advantages for researchers, including convenience, flexibility, ease of administration, cost, speed, question diversity, and immediate data analysis (Evans & Mathur, 2005). Since the topic of the research study is online education, it was appropriate to utilize an online tool. Further, the participants in the study were familiar with completing online surveys.

Interviews

Interviews are a primary means of data collection for qualitative research (Creswell & Poth, 2018; Yin, 2018). Lindlof and Taylor (2019) present the concept of the qualitative interview as an opportunity for the study's participants and researcher to connect in a meaningful way, explaining, "[A] research interview unfolds as a social process, and what emerges from that process is a richly expressive *inter-view* that neither person could have produced alone" (p. 220; emphasis in original). Qualitative interviews are, then, an attempt for the researcher to understand the lived experiences of the participants (Creswell & Poth, 2018).

There were 10 faculty and 11 student in-depth, semi-structured interviews. Interviews lasted from 11 minutes to 45 minutes each, with a total of 572 minutes transcribed for analysis. All interviews were conducted on Zoom. It is fitting that the interviews about Zoom fatigue were conducted via Zoom. Gray et al. (2020) determined the videoconferencing tool is a cost-effective, convenient alternative to face-to-face qualitative interviews with participants reporting positive experiences with interviews using Zoom. Videoconferencing tools, such as Zoom, can be an important tool for qualitative researchers to use to stay relevant in the digital world.

The full interview protocols that guided the semi-structured interviews for faculty and student respondents are presented below and in Appendix J and Appendix K.

Standardized Interview Protocol for Faculty.

1. I'd like to talk with you about your preferences in online teaching. What does effective online teaching mean to you? How do you prefer to set up your online courses?
2. Let's talk about your experiences using videoconferencing in your online courses. How do you feel when you lecture on videoconferencing? How do your students respond?
3. I'd like you to compare videoconferencing in your classes to other kinds of interactions with your students. For instance, can you describe how videoconferencing is different from face-to-face interactions or online discussion forums in classes?
4. How do you feel after videoconferencing with your class? Have you ever felt tired after videoconferences? Why do you think you feel that way?
5. How do you anticipate you will use videoconferencing in the future? What role will it play in your courses, career, or personal life?

Table 1 demonstrates the alignment of the research questions to the interview questions for faculty.

Table 1

Alignment of Research Questions to Interview Questions (Faculty)

Research Questions	Faculty Interview Questions
RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?	1, 2, 3, 5
RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?	4

The first question was used to build rapport with the interviewee and set a context for the conversation about the use of synchronous online learning, building upon research on faculty perceptions of learning modalities (Koenig, 2010). Questions 2-3 addressed videoconference experiences from a faculty perspective. These questions were designed to understand what it's like for instructors to teach synchronously online through videoconferencing, building upon past videoconferencing research in education (Francescucci & Rohani, 2019; Kobayashi, 2017; Koenig, 2010; Martin, 2005; Watts, 2016). Question 4 was intended to explore the causes of the recently identified phenomenon, Zoom fatigue, extending the research of Storck and Sproull (1995), who found communication through videoconferences takes more effort than face-to-face communication. Question 5 was investigated faculty perceptions about the impact videoconferencing will have in the future, building upon the thoughts expressed in questions 2-3.

Standardized Interview Protocol for Students.

1. I'd like to talk with you about your preferences in online learning. Can you describe a perfect online course?
2. Let's talk about your experiences using videoconferencing in your online classes. How does you feel when you're in a synchronous videoconferencing session? What is it like?
3. I'd like you to compare videoconferencing in your classes to other kinds of interactions. For instance, can you describe how videoconferencing is different from face-to-face interactions or online discussions in classes?
4. How do you feel after a class videoconference? Have you ever felt tired after videoconferences? How often? Why do you think you feel that way?

5. How do you anticipate videoconferencing will affect your life and career in the future?

Table 2 presents the alignment of research questions to interview questions for undergraduate student participants.

Table 2

Alignment of Research Questions to Interview Questions (Students)

Research Questions	Student Interview Questions
RQ3: How does mediated communication through videoconferencing affect college students as they learn online?	1, 2, 3, 5
RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?	4

The first question was designed to build rapport with the interviewee and set a context for the conversation about the use of synchronous online learning. Studies have found students prefer asynchronous online instruction compared to synchronous online instruction (Bernard et al., 2004; Kobayashi, 2017; Koenig, 2010). Questions 2-3 were intended to investigate videoconference experiences from a student perspective. These questions aimed to understand what it's like for students to learn synchronously online through videoconferencing, building upon past videoconferencing research (Francescucci & Rohani, 2019; Kobayashi, 2017; Koenig, 2010; Watts, 2016). Question 4 was critical for exploring the causes of the recently identified phenomenon, Zoom fatigue and expands the ideas of Storck and Sproull (1995) who claimed videoconferences take more effort than face-to-face interactions. Question 5 allowed students to

reflect on the impact they feel videoconferencing will have in the future, building upon the thoughts expressed in questions 2-3.

Data Analysis

There was a two-pronged approach for data analysis, including the use of the researcher as a coding instrument and the use of computer-assisted data analysis software. For the documentation review, a word frequency analysis of the qualitative comments from the institutional documents was conducted in NVivo, and the results analyzed. A sentiment analysis was also conducted on the comments. Further, the researcher coded the comments using thematic analysis, which revealed three relevant themes.

The surveys included quantitative and qualitative data, with the quantitative data analyzed through SurveyMonkey for descriptive statistics. The qualitative data was coded by the researcher. The quantitative and qualitative data from the surveys were grouped into several categories for analysis: faculty demographic analysis, student demographic analysis, faculty teaching modalities and methods, student learning modality and methods, faculty videoconferencing usage, student videoconferencing usage, faculty and Zoom fatigue, and students and Zoom fatigue.

With permission of the participants, the interviews were recorded electronically, so they could be transcribed and coded. Coding is the process by which researchers categorize data and assign labels (Creswell & Creswell, 2018) to patterns and concepts (Yin, 2018). Names were changed on the transcripts to protect the identities of the respondents. Member checks were performed after the transcriptions were prepared, so the respondents verified the information. Creswell and Poth (2018) recommended member checks as a method to ensure the credibility of the researcher's interpretations of data collected through interviews.

A pattern-matching analytic technique strengthened the findings (Yin, 2018). Thematic analysis was used to code the transcripts. Throuvala et al. (2019) recommended six stages for thematic analysis:

- (i) familiarization with the data following multiple readings of the transcripts, (ii) generating initial codes via open coding with the extraction and isolation of verbatim quotes, (iii) searching for themes both under the discussion topic and emerging ones based on extracts from the transcripts, (iv) reviewing initial codes and identifying any latent themes and then combining into preliminary themes, (v) refining and developing of themes in subsequent iterations, and (vi) consolidating further the identified themes under fewer themes. (p. 166)

The researcher identified patterns that emerged from the interviews as well as compared and contrasted responses between the faculty and student surveys and interviews. From 14 initial faculty codes, 10 emerged for final analysis, and an initial 10 codes for the student interviews were refined to six. Within the pattern-matching technique, the data was compared to three proposed theoretical frameworks to evaluate whether media richness theory, self-presentation theory, and expectancy violations theory is useful in understanding how the videoconference experience and Zoom fatigue occurs in online courses. Institutional documents and qualitative comments from the surveys were also coded using a similar process. Themes from the multiple sources of qualitative data broaden the understanding of faculty members' and students' perspectives.

Although non-numeric in nature, qualitative data can also benefit from computer-assisted analysis (Creswell & Poth, 2018; Yin, 2018). The computer-assisted qualitative data analysis software, NVivo, was used to cross-examine data. Yin (2018) cautioned that the use of such

software analysis programs be seen as a tool for the researcher's interpretations. Therefore, a blend of manual and computer-assisted analyses was used to provide a balanced, inclusive approach to data analysis.

Comprehensive analysis provided through the researcher's interpretations and the computer-assisted qualitative data analysis software tool informed the overall findings. A complete, detailed understanding of the use of videoconferencing in online courses at the site and how Zoom fatigue affected faculty and students emerged. An in-depth, thick description of the use of videoconferencing and Zoom fatigue in the higher education context of this institution provided rich insights about faculty members' and students' experiences in online courses.

Ethical Considerations

To protect participants and provide for the collection of rich data, it is imperative that social research be conducted with ethics and integrity. IRB approval was received by both institutions to ensure the research conforms to the necessary ethical guidelines. Effective, ethical procedures will help build trust with participants. Informed, written consent was obtained before the surveys and interviews took place, notifying participants that there are minimal risks associated with the study. Participants were also be able to withdraw from the study at any time. Member checks ensured participants were represented honestly. Care was given to guarantee the data is protected and secured with password protections for access to digital files. Finally, respondent names were altered before provided in the final report.

With any research design, there are ethical challenges that need to be addressed. The case study approach is generally a detailed, time-consuming design inquiry. Yin explained (2018), "Doing case study research is one of the most challenging of all social science endeavors" (p. 3). Case study research requires extensive time for the researcher to gather data from multiple

sources and gain an in-depth understanding of the case. A deep appreciation of the participants' experiences is necessary before the analysis can begin. One potential ethical situation for the current project is the relationship between the participants and the researcher. As a member of the institution in which data was collected, the researcher endeavored to navigate the complex relationship with the participants and the final analysis with integrity.

Validation Strategies

Qualitative researchers work closely with their participants in natural settings to obtain detailed information about their experiences. Validity and reliability within qualitative research are considerations that address the quality of the specific research study and the desire for researchers to get the account of their participants right (Creswell & Poth, 2018). In terms of validity and reliability, qualitative researchers often consider alternative, distinct terms, such as “credibility, authenticity, transferability, dependability, and confirmability” (Creswell & Poth, 2018, p. 256). Merriam and Tisdell (2016) discuss these criteria, explaining that qualitative research should be evaluated in terms of its rigor, sincerity, transparency of methods, and the ability to resonate with audiences. This research endeavored to provide “meaningful coherence” (Merriam & Tisdell, 2016, p. 240), connecting the research questions, literature, findings, and interpretations.

Credibility

Validation is an essential dimension to ensure that the findings are trustworthy and credible. The principal concern for qualitative researchers is that they feel confident that their observations, description, and account are credible, authentic, and honest. Creswell and Poth (2018) noted, “Written accounts must resonate with their intended audiences and must be powerful and convincing” (p. 258). Several strategies can be used to ensure to the internal

validity of qualitative studies, including triangulation of data sources, prolonged time in the field, close relationships between the researcher to participants, detailed thick description, analyzing negative cases, conducting member checks, involving participants in the process, and engaging an external auditor (Creswell & Poth, 2018). Triangulating data sources and data collection techniques, along with member checks were methods used in this study to maintain the study's credibility and validity. The researcher collected data from multiple sources and through multiple data collection methods, including documents, surveys, and interviews, and worked collaboratively with participants to discuss the findings' trustworthiness. These strategies ensure the data and findings are credible and true. The surveys and interviews provided cross-checks with the interviews providing deeper, more detailed information.

Dependability

Creswell and Poth (2018) suggested qualitative researchers seek dependability, rather than reliability in qualitative studies. Dependability can be achieved by taking detailed field notes, using recording devices, and employing software programs during analysis. This study's dependability was ensured during the interview process through the use of recordings and during analysis with the use of a qualitative data analysis software program. Computer-assisted qualitative data analysis software assists qualitative researchers in organizing and interpreting non-numerical data in an unbiased way, allowing the researcher to identify trends and cross-examine the data across sources. Triangulation of data collection methods and the use of multiple sources are strategies that also enhance the study's dependability as they provide a way to obtain consistent data that is congruent with the reality of the participants (Merriam & Tisdell, 2016).

Further, Merriam and Tisdell (2016) recommend researchers implement an audit trail to add to the study's credibility. An audit trail for this study includes field notes from the

transcripts, coding notes from thematic analyses, and a research journal. These methods provide a detailed account of how the study was conducted and how the data were analyzed, further ensuring dependable findings.

Transferability

Transferability, or external validity, refers to the ability of this case study to apply to other settings (Creswell & Poth, 2018). “In qualitative research, a single case or a small, nonrandom, purposeful sample is selected precisely because the researcher wishes to understand the particular in depth, not to find out what is generally true of the many,” Merriam and Tisdell (2016, p. 254) argued. This study utilized a case study approach and a single purposeful sample to better understand the phenomena of videoconferencing and Zoom fatigue in depth.

Typical sampling also enhances transferability (Merriam and Tisdell, 2016). Stake (2010) explained that the case may be unique but is also seen as common or typical. This case study’s setting is common and may be applied to understand how faculty and students in similar higher education institutions experience videoconferencing and Zoom fatigue in online courses. This case study is applicable for other small, private liberal arts colleges and universities, which includes 1,700 institutions and 5 million students. Like many other institutions across the country, faculty and students at the case study site faced an abrupt pivot to fully online instruction in spring 2020, and they negotiated the uncertain environment of the fall 2020 semester. As college faculty and students across the country adjusted to these uncertain times, the participants at the site responded comparably, so the experiences of the faculty and students at the site are typical and common; thus, it can be modestly extrapolated that the findings are applicable to other settings (Merriam & Tisdell, 2016).

Additionally, the use of multiple data collection sources that informed the thick description also contribute to the transferability of this study (Merriam & Tisdell, 2016; Terrell, 2016). Providing a thorough, deep understanding of the site and participants' experiences adds to transferability. Sufficient descriptive data enables user generalizability, which allows readers to evaluate whether the study's findings are applicable to their situations (Merriam & Tisdell, 2016). To that end, the study collected data from thousands of documents, 102 completed online surveys, and 572 minutes of in-depth interviews, so that a deep, thorough understanding of the phenomena could be better understood and assure transferability. The thick description provides readers the context needed to determine whether the study is transferable. This study described the setting and the experiences of the participants in detail, adding to its transferability.

Summary

This study explored how videoconferencing and Zoom fatigue affect faculty and students in online courses. It used document review, surveys, and semi-structured in-depth interviews to gain insights related to the research questions. College administrators, instructors, and students will potentially benefit from the results of this study as the results will inform instructors about including the use of synchronous learning in their online course design.

This chapter discussed the qualitative research approach and case study design. The single-site case and participants were described. The role of the researcher was discussed. Procedures, data collection, and analysis of data were detailed. Finally, ethical considerations and validation strategies were considered. The findings are presented in Chapter Four, and discussion of the findings, implications, limitations, and suggestions for future research are addressed in Chapter Five.

CHAPTER FOUR: FINDINGS

Overview

The use of videoconferencing (VC) in higher education is increasing at exponential rates, yet existing research does not consider how faculty and students experience the use of the communication technology, and more importantly, previous research does not address how fatigue, associated with the use of the communication technology, affects faculty members and students. The purpose of this qualitative single-site case study was to explore how VC use and fatigue are experienced by faculty members and students at a private, liberal arts university in Appalachia. The site illustrates an experience common to other higher education institutions that have quickly incorporated the use of videoconferencing tools in their teaching delivery methods without considering potential effects. The following research questions guided this qualitative study:

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?

RQ3: How does mediated communication through videoconferencing affect college students as they learn online?

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?

This chapter presents an analysis of the case study's principal findings. Data collection was triangulated through multiple data collection methods and sources, including institutional documentation, preliminary online surveys, and in-depth, virtual interviews. The chapter begins

by providing background information about the case study site to provide context for understanding how videoconferencing was implemented and used on the campus. Next, demographic information about the participants is provided. Following this information, findings from documentation analysis, the surveys, and the in-depth interviews are provided. The procedures used for analyzing the data from each source of data is outlined, while emerging themes are identified and explained. A discussion of the findings is provided in Chapter Five.

Background

Background information of the case study site where the research study was conducted and its participants is provided because thick, rich description is integral to case study research and will allow a frame of reference for the analysis of data presented later in the chapter (Creswell & Poth, 2018). Case study research requires an understanding of the specific site to position the research study within a contextual framework. The description is crucial in situating the participants' survey and interview responses within the context of their specific situation, so their insights about the use of videoconferencing and how it causes videoconferencing fatigue can be understood and applied to similar environments.

Case Study Site

A small, private, independent liberal arts university in Appalachia was selected for this single-site case study because like many other higher education institutions did in spring 2020, the university recently implemented the use of Zoom within its online and hybrid courses. A hallmark of case study research is that it provides an in-depth examination of a specific case that is common to other cases, affording important insights into the studied phenomenon (Yin, 2018). While not generalizable to all universities, the chosen site is representative of other small, private independent higher education institutions and presents a common case for better understanding

the use of videoconferencing in higher education teaching and learning as well as the newly identified problem of videoconferencing fatigue.

Located in the foothills of the Appalachian Mountains, the institution's 1,150 undergraduates and 850 graduate and professional students experienced a massive shift in instructional methods during the spring 2020 semester necessitated by the COVID-19 global health pandemic (Sidle, 2020). In an effort to narrow its focus, the study focused on the undergraduate faculty and students at the university. On March 16, 2020, the institution transitioned all of its undergraduate courses online. Faculty members were notified during the institution's spring break and had four days to convert their previous face-to-face courses to a fully online format. The university uses Canvas as its learning management system (LMS). At the time of the online shift, the only videoconferencing tool available to faculty imbedded within the LMS to use in their courses was BigBlueButton, an open-source web conferencing platform. As part of its Microsoft Office package, Teams was also available. Immediately, the institution identified the need to expand its videoconferencing capacity, and it widened its corporate Zoom account, establishing a domain-wide license and allowing the platform to be accessed by all of the institution's users. The director of information technology sent a message to faculty on April 2, 2020, announcing the expansion of the corporate account for the videoconferencing tool as faculty members had already been using the platform "as a primary driver for delivering lectures remotely to our students" (J. Williamson, personal communication, April 2, 2020).

Institutions across the country implemented various measures to confront the continued challenges from the pandemic in the fall 2020. Nationally, higher education responded to the pandemic challenges with a variety of approaches that ranged from fully in-person instruction to fully online. Predominately, institutions turned to remote learning with 10 percent reporting they

were fully online, 34 percent reporting they were primarily online, and 21% hybrid. Only 4 percent were fully in-person and another 23 percent were primarily in-person (Elias et al., 2020). The case study site implemented a HyFlex learning model in fall 2020. Gannon (2020) explained HyFlex learning allows students to take a course in-person synchronous, online synchronous, and online asynchronous. “The idea is that they can move back and forth between those modes throughout the duration of the course as it fits their needs and contexts” (Gannon, 2020, para. 4). To facilitate the HyFlex model, the site also re-envisioned its traditional 16-week semester schedule, breaking it into two eight-week block terms. In announcing the approach to the undergraduate faculty in April 2020, the institution’s president explained, “In eight-week intensive courses, students achieve the educational outcomes set for them at least as well, and in most studies significantly better, than their 16-week counterparts” (B. Webb, personal communication, April 23, 2020). The administration determined the eight-week blocks would allow the institution to offer face-to-face, online, and hybrid courses during the fall 2020, with a capacity to pivot to various modalities as external circumstances required. This substantial change to the academic calendar was a strategy that many other liberal arts colleges used to respond to the challenges of the pandemic (McMurtrie, 2021). After the fall semester, most colleges reported the innovative approach worked for students learning fully online, while it also allowed institutions to better accommodate social distancing for in-person classes. *The Chronicle of Higher Education* reported most schools do not plan to keep the model permanently as the compressed schedule may inhibit learning; however, the shorter module-style schedule may play a role in some institutions’ future as a way to attract nontraditional students and others whose outside responsibilities place demands on their time (McMurtrie, 2021).

While the case study site employed the HyFlex learning model in two eight-week fall terms for undergraduate students, the institution also required all courses to be either hybrid with online and in-person components or fully online. These adjustments were made to facilitate the easiest transition between learning modalities, ensuring responsiveness to changing conditions throughout the semester. The plan worked, and during the first eight-week term, the university shifted all learning fully online for two weeks as a result of an on-campus surge in the coronavirus. In the second eight-week term, the institution instituted a planned shift fully online after the Thanksgiving break to prevent further spread of the virus, as did many universities. Therefore, during the spring and fall 2020 terms, undergraduate faculty and students experienced multiple teaching and learning modalities with shifts between modalities in each term. The institution's experience in shifting teaching modalities was common to many other institutions as colleges nationwide scrambled to respond to rapidly changing health situations.

Due to the uncertainty that accompanied the pandemic, the higher education industry predicted enrollment would be negatively affected by the pandemic in fall 2020, and the National Student Clearinghouse Research Center (2020) reported that total fall enrollment was down 2.5 percent across all of higher education. However, undergraduate enrollment's decline was steeper at 3.6 percent across institutions. Examining the data further, first-time freshmen drove the decrease with 13.1 percent fewer first-year students compared to 2019 (Bennett, et al., 2020). Nationally, the enrollment drop was more significant for men who decreased by 5.1 percent compared with only a 0.7 percent decrease by women (Bennett, et al., 2020). The case study site's fall 2020 enrollment numbers were slightly more positive than the national numbers, although they were comparable. Overall, fall undergraduate declined 3 percent, while first-time

freshmen decreased by 7 percent. The institution also saw 7 percent fewer male students in fall 2020, yet female students increased by 0.7 percent (Sidle, 2021).

Participants

The single-site case study included faculty members and students at a small, liberal arts university in Appalachia. To provide information related to a common experience, the case study focused on a purposeful sample of undergraduate faculty and students at the university. Faculty and students who participated in undergraduate courses during both the spring and fall 2020 semesters received an invitation to complete a preliminary survey. This sample was selected to ensure faculty and students had significant experience with videoconferencing at the institution. In all, 67 faculty members and 654 students received the survey. Faculty members were full-time (70.2%) and part-time (29.8%), including all ranks with 28.4% at the professor rank, 22.4% associate professor, 19.4% assistant professor, and 29.8% adjunct instructor. A majority, 58.2%, hold terminal degrees. The gender breakdown was fairly even with 50.8% men and 49.2% women.

The majority of students were full-time (97.9%) with only 2.1% part-time. The student population was 51.8% female and 48.2% male. The students are primarily white/Caucasian (82.6%), with 12.5% Black, 1.2% Hispanic, 0.9% Asian, 0.8% Native American, and 1.8% International. The racial diversity is consistent with the students' background as 82.7% are from a rural hometown, with 78% from Kentucky, and 76.2% from Appalachia. More than a third of the students are first generation (34.9%), and more than half are student-athletes (51.5%).

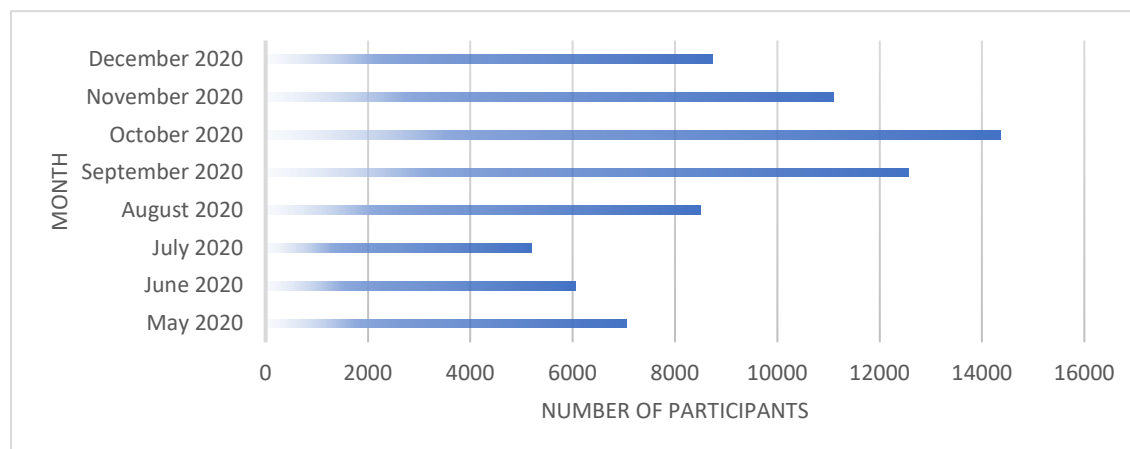
After 35 faculty members and 67 students completed a preliminary survey, a stratified sample of faculty and students was recruited and selected to complete in-depth interviews. Ten faculty members, and 11 students participated in semi-structured interviews. The faculty

members included five women and five men, and they represented a variety of disciplines across the institution from the humanities, social sciences, sciences, and nursing and human services. To protect their confidentiality, pseudonyms were selected to present their responses. Faculty participants were Mark, Angela, Randy, Kathy, Sandy, Amy, Ted, Kris, Tony, and Adam, and they teach in a variety of disciplines, have a variety of teaching experience, ranging from three to 20 years, and represent the range of faculty ranks, including assistant professor, associate professor, and professor. Student respondents included eight women and three men, representing a variety of majors. They included sophomores, juniors, and seniors. Pseudonyms were assigned to protect their confidentiality as well. The student participants are presented as Chad, Christy, Erica, Kayla, Leah, Leslie, Melissa, Rene, Stacy, Wes, and Zane.

Findings

Documentation

Documentation from the institution revealed the substantial use of videoconferencing during the spring and fall 2020 terms. Institutional reports demonstrated a high level of Zoom usage by faculty and students as is shown in Figure 1. October represented the highest level of use. This aligns with the period of time in which the institution transitioned instruction to fully online due to a surge in the virus on campus. Overall, the use of mediated communication through the use of videoconferencing was extensive and played a major role in university activities for faculty and students.

Figure 1*Videoconferencing Usage by Month*

To provide a detailed analysis of how students experienced the online shift, written comments from student evaluations in spring and fall semesters 2020 were gathered and analyzed. All names were removed prior to analysis by the researcher. The institution's student evaluation form asks students to comment on the instructor's strong points. The form reads, "We all do some things well. Is there anything you would like to let the instructor know that affected your learning in a positive way?" During the spring 2020 semester, 3,393 evaluations were completed, with 1,487 responses to this item. There were 3,057 evaluations completed during the first eight-week fall term with 889 responses to the item. In the second eight-week fall term, 1,004 responses were left on the 3,355 evaluations completed. The narrative comments were read and re-read to gain a sense of what students deemed important. A content analysis of the qualitative comments was conducted to condense the number of comments that were relevant to the study. Comments that mentioned key words related to the use of communication technologies, such as Zoom, videoconferencing, video recordings, and online teaching were pulled for analysis. This yielded 213 relevant, meaningful comments from the spring 2020 term,

82 comments from the fall first eight weeks term 2020, and 95 comments from the second eight weeks term 2020 as shown in Table 1.

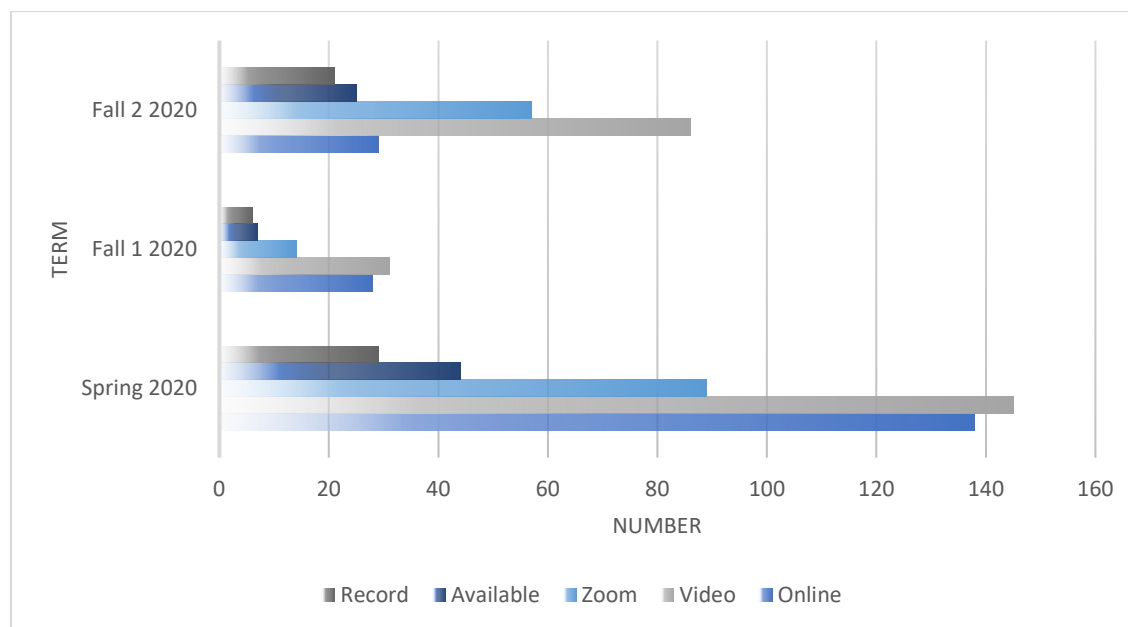
Table 3

Number of Student Evaluations and Narrative Comments Per Term

Term	Number of Evaluations	Number of Comments	Number of Relevant Comments
Spring 2020	3,393	1,487	213
Fall 1 2020	3,057	889	82
Fall 2 2020	3,355	1,004	95
Total	9,805	3,380	390

The 390 relevant comments were analyzed by NVivo. Word frequency analysis determined the most frequently used words were online (138), video/videos (28), Zoom (18), and available/availability (10) in the spring 2020 qualitative student comments. For the first eight weeks term in fall 2020, the most frequently used words were video/videos (31), online (28), Zoom (14), availability/available (7), and record/recorded/recordings (6). Video/videos (86), Zoom (57), online (29), availability/available (25), and record/recorded/recordings (21) were also the most frequent words used in the second eight weeks term in fall 2020. Table 2 and

Figure 2 presents the most frequently used words by term.

Figure 2*Word Frequencies by Term*

Due to the transition to fully online teaching midway through the spring 2020 semester, the institution added an open-ended question to the campus-wide evaluation form for that term only. Students were asked, “All courses and support services were moved online the last 6-7 weeks of the semester. Please help the university identify creative and innovative strategies you experienced in the online classroom that we should continue after COVID-19.” After removing the “non-applicable” or “N/A” answers, all of the other written answers were included in the content analysis as the question specifically addressed the subject of the current research project. There were 968 narrative responses to the online transition item on the evaluation form, which represented about 29% of the total completed forms. Responses ranged from one-word answers, such as, “Zoom,” to extensive paragraphs. One student wrote:

The set-up of her online course was perfect. She put each of our lectures in modules that were easy to navigate through, and she used Panopto video to lecture just like if we were

in class. If we ever have to do online again, I hope all of my courses are set up just like this one.

The most common occurring words in the responses were online (420), class (403), Zoom (151), and assignments (124).

Examining the sentiment expressed in the responses revealed they were more positive than negative, with 140 (14%) positive comments and 101 (10%) negative comments out of the 968. Comments were coded as positive if they included words, such as “great,” “good,” and “nice,” whereas comments were coded as negative that included words, such as “terrible,” “hard,” and “horrible.” An example of a positive comment was “I liked being given a week's worth of work online and being able to complete it at my own pace. This is a great strategy for students who work or have busy home lives.” One student offered this positive experience:

[The instructor] never failed to let us know he loved and missed being in the classroom with us. Each day he worked to make our semester as close to normal as he could, considering the circumstances. Never did anyone doubt he was always rooting for us and willing to aid our success in any way he could. That type of attitude is critical to facilitating learning – in the classroom or online.

Another student's positive reflection stated:

The BigBlueButton was wonderful. I appreciate everything [the instructor] has done in terms of changing to an online environment at the drop of a hat. The course ran smoothly, and she kept everyone informed of how the class was to be completed in this format. We even presented projects in an online format which was a great educational and career experience.

However, not all students enjoyed the forced online format. One student explained, “I experienced a hard drop in grades due to poor internet connection at my house. It was also hard to learn the material even with my instructors help due to how I’m used to learning class materials.” Students with families also experienced extra challenges, as one wrote, “It was a huge struggle being a non-traditional student with a family to switch to online learning.” Other students simply expressed their displeasure with online learning. One said, “It was rough.” Another revealed, “DID NOT enjoy not meeting face-to-face at ALL! I felt way too overwhelmed, and it was hard to adjust.” The negative feeling was echoed by others. One wrote, “I felt very overwhelmed with the online work in all of the classes.” Other students related their frustration more simply. “I just miss everyone,” one said. “Please do not do this to us again. Thank you,” another pleaded.

In all, a total of 1,358 qualitative student comments were analyzed from the year across the three terms. Table 2 summarizes the number of qualitative student comments analyzed.

Table 4

Number of Relevant Student Comments Per Term

Term	Number of Comments for Q1	Number of Comments for Q2
Spring 2020	213	968
Fall 1 2020	82	N/A
Fall 2 2020	95	N/A

Note: Q1: Is there anything you would like to let the instructor know that affected your learning in a positive way?

Q2: Please help the University of Pikeville identify creative and innovative strategies you experienced in the online classroom that we should continue after COVID-19.

Figure 3 is a word cloud, depicting a comprehensive list of the most frequently used words in all of the qualitative student evaluation comments in the three academic terms.

Figure 3

2020 Student Comments' Word Frequencies

Student Evaluation Comments, 2020

Word Frequencies



The word cloud demonstrates how students commonly discussed the predominance of “online” learning as “online” was the most common word used. In their reflections, students discussed their preferences for “lectures” on “Zoom” or “videos.” Students also emphasized the “help” they received from faculty during the stressful semesters.

Analysis of the qualitative comments revealed students reacted positively to effective use of communication technologies in their courses. Student comments about the shift in learning modalities during their 2020 courses underscored their preference for the use of communication technology tools, most notably the use of recorded videos and live Zoom lectures. Students characterized the shift to online learning during 2020 primarily positively. Themes emerged from the analysis, indicating students viewed the use of videos, Zoom, and professor availability and helpfulness as key to their academic success.

Student Reactions to Video Content. Students positively reacted to videos posted to the LMS. One student wrote, “He showed videos that were very helpful about the topics in our chapters he talked about and as a class we interacted well with him.” Another student noted,

“[The instructor] regularly gave weekly videos of herself explaining and going into detail the assignments that were to be completed, which I felt was helpful.” Videos were a popular learning tool for many students. Another student explained, “When classes transitioned to online, doing videos really helped. I was glad that you decided to do that because just reading the textbook confused me.” In addition to supplementing course content, students discussed other benefits with the use of videos, including the ability to learn at their own pace. As one student related, “Your video lectures once going online helped me tremendously! I was able to go through the lecture at my own pace and make sure I learned everything,” while another added, “I really like the lecture videos. The ability to watch them over and over really helps.” Students also liked the ability to see how to complete assignments through video content. One student shared, “The tutorial videos you made helped me a lot!” Another student expressed, “I thought the step-by-step videos on how to do things helped a lot.” Other students also connected the video content to concrete applications. One revealed, “The videos were the most helpful part of this class. To read about something is one thing, but for it to be fully explained and shown with an example gave me a better understanding of the topics.” Another conveyed, “The videos mixed in the PowerPoints helped apply the information we were going over to the real world and were interesting to watch.” Finally, one student disclosed how the videos helped to bridge the distance of learning remotely, stating, “I really enjoyed the video lectures. They were done in a way that felt like we were in the classroom. It helped a lot in learning the material and with the isolation of being online.”

Student perceived recorded videos as an effective method to convey course content. Whether videos featured PowerPoint slides, demonstrations, or lectures, students responded

favorably to recorded videos posted to the LMS. Overwhelmingly, they reported videos helped them to learn the material and achieve course outcomes.

Student Reactions to Videoconferencing Content. Students also responded favorably to the use of Zoom in their online courses. One student wrote, “Using Zoom for our class was very efficient and was a good way to be able to check in with our classmates and teacher.” Another student shared, “Maintaining contact and also making us be involved in Zoom/BigBlueButton lectures helped a lot to supplement our learning.” Videoconferencing helped students stay engaged as one student explained, “The regular Zoom meeting for online class helped me continue to stay focused on the course work.” Students also discussed the interaction capabilities that videoconferencing offered, with one student relaying, “The Zoom meetings were good for learning as well because we could ask questions about the course.” Another student expressed, “Zoom meetings were always straightforward and easy to understand. He was always asking for class participation and looked to us to provide discussion.” Yet another student added, “I really enjoyed our Zooms and how the class was about to interact with each other although on Zoom.” Students appreciated the effort instructors took to make the videoconferences available, as one student shared, “I could tell that you cared for our learning based on the time spent in Zoom meetings after being switched to online. Thanks for your help.” Another student articulated, “I have been thoroughly impressed with your Zoom recordings, it is not easy to teach at a camera, but I always felt like I was in class when I watched them!” Other students agreed, with a student commenting, “I like attending Zoom with our instructors to make it seem a little more real.” Another added, “I enjoyed the Zoom meetings for this class. Especially with it being a smaller class size, I felt like I could communicate with the professor easily, and it always felt like she cared about helping me.”

Some students expressed the desire to have Zoom sessions in a course that didn't utilize the tool. "I wish we would have done Zoom meetings," one student wrote. Another expressed, "I feel like the professor could have used Zoom. That way students could ask questions in real time. It is difficult watching a video, getting a question, emailing it, and then waiting on a response."

Other students requested the university continue teaching through Zoom with comments, such as, "Please include live meetings," and "More Zoom sessions." One student expressed being conflicted about the use of videoconferencing, reflecting, "Zoom meetings are both amazing and awful at the same time. I highly recommend them while hating myself for doing so." The only negative comment regarding the use of Zoom was in comparison to the use of videos and related to flexibility. The student explained:

Having our lectures videoed and available to me at any time made this class much easier to learn. I enjoyed this way of instruction much more than a Zoom call because I could do it on my own time when I was focused and ready to learn the information I was being taught!

Notably, among the 1,358 student comments, not one referenced Zoom fatigue or exhaustion related to the use of videoconferencing.

Students overwhelmingly supported the use of synchronous instruction through videoconferencing. They indicated the use of the synchronous communication was interactive, real, and helped them maintain focus on course material. Students expressed a desire for continued use of synchronous videoconferences in future courses.

Student Reactions to Instructor Availability & Helpfulness. During the unsettling environment of 2020, many students also expressed their appreciation for professors' availability. One student wrote, "Thanks for being available and answer super-fast the emails or

Canvas messages.” Availability included helpfulness and responsiveness as a student described the instructor, “Very caring, very helpful, and always available for questions. Really enjoyed this online class.” Care and compassion were important to students as a student noted, “She made the transition to online very smooth. She is so thoughtful and caring. She made sure she was available to help when needed. She made this class so comfortable and easy.” Other students stressed the importance of communication. One wrote, “I just think the open communication helped immeasurably. I’ve never felt more supported by my college and my professors.” Another student offered:

[The instructor] made herself available to students and gave us many chances to meet with her on Zoom and encouraged us to email her with questions or problems and she replied in a very timely manner. I felt this was very important during our online semester. Zoom was commonly mentioned as a communication tool that signified availability and caring. One student characterized the instructor, “Always made sure he was available either in person or Zoom during his office hours.” Students also cited the importance of email responsiveness. A student mentioned, “I loved the fact that she added extra videos and PDFs for examples of the problems we were doing each week. She’s always available via email and never took too long to reply.” Many students expressed they were impressed by the care faculty and university officials demonstrated. For example, a student relayed, “The offer for help was significant. Everyone offered help in any way possible for services like tutoring online and Zoom sessions. Professors supported students in staying motivated.”

The role of the instructor in student achievement was clearly evident in the student comments. Students identified caring, compassionate instructors who communicated with them

encouraged their success. Videoconferencing was a preferred communication channel mentioned in the comments.

Summary of Documentation Findings. A systematic review of institutional documentation written by students showed that they had many positive reactions to the use of Zoom and recorded video lectures in their online courses. They reported faculty who were available to them, even from a distance via communication technologies, such as Zoom and email, helped to ease the burden of shifts between in-person and online learning modalities. Comments about the use of videoconferencing in online courses were overwhelmingly positive, and students did not mention dissatisfaction about the use of videoconferencing tools for educational purposes. Neither Zoom fatigue nor a sense of tiredness was evident in the student evaluation comments.

Preliminary Surveys

Online survey instruments were distributed to 67 undergraduate faculty members and 654 undergraduate students during a two-week period. The faculty survey yielded a strong response rate of 50.2%, while the student survey response rate was 10.2%. With 35 faculty respondents and 67 student surveys, a total of 102 surveys were completed (14.13% overall survey response rate). The use of survey research in higher education is well established; however, in recent years, researchers have seen response rates decline with student populations (Forsacht et al., 2017). Even with low response rates, higher education survey data can be valid, valuable, and meaningful. Forsacht et al. (2017) determined response rate estimates are increasingly reliable after receiving responses from 50 to 75 students. They concluded, “[I]nstitutions and researchers examining college student behavior may not need to exert great effort maximizing response

rates” (Forsacht et al., 2017, p. 259). Given this information, the preliminary survey data is deemed valid and reliable.

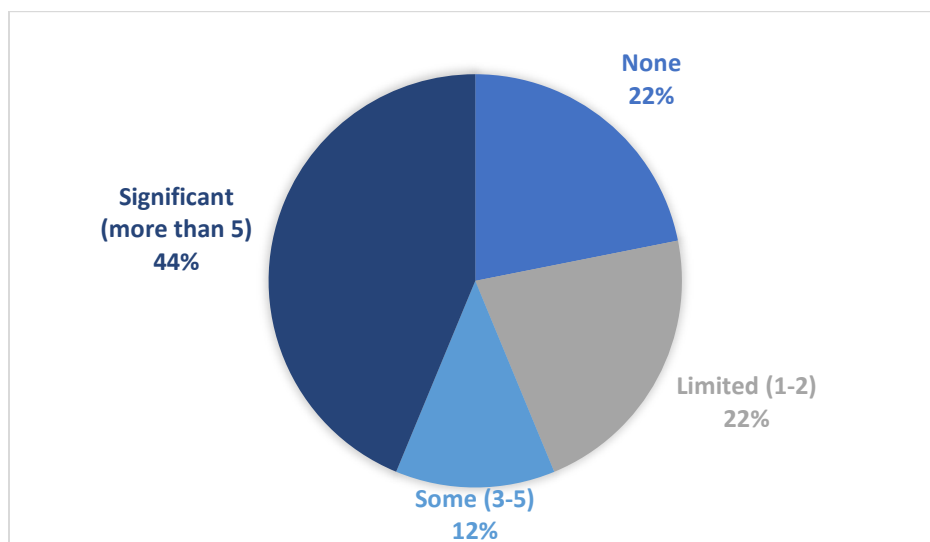
Faculty Demographic Information. The average age of faculty members was 47.67 years old, with a range from 31 to 66 years old. The majority of respondents were women (59.38%), and 37.5% were men. Faculty members had a wide range of teaching experience spanning from three to 41 years, with an average of 15.66 years.

Student Demographic Information. The average student age was 21.88 years old, with a range of 19-54 years old. The majority of the students were women (76.92%), and 23.08% were men. Most of the students were upperclassmen with 28.85% sophomores, 26.92% juniors, and 40.38% were seniors. Only 3.85% were freshmen, which was a result of the survey’s inclusion of only students who had attended the university in both the spring 2020 and fall 2020 terms. The students represented 15 various majors on campus with 25% studying psychology, 19.23% in education, 17.3% in biology, 9.62% in communication, 9.62% in social work, 7.69% in history/political science, 5.77% in history, 3.85% in English, 3.85% in nursing, 1.92% in computer science, 1.92% in criminal justice, 1.92% in pre-nursing, 1.92% in religion, and 1.92% in sociology.

Faculty Teaching Modalities and Methods. Next, the survey addressed teaching and learning modalities. Figure 4 shows faculty members’ online teaching experience varied with 21.88% never teaching online prior to the spring 2020 shift to remote learning, 21.88% having limited online teaching experience (one-two classes), 12.50% having some online teaching experience (three-five classes), and 43.75% having significant experience teaching online (more than five classes).

Figure 4

Faculty Experience with Online Teaching, Number of Courses

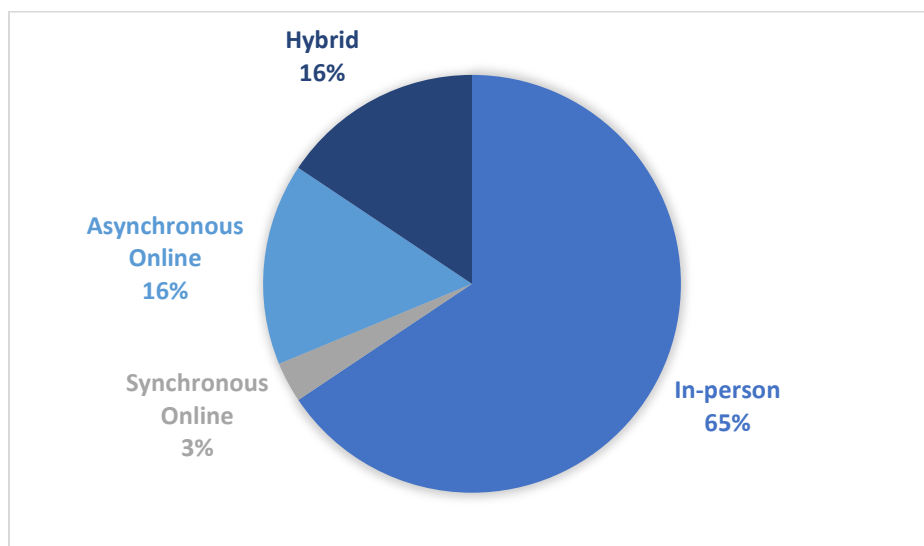


The majority of the faculty surveyed reported when they have the option, they prefer teaching face-to-face, in the classroom (65.63%) while 18.75% reported they prefer teaching online.

Finally, 15.63% of faculty reported they prefer teaching hybrid courses that include a mixture of in-person and online instruction as displayed in Figure 5.

Figure 5

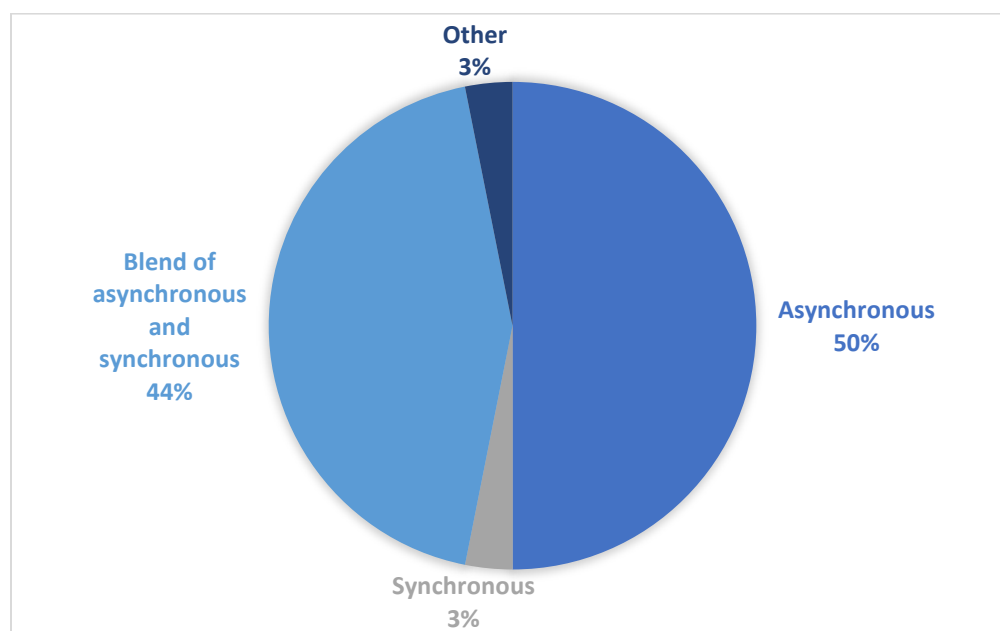
Faculty Teaching Mode Preferences



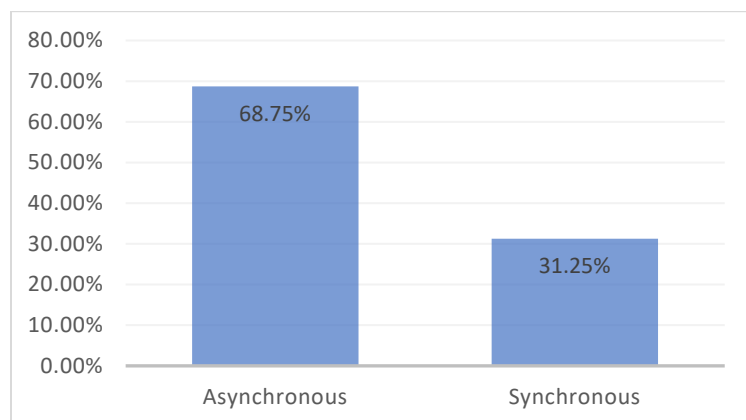
Faculty members were asked how they taught their courses during the spring and fall terms of 2020. Half (50%) of them reported they taught their courses online asynchronously while another 46.88% reported using a blend of asynchronous and synchronous instruction. Only 3.13% of faculty members reported their online courses were synchronous (see Figure 6).

Figure 6

Course Delivery Modes for 2020



However, when asked about their preferred online instructional delivery mode, 68.75% responded that they prefer asynchronous online teaching, and 31.25% prefer synchronous online teaching as displayed in Figure 7.

Figure 7*Faculty Preferences for Online Teaching*

Faculty member's overall preference for in-person teaching emphasized the richness of interaction that is more apparent face-to-face, citing eye contact, gestures, and direct feedback. One instructor explained, "Delivery, conversation, discussion is all more fluid. You can read students expressions F2F and respond when needed by a change in language, story or demonstration. It allows for more individualized instruction where needed." Another instructor described the "regular interaction with students, and I can put my eyes on them to make sure that they are doing well," while another added in-person instruction allows reading "body and facial expressions as a means of formative assessment." Additionally, some faculty members expressed the uniqueness of the face-to-face classroom. "There is an intangible social force in the classroom that just makes it different," one shared. Another further elaborated, "I prefer the energy of in-the-room give and take."

While the majority of faculty members preferred face-to-face teaching, others like online and hybrid teaching. Those who preferred online teaching discussed the benefits to students, including flexibility and accessibility. One relayed, "Students can complete at their leisure and schedule." Another instructor emphasized, "It gives me more opportunity to individualize

instruction and allow flexibility for my students. It creates a situation where my students can have choices.” Others appreciate the dual approach of hybrid teaching. As one instructor described, “It provides the best of both worlds. I use Canvas extensively in my face-to-face courses, and all assignments are submitted on Canvas. This frees class time for discussion.” Another added, “I like to teach online, but I also love to have the face-to-face interactions with students.” Another instructor explained, “Building rapport and engaging with students is much easier face-to-face than online.”

If teaching online, the faculty members overwhelmingly (68.75%) preferred asynchronous instruction due to the flexibility and convenience it offers students. Faculty felt, “Online should be, to an extent, at your own pace.” Another simply stated, “Asynchronous is more accessible to and flexible for students.” One faculty member illuminated further:

It allows for individualization and flexibility. It also respects students’ time, allowing students to work around jobs, athletic travel and practice, and other obligations that interfere with synchronous meetings. Often, with synchronous instruction, it is a constant challenge to accommodate students who have to miss class. In asynchronous classes, it is rarely ever an issue. They just work around their conflicts.

Others discussed students’ reticence with using synchronous online instruction. “Students have a tendency not to attend synchronous meetings,” one instructor related. Another added:

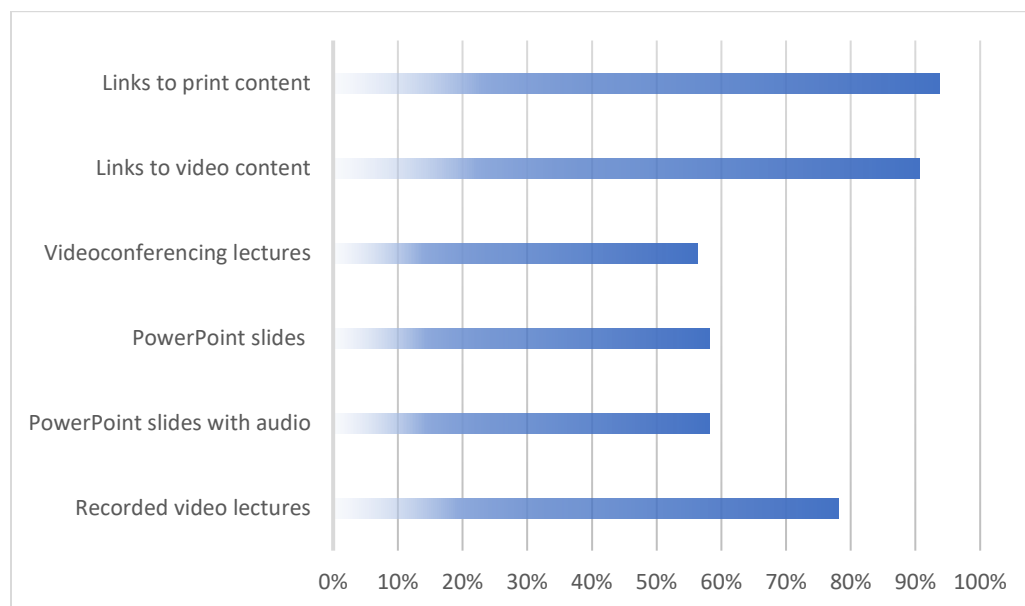
While, in theory, synchronous contact should help to engage with students, I have found that many students are hesitant to participate in video class meetings. I think it is a better use of time to record lectures and messages to students than to try to coax them to participate in a Zoom meeting.

However, almost a third of the faculty, 31.25%, preferred synchronous instruction for

online courses. Those faculty members noted the benefits of synchronous online instruction, which they reported included opportunities for discussion, interaction, engagement, and routine. One professor explained, “It helps to have a real conversation with students. Discussion is more personal.” Another discussed how synchronous online learning “requires more engagement” with students. One instructor added, “I can address questions in real-time, and all can hear my answer.” Other faculty members described how a virtual, synchronous environment adds an element of routine for students. As one instructor detailed:

I find the asynchronous teaching to be more chaotic than synchronous. It seems from my experience that with synchronous instruction provides students with a routine and expectations that makes it more difficult to procrastinate and get too far behind.

Faculty members reached their students through many methods of instruction. They reported using a variety of instructional methods in their courses during the 2020 spring and fall terms with 93.75% providing links to related print content, 90.63% providing links to related video content, 78.13% using recorded video lectures, 56.25% using live videoconferencing lectures, 53.13% using PowerPoint slides with recorded audio, 53.13% using PowerPoint slides without any recording, and 3.13% written content (see Figure 8). Faculty explained they used a variety of tools to meet students’ needs, as one instructor conveyed, “I used all of the resources at hand. Different delivery methods work better for different students. I try to provide a range of options.” Another professor related, “I felt that more diversity in delivery was most helpful to students and it helped to break up the boredom of online experience.”

Figure 8*Faculty Use of Instructional Methods During 2020*

An instructor shared:

I was trying to reach the various learning styles in my classroom. I thought by providing a multitude of options it would help bridge the gap for the lack of personalization created by the online environment. I offered optional synchronous Zoom sessions for students in addition to PowerPoints, recorded lectures, and links to readings and supplemental material. This way students had the option to work through the material on their own schedule and/or spend time in a synchronous session working through the material.

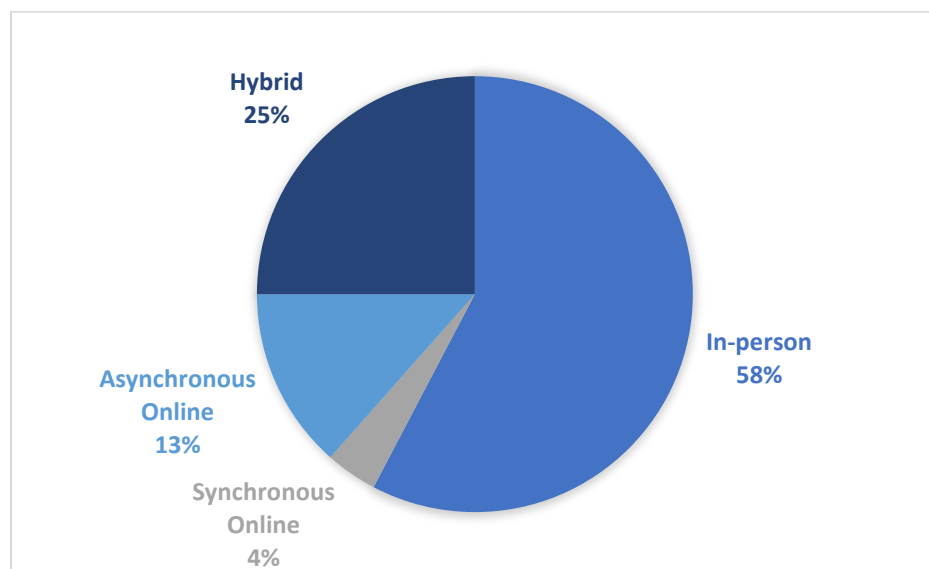
Although faculty members expressed a preference for face-to-face teaching, they reported using a variety of modalities and instructional methods to reach students during the disruptive environment of 2020. Almost a third of the respondents preferred synchronous instruction when they teach online. A little over half of them utilized live videoconference lectures during 2020.

Student Learning Modalities and Methods. In considering all possible learning modes, the majority of students also reported they preferred face-to-face, in-person courses (57.69%),

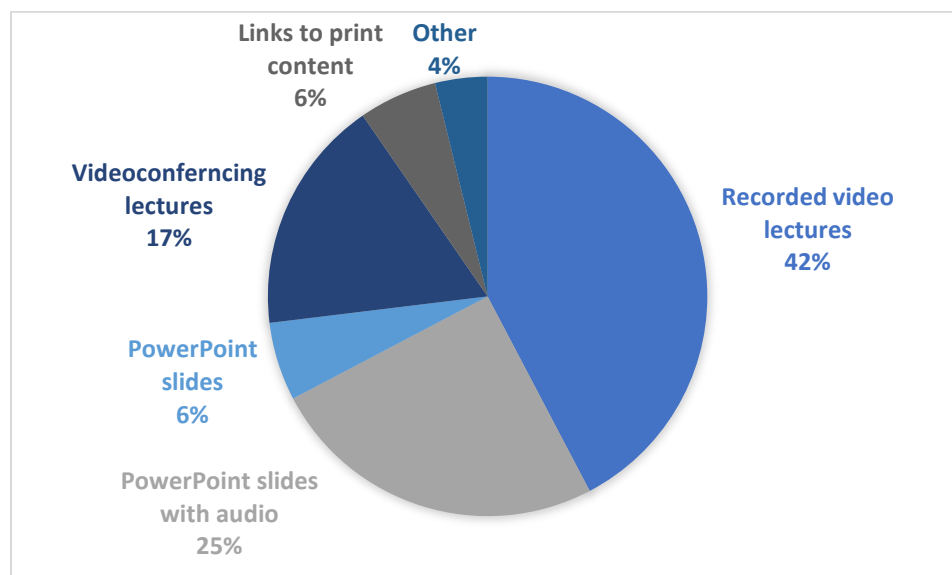
while 25% preferred hybrid courses with a blend of online and face-to-face instruction. Online instruction was preferred by 17.31% of the students with most of them preferring asynchronous online instruction (13.46%) and only 3.85% preferring synchronous online instruction as depicted in Figure 9.

Figure 9

Student Learning Mode Preferences



The survey results demonstrated students were comfortable with a variety of instructional tools in their online courses with 42.31% expressing they prefer the use of recorded video lectures as shown in Figure 10. Another 25% preferred the use of PowerPoint slides with recorded audio and 17.31% prefer live videoconferencing lectures. A minority of students preferred the use of PowerPoint slides without audio or visual accompaniment (5.77%) and 5.77% of students also preferred the use of links to related print content, such as books and articles.

Figure 10*Student Preferences for Online Instructional Methods*

Many students expressed they appreciate the flexibility associated with recorded lectures compared to live videoconferencing. A student explained:

I do not like having to Zoom - as I still have a job that requires my attention. During college, they're able to allow me to attend class on campus; however, with the pandemic, they feel as I can do my online work whenever rather than having to meet at a specified time.

Another added:

With the level of stress that exists currently, I feel like a scheduled live meeting is an obligation that seems unnecessary to most students. A recorded lecture is the ideal in-between of live classes and simply being handed content.

One student discussed technical problems sometimes associated with videoconferencing, sharing, "The recorded lecture is the closest thing to an actual class. There are more benefits with

this one. If you miss something, you can always go back. If you are on a Zoom call, the internet is not always reliable and makes it difficult to learn and understand.”

Other students also relayed the convenience of recorded lectures, as one student responded:

I can watch the recorded video lecture when it's convenient for me and I can watch it as many times as I need to. Also, I can easily take notes on it. This method also lets the professor be involved in the class without me just having to teach myself.

The ability to re-watch recorded lectures was a common benefit for many students. A student shared, “I have always been a visual kind of learner, so being able to see the teacher taking really helps me, and I am able to go back and watch something if I need to hear it again.” One student reflected, “When classes are online students have a lot more work, and if the lectures are recorded, you can watch them at any time and as much as need to understand that information.” “It allows me to watch and work on my own time,” another offered. “Can go back and look at it at a later time,” one student relayed, while another mentioned, recorded videos are “easier to follow along at own pace. Can pause. I'm hard of hearing, so sometimes I miss a lot of things said, and I can't pause or rewind live classes.” Others agreed, as one said, “It's easier to follow along with the content and be able to pause, rewind, or fast forward at my own pace.” Students also likened the recordings to face-to-face instruction, with one stating, “I think recorded lectures feel the most like a normal class,” and another adding, “It is the closest to in-person for me.” A student claimed, “It makes it much easier to understand the material. It also gives a similar feel to in-person instruction. It makes it feel in person.” Another student described, “It was nice to actually see the professor while they were talking. It felt more like a classroom.”

The use of PowerPoint slide presentations with recorded audio was another popular teaching method with the student respondents. They appreciated the audio and visual combination with this method. “There is audio lecture with visual aid,” one student explained. “I can read and also listen to them explain,” a student conveyed. Another added, “I like being able to see the notes and also hearing the professor talk and explain what is going on. Pictures along with audio help me remember some things better.” Other students concurred, with one sharing “Because sometimes my teachers will talk, and we can’t see anything, and I like to have a visual, but also the extra information you get when someone presents a PowerPoint vs. just what’s on the PowerPoint.” A student responded, “I prefer this method, because it allows me to see the information that is being taught to me on a PowerPoint as well as hear my professor speak/teach about it. It gives almost the same effect as sitting in a classroom does.” Another student compared the slide presentation with audio to videoconferencing, stating, “It is easier for me to see the PowerPoint to write my notes down, instead of trying to get them while on a Zoom call.”

However, a minority of students reported they preferred live videoconference lectures. They described the advantages of videoconferencing in terms of real-time interaction and feedback, describing it as “effective.” A student related, “It best resembles an in-person class.” Another student illuminated:

Some teachers just assigned us to read a chapter or watch a random video over the topic. When the teacher taught to us live, like on Zoom, it was more like a classroom setting. We could pause to discuss or ask questions. It is easier to learn when someone is describing the content to you, instead of trying to read it and teach it to yourself.

Another student added, “I learn better through conversations/discussions and that’s very hard to do without interaction between professors and fellow classmates.” One student remarked, “Can

communicate with professor like actual lecture.” The ability to receive immediate feedback is important to students. “I can ask questions as we go along instead of waiting for a reply or an email for possibly days,” one student shared. Another agreed, “Because I need the professor to answer every question I have in person instead of over email.” Others talked about how videoconferencing helps them to concentrate. “For me, that is the way I pay the most attention, and I find that I get more out of the lesson that way compared to other methods,” a student explained. Another admitted, “It’s very easy to get in the habit of not watching the videos until last minute. It’s also a lot easier to stay focused and ask questions when you have a set time and day to video.”

Very few students preferred links to print content, such as books and articles. Those who did appreciated the personal nature of reading. “It’s easier to comprehend,” one student claimed. Another expressed, “It allows me to go at my own pace and on my own time.” One remarked, “It lets me figure things out.”

Students reported they prefer to learn in person. When they learn online, the majority of them favored the use of recorded video lectures or PowerPoint slides with audio. A minority expressed they preferred synchronous videoconference lectures.

Faculty Videoconferencing Usage. Faculty members revealed they spend a great deal of time videoconferencing each week. On average, they reported spending 6.04 hours a week in meetings, 3.97 hours in office hours, 1.66 hours advising students, 3.75 hours lecturing, and 1.42 hours socializing, for a total of 16.84 hours per week videoconferencing. Faculty members also noted that they spend time videoconferencing to collaborate with others on projects, to attend webinars, or to present at conferences or workshops. While they participate in videoconferences,

the faculty members reported they use the off and on functions for the camera and audio as well as the chat function.

Faculty discussed the benefits of using a videoconferencing tool for synchronous instruction as a method for direct communication and to build community. “Without Zoom, there would be no face-to-face contact with students. It’s an excellent tool for extending personal presence in an online course,” a professor described. “It’s a way to be ‘together,’” another offered. “Videoconferencing is wonderful in helping us stay safe and connected in the midst of the pandemic. I am thankful that its use has allowed us to keep moving things forward,” an instructor remarked. One elaborated, “They allow you to talk face to face to a student and connect with them. Sometimes, writing get misinterpreted, and a conversation can be really, really helpful.” Other faculty members commented that the platform’s features add to its utility and mentioned the recording ability, break-out rooms, chat, screen-sharing, and polling features. “People can post in chat and that lets you get to questions that might not be possible in face to face (time, people forget, etc.),” one instructor observed. Another added, “The recording feature. It allows students to review the presentation at their convenience. I also enjoy screen sharing, i.e. the immediate presence of audio and video material.” A professor noted, “I like the ability to share screen and actively interact with students. I also like the ability to do breakout rooms to replicate some of the group work we're currently unable to do in person.”

Faculty also shared some concerns they have with using videoconferencing in their courses. Most notably, those concerns focused on technical problems, student participation, and spatial issues. Regarding technology, faculty reported internet connectivity difficulties and problems with device accessibility. “Sometimes the technology (due to internet or devices) is spotty and breaks up. That just gets frustrating. Everyone is trying but getting nowhere and time

is being wasted,” a professor explained. Another instructor responded, “Not all students have access to computers. Some share with an entire family or dorm room. Some use cell phones, but bandwidth and connectivity can be a problem.” Engagement with students on videoconferencing is also problematic, according to the faculty. “Just because someone ‘logs in’ to the course does not guarantee they will be present to watch it,” an instructor observed. Another agreed, “I do not like that I cannot tell if they are really there or not. I do not require them to use their cameras so they may join the Zoom and then leave the room for class and then come back and turn it off at the end.” A professor described, “I don't like seeing students that don't appear like they are interested in being there. You know...the ones that are clearly still in bed or paying attention to something else.” Other faculty members focused on how videoconferencing differs from in-person interaction in terms of space. “It provides separation and makes it more difficult to engage students,” one instructor indicated. A professor elaborated:

To me, [I know this is going to sound super strange, but] I believe that there is a human presence that is not there in a Zoom meeting. For example, if I am physically in a room with someone, I feel like I have a sixth sense, and I feel that person in the room with me. I think this is more pronounced now that we have spent so much time in this online / social distance world. If in a Zoom room, there is no sharing of space. Thus, there is a sense of some of the human connection lost.

Another instructor revealed, “I dislike not being in the same space as students and the inability for conversations to flow as well as they do face-to-face.” Another response simply stated, “The space can be disorienting.”

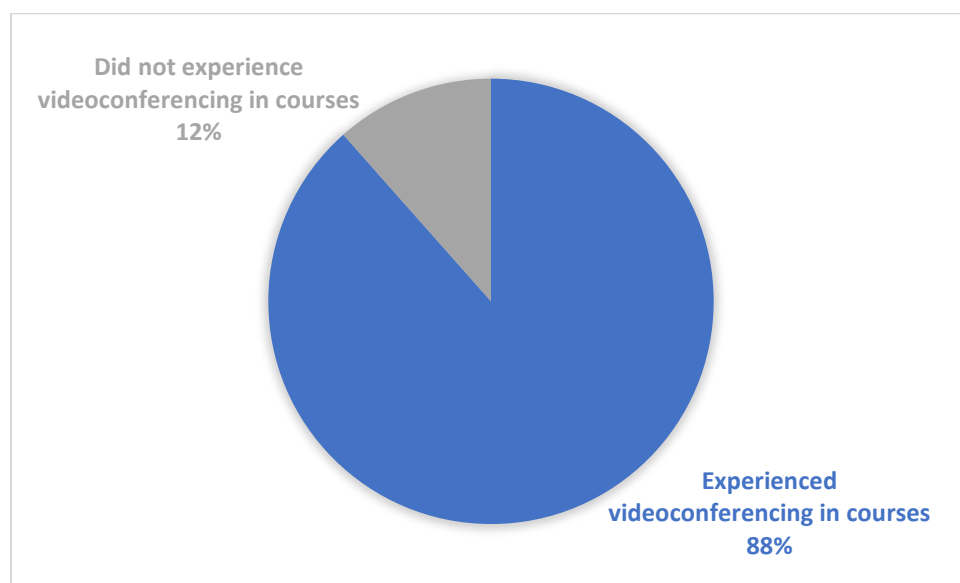
Faculty members expressed mixed feelings about the use of synchronous instruction through the use of videoconferencing. Although they recognized the communication

technology's tool ability to increase presence and encourage connection, they also had concerns about students' access to adequate devices and internet. The faculty respondents were also concerned about student participation and communication breakdowns.

Student Videoconferencing Usage. Students reported they used videoconferencing tools an average of 4.08 hours per week. Figure 11 displays the majority of students, 88.46%, reported they had experienced the use of videoconferencing in their online courses, while 11.54% reported they had not.

Figure 11

Percentage of Students who Experienced Videoconferencing in Courses, 2020



The students prefer to participate with their microphone off, 75%, and 59.62% prefer to have their camera off, while 34.65% reported using the chat feature.

A sentiment analysis of the qualitative comments about respondents' videoconferencing experiences in their courses revealed positive, negative, neutral, and a blend of positive and negative feelings. For instance, negative responses included, "I, personally, am not a fan of Zoom just because it makes it harder to understand material," and "Not enjoyable. Very

distracting.” Negative feelings emphasized technical problems and concentration issues. “It always messes up and takes way longer than it should,” one student shared. Another revealed, “I hate using it. I feel as though I do not pay attention as well.” A student discussed issues with connectivity, explaining, “I found that it was difficult at times, especially when multiple people in the dorms had classes at the same time, and my dorm didn’t have good or adequate Wi-Fi. This would often cause the videoconferencing to cut out a lot of the time.” One student noted, “Some parts get cut out, and you can’t hear what your professor is saying. I’ve also had trouble with my Zoom crashing and not being able to reconnect.” This was a common experience, as a student recounted, “The internet connections are not always reliable and make the learning difficult.” Another criticized, “It is very hard to use sometimes. It kicks you out sometimes, and then, it won’t let you back in. And, if it kicks you out and your instructor doesn’t see, then you really can’t get back in.” Others characterized videoconferencing in their classes as “glitchy,” a “hassle,” and “wasted time.” Students also faulted other students for not fully participating in the videoconferences. One illustrated:

I don’t think it was the best method. I realize a lot of teachers were working with what they had; however, many students were not very active in Zoom. In my Zoom lectures, there were very few students that would use their camera. Many students also wouldn’t talk; it always felt like the professor and the same three students going back and forth every lecture. If anything, I feel like Zoom should be utilized more as optional study sessions with the professor to ask questions regarding recorded lectures.

A student added, “It can be hard because a lot of students don’t turn on the camera, so it is hard to see who you are talking to.”

Yet, other students spoke about their positive experiences with synchronous videoconferencing in their classes. “I enjoy it because I feel more comfortable learning from home,” a student responded. Students readily compared videoconferencing to in-person instruction. One student maintained, “I enjoyed it. It was the closest I could get to in-person lectures.” Another asserted, “I have no complaints against Zoom; it works really well, and I like that you can turn your audio and video off if you wanted. It is the closest way a class can come together for a lecture if the class is strictly online.” Other students described the use of Zoom in their courses as “handy,” “convenient,” and “helpful.”

Many students recognized the use of synchronous videoconferencing added benefits and challenges to the online classroom. One acknowledged, “Although there have been technical difficulties at times, Zoom has been good.” Another admitted, “The classes are effective if it’s more than a lecture and has student participation. The long sessions of nothing but lecture become monotonous.” A student reported:

When done properly with the right tools being used by professors/students, it can be beneficial. The disconnect that is enabled by other devices/apps, however, creates a lack of engagement when students no longer want to be in class. It’s the equivalent of just walking out of a lecture hall, minus the weird looks and the questions asked by your professor.

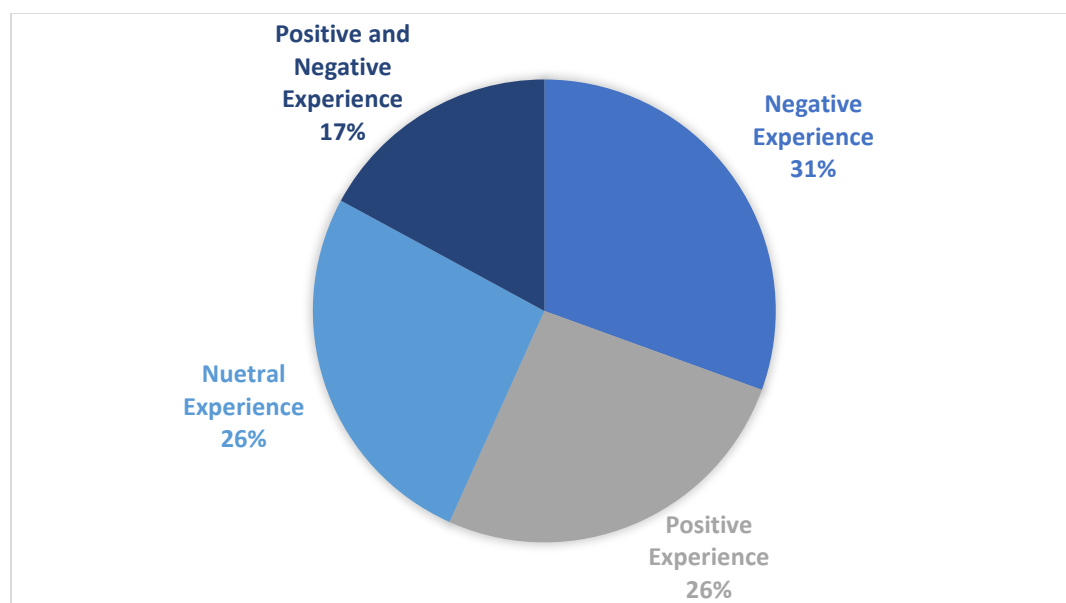
Issues of connectivity and focus remained at the forefront of student comments. One explained, “It’s alright. Sometimes, it will lag, and then, I miss everything they said.” Another added, “Zoom is okay if you can make yourself pay attention. Sometimes, I wouldn’t feel like paying attention, so I would just join the Zoom and play on my phone. I prefer to be in class.” As one student summarized, “It’s okay. I would rather be in person.”

Several comments were characterized as neutral because they described the use of the videoconferencing tool without relaying any feeling or opinion. For example, one student wrote, “Two classes I am taking this semester are both synchronized online using Zoom. We meet every two weeks via Zoom, and on our off weeks, we have various assignments due on Canvas. Another student remarked, “We have had discussions over our reading assignments.”

Overall, the sentiment analysis of student comments about their experiences with videoconferencing in their courses revealed a fairly even distribution of feelings as seen in Figure 12. Slightly more students discussed negative experiences, 30.43% of respondents, while 26.09% shared positive experiences. Another 26.09% described their experiences neutrally, and 17.03% described live videoconferencing during classes in both positive and negative terms. Negative feelings emphasized technical difficulties and students’ inability to pay attention while positive feelings stressed convenience and the similarity of the synchronous lectures to in-person classes.

Figure 12

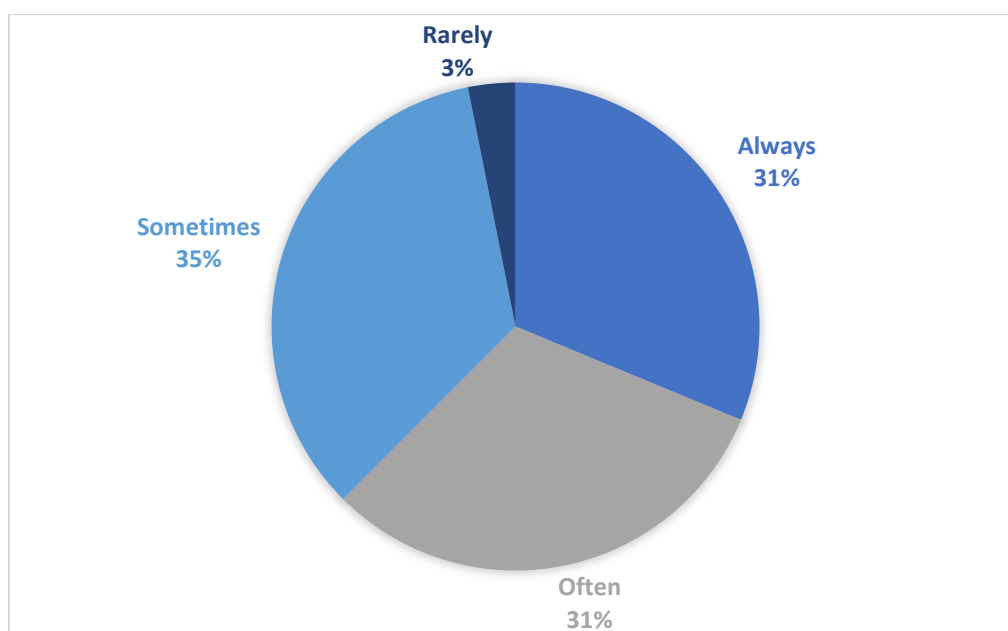
Sentiment Analysis of Students’ Comments about Videoconferencing Experiences



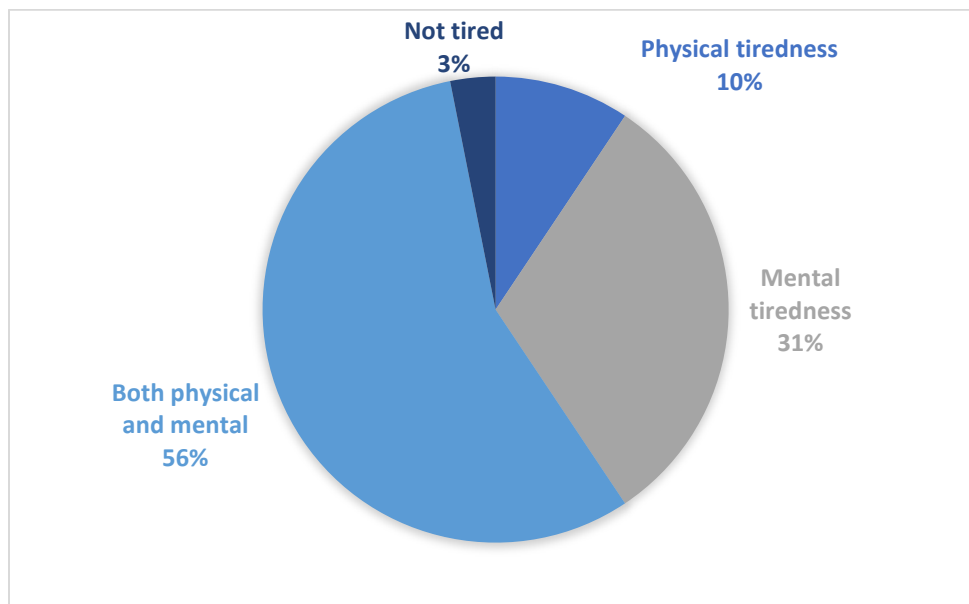
Faculty and Zoom Fatigue. When asked about Zoom fatigue, or a sense of exhaustion after videoconferencing session, all of the faculty members revealed they have felt tired after using videoconferencing tools with 31.25% reporting they always feel tired, 31.25% reporting they often feel tired, 34.38% reporting they sometimes feel tired, and 3.13% reporting they rarely feel tired (see Figure 13). The majority of the faculty members described their tiredness as both

Figure 13

Faculty Zoom Fatigue Frequency



physical and mental (56.25%), while 31.25% reported it is mostly mental and 9.38% reported it is mostly physical tiredness (see Figure 14).

Figure 14*Faculty Zoom Fatigue Perceptions*

Faculty members overwhelmingly feel Zoom fatigue, as one shared, “I get tired of Zoom if I’m on it all day.” A number of factors caused their feelings of exhaustion. The faculty respondents emphasized physical reactions, effort, and anxiety issues. The common physical problem mentioned was eye strain. One professor revealed, “It is difficult to relax my eyes when I’m focusing on the screen.” Another related, “Looking at the screen for long periods of time tires my eyes and makes me tired.”

Many disclosed that communicating on Zoom requires increased effort. They revealed they have difficulty in concentrating on videoconferences, with one remarking:

It takes concentration. There can be a large input of information and things to react to (faculty meetings). There is also a limitation re: the full experience, so your mind has to fill in things. In video class sessions, with the students hiding behind the dark screen; too often, I feel like I am doing all the talking and I am worn out by the end of the session.

Others agreed, as one explained, “It requires more focus than a regular meeting. I also can't read body language, so all I have is a little box and audio.” Another offered, “It's work requiring concentration.”

Faculty members drew a stark contrast between face-to-face and Zoom interactions in terms of energy levels. One professor described, “For whatever reason it seems to take more energy to act like I'm passionate about the topic. It's easy to get excited when the students are there asking questions and participating. The participation on Zoom just isn't there.” Another reflected, “I think Zoom meetings can feel more subdued than in-person meetings. I have often had more energy at in-person workshops and meetings for some reason than Zoom sessions.” A professor who perceives this difference considered, “When you talk to people F2F there is a certain amount of energy. When you talk on Zoom, there is a sense of a barrier or a distance that needs to be overcome, so you increase your energy level?”

Several faculty members reported Zoom increased their anxiety levels. “It's like being on TV; anxiety about appearance or minor mistakes amplified,” one instructor described. Another characterized the issue by sharing:

I am an introvert, and I prefer small group interaction instead of large group interactions. I often feel exhausted after lots of face-to-face social interaction, which is true for virtual social interaction. I also find that leaving the camera on during videoconferences causes a great deal of anxiety for me. Sometimes the anxiety is so intense that I have difficulty concentrating on the discussion in the meeting. Some days I can mentally tolerate participating with the camera on better than others.

A professor recounted, “I think it's because I am so anxious about it. I'd much rather attend a meeting in person. I can see when someone is looking at me in person.”

The sense of mediated space was also noted by one faculty member, who mused: It's partly related to the meaning nature of most of the meetings we have to attend. It's also related to the contradictory nature of the medium meaning you are presenting yourself in a public arena (with all the preparation and effort that takes) but you're not really in public. Quite often you're at home (your private place and refuge from the public sphere).

All of the faculty respondents revealed they experienced Zoom fatigue to some degree. They described the fatigue as both mental and physical and nature, identifying a number of factors that contribute to their exhaustion. The faculty members cited physical reactions, concentration problems, increased effort, and anxiety as reasons for their Zoom fatigue.

Students and Zoom Fatigue. The students also predominantly reported they had experienced Zoom fatigue (90.38%), although 9.61% of them reported they rarely or never had experienced Zoom fatigue as seen in Figure 15. Almost half of the students, 46.15% revealed they always feel tired after videoconferencing, while 21.15% often feel tired, and 23.08% sometimes feel tired.

Figure 15

Student Zoom Fatigue Frequency

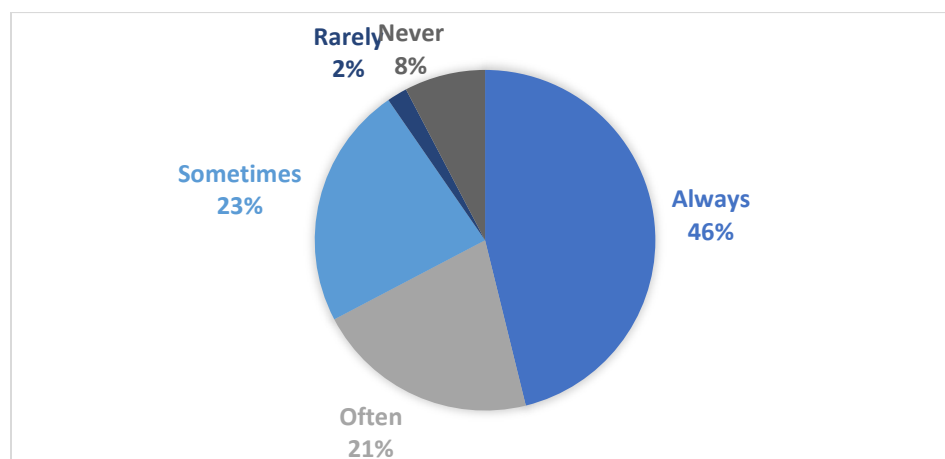
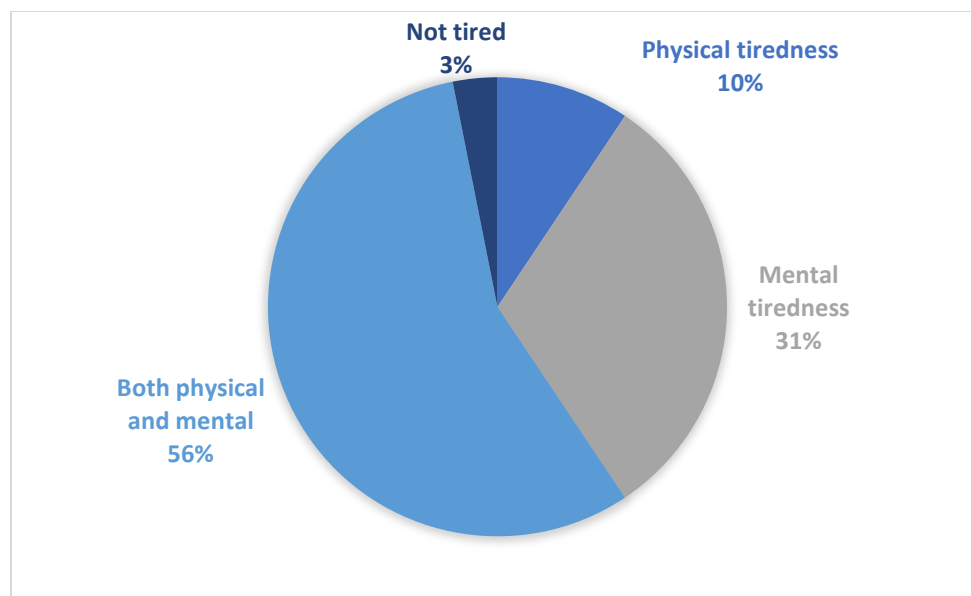


Figure 16 demonstrates the majority of the students, 57.69%, described their fatigue as both mental and physical, with 30.77% describing it as primarily mental fatigue and 3.85% describing it as primarily physical fatigue. Another 7.69% claimed they do not feel tired.

Figure 16

Student Zoom Fatigue Perceptions



Students emphasized “too much screen time” in describing Zoom fatigue. One criticized, “Anytime I look at a computer screen for long, I start to feel tired, and I get a headache.” Another related, “The fact we are only looking at screens, and we are scared to speak.” A student observed, “Looking at the screen is draining.” One complained, “I’m not used to looking at my laptop for so long.” Another explained, “It is monotonous being on-screen.” Several other students also characterized the synchronous videoconferencing during classes as “boring,” with one remarking, “I get bored while on a Zoom call if I don’t have anything else to do.” A student added, “I get bored and unfocused.” One described, “It’s not as engaging as in-person classes and is often boring.” Another confided, “It feels like I have to use twice the amount of energy to

stay engaged during virtual lectures.” One student observed the exhaustion is “because it’s not natural. It’s not how I’ve been educated my whole life.”

The majority of student respondents feel Zoom fatigue after their videoconference course sessions. They described the fatigue as both mental and physical fatigue. The students identified increased screen time and boredom as contributing to their feelings of exhaustion.

Summary of surveys. Faculty and students prefer face-to-face classes. However, when teaching and learning shifted online during 2020, the respondents reported a variety of attitudes about their preferences for online education. The majority of faculty respondents reported they primarily prefer to teach asynchronously when they teach online, with about a third of faculty expressing a desire for synchronous videoconference classes. Survey results showed faculty utilized a broad spectrum of instructional methods to deliver content to students, with more than half using live videoconference sessions. Student respondents clearly identified recorded videos as their preferred method for learning online although nearly 90 percent of them participated in live videoconference class sessions. The majority of faculty and student respondents shared they had extensive experience with videoconferencing tools in their teaching and learning during 2020, and they reported feeling Zoom fatigue after class videoconferencing sessions. Both groups primarily labelled their feelings as both mental and physical fatigue. While faculty members attributed their feelings of exhaustion to increased effort, anxiety, and physical reactions, students primarily ascribed their fatigue to increased screen time and boredom.

Interviews

Twenty-one in-depth, semi-structured interviews were conducted virtually using Zoom during a two-week period. Interviews were guided by an interview protocol (see Appendix H and Appendix I), but the qualitative nature of the interviews allowed for in-depth probes based on

respondents' feedback during the video call. After each virtual meeting, the researcher wrote reflective field notes. Interviews were recorded and transcribed. In all, 572 minutes of interviews were transcribed, yielding 114 single-spaced pages of faculty interview transcripts and 57 pages of student interview transcripts. The transcriptions were then read and re-read to identify relevant themes. Interview participants were also sent their individual transcripts to review for accuracy. The reflexive, interpretative analysis identified numerous themes as central to understanding how faculty members and students experience mediated communication through videoconferencing during their teaching and learning in online courses and why they feel videoconferencing fatigue after their course interactions.

Faculty Interviews. The faculty interviews revealed professors included videoconferencing as part of their online instructional methods because they judged videoconference interactions to be as close to face-to-face interactions as possible through a communication technology. In their responses, they discussed the technological tool's ability to present media richness in terms of verbal and nonverbal communication. Their insights related to media selection and media richness are outlined as part of the theme, "The next best thing." Unfortunately, the reality of the virtual classroom through videoconference calls posed numerous challenges for faculty members. Their frustrations are presented in the theme, "Talking heads and black boxes," which discusses the awkward communication between faculty and students during videoconference sessions. Teaching on videoconferencing also impacted instructional strategies, and faculty members' comments about those problems are expressed in the theme, "Juggling act." Faculty identified an unexpected benefit of teaching virtually through videoconferencing was the addition of a text-based feedback channel, and this feature is addressed under "Let's chat." In reflecting on their experiences with using Zoom to teach

virtually and remotely, faculty members revealed the intersection of their identities, and this is explored under “When worlds collide.” Faculty members repeatedly shared how the size of a Zoom session impacts its effectiveness, and this theme is discussed under “Size matters.” The theme, “Disconnected,” relates faculty concerns about internet connectivity and technology accessibility. Faculty members’ responses demonstrated an interesting interplay between participants’ anxiety levels and their videoconferencing experiences, which are highlighted in the theme, “State of anxiety.” The newly identified phenomenon of Zoom fatigue is discussed in the theme, “Zoomed in on faculty fatigue,” and faculty members attribute the feeling to several factors. Finally, faculty members wondered about how videoconferencing may impact their futures and the future of higher education in the theme, “Back to the future.”

The next best thing. Overwhelmingly, faculty members shared they implemented videoconferencing in their courses to increase student engagement because it was the best way to simulate in-person teaching, the richest medium possible when face-to-face was not an option. Faculty said they were searching for “engagement,” “interaction,” “connection,” and “human contact” through videoconferencing. Amy described, “I was trying to recreate that in-person experience.” Kathy noted the benefits of videoconferencing sessions, “With a synchronous type of thing, where you can actually lay eyes on them or at least talk to them in real time, it’s easier to keep up with where the student is really and keep the student engaged.” Ted explained he preferred a live session because he feels “more connected to the students than I do watching a video or reading through some discussion posts.” Kris likes synchronous videoconference sessions because “a physical interaction is very, very important.” Angela also prefers synchronous interactions, but she doesn’t require students attend. “I really love the ability to have Zoom calls... While I prefer being able to have synchronous conversations with students, I

don't do that when I teach online. I do it optional...I do them several times a week, and I have pretty good attendance at those, but they're not required."

Faculty also discussed how the real-time contact permitted richer discussion than asynchronous discussion boards could provide, and this type of deep discussion is necessary for particular courses or content. Mark reported he uses videoconferencing for "discussions...when we have case studies and things that are complex, when we're picking apart something. It's just too time-consuming to use a forum because you have to keep prompting and prompting." Adam explained, "Interpretation and significance, that's where discussion's valuable...things work best when the students are discussing and engaging, and that means that has to be built in." He argued that in a small class, this type of discussion works on Zoom, describing, "It feels organic. It feels like we're really there because the bulk of what we're doing is just talking and discussing our opinion on something." Sandy felt that this type of engagement is essential in some courses, stating, "I wanted my upper-levels to have a synchronous component because I really feel like for the upper-level courses, there's a depth that if I'm doing my job the way that it should be done, then I shouldn't be skimming the surface...That's a conversation we need to be deeply engaged in." Angela conveyed her success with developing discussion on Zoom, saying, "My students have all been pretty receptive. We've been able to have a back and forth. I don't think I've been in a situation where I'm just talking to a screen and nobody responds."

Faculty reported they encouraged student engagement through the use of breakout rooms, reactions, and polling features available in Zoom and other videoconferencing tools. "I think it engages students a lot more, and they seem to be paying more attention," Kris indicated. Angela reflected, "When I learned more about the functionality of Zoom, how to use breakout rooms,

how to use reactions, things like that, I think that helped me before more comfortable with it.”

She revealed her success with the use of breakout rooms, sharing:

So, yesterday on Zoom, we were able to do breakout rooms. Students would go, and I would brainstorm a section, and then we would come back together, and they were able to share ideas. So that energy, I think, is the synchronous part for me. Learning doesn't happen in a vacuum, and especially when it's these topics that really rely on other people's points of view.

During a time of social distancing, faculty members identified Zoom as a channel to interact with others. Angela mentioned, “It's convenient we have it [Zoom]. I'm glad we have it. Otherwise, I wouldn't have seen my students at all in the past year. We would have lost a lot.”

Kris shared a moving example of how valuable this type of communication was to her. She described:

I almost broke down over Zoom because that's the first time I'd seen a student essentially in our, sort of, real life. During that session, I was just like a different person. I was like, this is the best thing since sliced bread that you contacted me to get some help. After that session, I was just like, thank God that even happened because there's a lot of things that this pandemic has taken. One of the big things it has taken is interaction. A lot of people miss the concept of really, truly being together.

Other faculty members also long to be together, face to face, with their students. If given the opportunity, faculty expressed a clear preference for the in-person classroom. “There's functional elements for a conference call, but the human element, the more aesthetic element, the perceptual, and maybe even relationship-building element, is obviously stronger in face to face,” claimed Tony. Kris described, “There's this physical being of someone in the same space, and

that's something valuable to me as a faculty member... There's a difference in somebody in your face and somebody in the same space." Ted recognized that the classroom is a different dynamic, saying, "There's something about being able to sit in class and see the professor as opposed to just a talking head." Angela added, "I prefer being there with students."

The use of synchronous videoconferencing instruction also created a structure for students, and faculty members believed this routine increased student accountability, aided student motivation, and improved student outcomes. Kathy claimed the students liked the structure of the synchronous videoconference lectures because "it helped them to stay on task." Kris also described synchronous videoconference lectures as beneficial because "students are accountable for showing up, just like how they're accountable in a regular face-to-face class." Randy agreed, "I do like to offer at least a routine for students. So, every Monday, Wednesday, and Friday, I'll be on at this time. It will also be recorded... a few of them like the routine. Others, of course, want to do their stuff at 3 a.m., and awesome, like, 3 a.m. is fine, but for my students who need something at 10, we'll be on. They can interact."

Other faculty members expressed frustration because students did not show up to Zoom sessions. Sandy revealed, "I set up a synchronous component, and that worked for a while. And then, it didn't. So, then, I started attaching bonus points to it, and that helped again for a little bit until it didn't... Their interest in the Zoom dissipated as the semester went on." Adam also had little success encouraging students to attend Zoom sessions. He related, "I tried to have an extra credit weekly Zoom session. I said, log in to this session. I'll go over what we're doing this week, kind of summarizing and answering questions. Out of about 18 students, I had one guy show up." Adam also revealed he encountered student resistance to the use of videoconferencing with a few students who claimed, "I can only learn visually. I can only learn in-person." But he

eventually worked with those students to help them learn through recorded videos, tutorials, and Zoom sessions.

When describing their reasons for implementing synchronous videoconference sessions in their teaching, professors highlighted the medium's richness and similarity to face-to-face instruction. They used terms such as "connecting," "interacting," and "engaging" when describing how videoconferencing facilitates communication. Faculty members also noted synchronous videoconference sessions build structure and routine into their courses to encourage student success. A couple of faculty members expressed concern about student resistance to attend synchronous sessions.

Talking heads and black boxes. While faculty members explained they implemented videoconferencing in their courses to engage their students and simulate face-to-face interactions, the reality they faced online was a virtual classroom plagued with communication challenges and breakdowns. Faculty discovered virtual, live videoconferencing sessions with their students did not meet their expectations as they faced a wall of black boxes when student participated with their cameras off. Deficiencies in both nonverbal and verbal communication patterns created learning environments faculty members described as "disjointed," "dysfunctional," and "awkward."

Several faculty members described themselves as a "talking head," invoking imagery that is less than engaging. "What we're doing right now feels like a 1955 newscast," Randy portrayed. "I give information, like my grandma would have loved it, but it seems very foreign." Ted admitted, "To be honest, you feel a little like the talking head unfortunately. I get some questions, but when half the screens are off and are blacked out, and I'm staring at their names, they could be paying attention to me or not...It's too much of a one-way street." Angela also

describes the feeling of being on screen negatively. “I feel like it makes it more formal, and I prefer being more informal...I feel a little bit like it’s more official if you’re on a screen...This is the talking head who’s come to talk to you...and that, to me, feels removed, which makes me feel more formal.”

Faculty members universally bemoaned videoconferencing’s inability to communicate nonverbally. They felt restricted by Zoom’s confined display. Randy asserted, “It’s really hard to read body language.” Angela illuminated, “You don’t have that personal body language that you have when you’re talking to people and you have that proximity to them, and you feel comfortable in their presence.” Ted also pointed out the medium’s nonverbal deficiencies, saying, “Lack of feedback, lack of nonverbal cues, gestures, facial expressions, all that is lost.” Sandy concurred, “I know so much of communication is nonverbal, and then, on Zoom, if they have their camera off, you don’t have the nonverbal communication. So, it’s really hard to know if I’m boring to tears or if they’re even paying attention. I found it very difficult to facilitate conversation.”

Tony expressed frustration with the inability to display movement on the small screen because he said, “I move my hands. I’m a walker [in the classroom].” Kathy reflected, “One of the things I do in class is I usually don’t stay in one place. I’m very prone to gesturing, and look at this and stuff, and I can’t do that.” Angela is also disappointed by the confining nature of videoconferences, explaining:

That’s a way that I feel comfortable in a space is my movement, and movement is important to me, and I think that’s a personal thing. I’m not a very stationary person. When I’m with a person, I can tell a lot about how they’re receiving information, or how comfortable they’re feeling, by that body language. When you’re in a classroom, there’s a

moment when you can tell if they're with you or not, by the way, if they're not paying attention to you, or if they're really involved. I think you do lose that with the videoconference.

Kris disclosed body language is especially crucial for those with disabilities. "I need to see somebody's entire body interactions as opposed to literally basically your face," she explained.

Eye contact is also different in videoconferencing. "When you can see everybody, you can basically directly look at everybody's faces to see their expressions...it's a different dynamic of interaction," Tony explained. Angela was also concerned with demonstrating eye contact to her students, disclosing:

I try to look at them because I want them to feel that informality. When I'm in the classroom with them, I can make eye contact with them, and I can do what I can to make them feel comfortable in that space. But here [on Zoom], I don't know if they can tell I'm making eye contact with them or not. So, I try to look at them. I try to look at my students even when it's a black box, and they're not even on the screen. I'm still trying to pour that attention to them, so that they know that I see them, or I hear them, and that they're important in that conversation.

Amy identified the lack of facial expressions as disappointing. Also, in face-to-face interactions, "You can hear people sigh in the background. Those kinds of things get lost on Zoom," she observed.

Ted discussed the lack of feedback as unfavorable to teaching. "Maybe we're all little diva performers, and we just feed off our audience. There are little signs, if you get a nod when you look at them, and your point to them, talk to them, ask them, and they realize that. They understand it, and they get it," he shared. Adam observed, "I think on Zoom, the lack of

interaction is more of an issue. You have to try harder to make it interactive, whereas when you could do a more traditional lecture and just look at somebody and be like, ‘What do you think about this?’ You connect, and it’s easier to have those short mini-reactions from students.”

Randy complained, “I think energy is really hard to gauge online. I typically will bring a lot of energy into the room, and I don’t think that translates...I think that stuff that I’ve typically relied on previously needs a different skill set for Zoom, so I have a really hard time figuring out how to communicate the idea of engagement during a session.”

Sandy agreed, explaining:

It’s really difficult to gauge the room. When I’m teaching face to face, I kind of have a sense of the room. If there’s one student getting distracted, it’s much easier to pull them back in if I’m face to face, whereas on Zoom and they have the cameras off, knowing they could be doing whatever, I would have no idea. So, it’s really difficult to pull a distracted student back in on Zoom.

Kris also noted that it is not possible for her to determine whether students are taking notes when they’re on Zoom because there is a lack of visual information and a lack of nonverbal cues. “I would like to see if all the students are actually writing down what I’m doing. When you’re standing right in front of the students, you can, literally look over and be like, write this down, and then walk around the room and see that they’re writing stuff down,” she illuminated.

Faculty members considered it difficult to teach on videoconferences when students primarily have their cameras turned off. Kathy recognized, “I’ve had students with the black box where you wonder if they’re even there.” Ted observed, “I don’t know if they’re sitting there brushing their teeth, eating breakfast, drinking coffee, and they’re just kicked back. They’re not

really as engaged with it as they probably should.” Mark acknowledged, “One of the things I notice is when I’m in a face-to-face classroom, I get to see all the students all the time. On Zoom, if it’s the whole class, individuals will disappear, and I don’t know if they’re behind the camera or not because they turn it off, and they’ll mute, and I wonder if they’re there...I don’t want to pressure them.”

Adam noted:

A lot of them don’t like to be on camera...They don’t want to be on camera most often, especially it reverberates if a few people have their camera off. I’m turning my camera off, too. But it’s a group think thing. If most people have their camera on, they turn it on...It’s a group think thing, and with big groups, it’s easier to get into that.

Sandy expressed frustration with teaching to black boxes, noting, “Half the people have their camera off, and I don’t want to be that person that says you have to turn your camera on, so I feel like I’m just lecturing to an empty room.” Amy had similar experiences, sharing:

I was asking them if you can please turn on your camera, but I would have like two people turn on their camera, and a lot of folks wouldn’t even have a picture ID like an avatar or anything, and it just made it painfully awkward. I was having situations where sometimes a student would log in, but they weren’t really there.

Kris recognized this phenomenon is particularly challenging for people with disabilities. “There’s a lot of students who don’t turn on their cameras, and that’s detrimental to someone who is learning disabled, or even hearing impaired,” Kris argued. She further explained:

I have problems hearing sometimes. I try to rely on reading people’s lips at the same time as trying to hear what they’re saying, but you’re just looking at a black screen at some point. Some of the students have even told me that they have trouble trying to figure out

what is going on if the faculty member or other students don't have their cameras on at least. If you know, for a fact, you have a student who has a disability in your class, and you don't have your camera on, they're going to be much more lost than they would be normally because you could look around the room, and you're in the room. You can see them and figure out what they are saying. In Zoom, it's like we have all these little squares all over the place, so that becomes really hard.

Randy recognized that students are "overwhelmingly self-conscious," and that may contribute to their reluctance to have their camera on. He discussed how carefully students cultivate and filter their social media images, but they cannot filter as much with Zoom. Students may also choose to turn off their cameras because they are "embarrassed where they're at in their home," he said.

Although there is live audio during the videoconferences, verbal communication is not as smooth to maneuver as it is face to face. Randy cited, "There's the whole awkward people accidentally talking over each other, and no one wants to be that guy who continually interrupts, so I think some of that makes it awkward also." Sandy pointed out the technology's audio limitations as well, noting, "There's also a lag. Sometimes, when you're having a conversation with somebody on Zoom, you accidentally talk over each other, and that type of thing doesn't happen in quite the same way when you're face to face."

The lack of direct feedback bothers Ted. He explained, "You feed off your audience, and that doesn't happen with Zoom." Sandy added, "It's not a fun experience. I hate it because one of my strengths in the classroom is having a really solid rapport with students, and it is a very conversational type thing. Zoom is just awkward."

Pausing and silence are also experienced differently on Zoom, according to the faculty respondents. Angela observed:

In the classroom, if I ask a question or make a statement and nobody responds, it's different. We can be like, oh, don't everybody jump at once. But on Zoom, that silence is different. It's different than a classroom, in-person silence if nobody asks a question. And I think a lot of students are aware of that, and so, they do try to make sure that they're there.

Amy related, "I would call someone asking a question to follow up on an assignment and it was just like crickets. Then, a few minutes later, they would come rushing back in." Adam revealed, "Sometimes, I would ask questions on the Zoom with 35 people, and it was just dead air. Nobody said anything." Sandy also experienced problems getting students to respond, expressing, "On Zoom, it's like talking to a brick wall. I tried so hard to get the conversation flowing and just struggled so much with it." She further detailed:

When you ask a question in class, and it's crickets, and then, if you're face to face, you can wait out the crickets, and eventually, somebody will say something. I've not had the experience on Zoom. I have not been able work the room well enough to facilitate conversation. I feel like I'm forcing students to talk, and the conversation is limited at best...there was just no connection.

Kathy recognized how uncomfortable ending Zoom sessions can be since they do not follow conversational norms. "Ending a meeting seemed very awkward at first. It's almost like we were all, 'Goodnight, Chandra.' 'Goodnight, Kathy.' It was like 'The Waltons,' and nobody wanted to press that leave button."

While professors sought to increase connection, interaction, and engagement through the use of videoconference sessions in their courses, the mediated environment offered significant challenges. Faculty members described the limitations in nonverbal and verbal communication as “awkward” and “difficult” as they detailed critical differences between face-to-face interactions and interactions on videoconferences. Most notably, nonverbal communication is limited due to small camera displays, and faculty members criticized the inability to demonstrate movement, gestures, and facial expressions effectively on Zoom. Nonverbal communication is further hindered by the large number of students who participate in the videoconference sessions with their cameras off. Instructors feel conflicted about the wall of black boxes they often face when teaching on Zoom. Although they understand the pressures of participating in synchronous class sessions while at home, the black boxes make it impossible to determine whether students are paying attention, focused, or learning. Additionally, verbal communication is also complicated through the use of videoconferencing, and faculty members decried the medium’s ability to facilitate conversation with a natural flow. Specifically, they argued lags, overlapping, interruptions, pausing, and silences are disrupted due to the communication technology. While faculty members embraced videoconferencing for its interactive capabilities and similarities to face-to-face communication, the medium’s functionality created difficulties for what they considered natural nonverbal and verbal communication.

Juggling act. Faculty members found the videoconference environment presented significant pedagogical challenges and numerous instructional decisions. Many faculty members discussed problems with balancing all of the features of Zoom while maintaining focus on their content or message. Ted complained, “Sometimes, you just have to focus on way too many things...It’s the controls; they’re not intuitive, and it just takes time.” Tony admitted, “I can

sometimes be distracted.” Amy explained, “You have to be much more intentional online, and obviously, the Zoom was helping, and that’s something I’ve had to learn is, how do I connect with these students?” Ted reflected, “It’s just been hard in general, and the effort that goes into this is phenomenal.” In considering switching from PowerPoint slides, videos, and other content, Mark added, “It’s a little bit of a juggling act sometimes.”

While faculty members agreed that they struggled with instructional strategies on Zoom, they disagreed on the ability to share content through the videoconference lectures and the perfect balance of content presentation. Tony claimed, “I get through more material.” He attributed this to the fact that students ask fewer questions during the videoconference lectures, which is another indicator of less student engagement. Other faculty members intentionally altered the amount of content they share in Zoom sessions. “When you have lecture time, for lack of a better term, I definitely see it has to be shorter. So, I’m trying to figure out how to do that without cheating students out of material,” Randy revealed, “A 50-minute lecture on Zoom is a lot different than a 50-minute lecture in person. It feels like people’s attention span is a lot more potentially distracted.” Mark maintained, “I don’t use it to provide information. I use it to rehearse and reinforce information and have discussions about it. If I’m just going to give them information, I’ll generally just do a recording of it or give them a text or write something to them. I’ve never found Zoom to be a good format for to teach stuff as far as lectures. They just listen, and it’s kind of pointless.”

A few faculty members also noted the difficulty in teaching specific content, such as laboratories, on videoconferencing. “The science labs, that’s impossible,” Amy remarked. “You can’t say that someone is competent to work in a lab on Zoom.” Ted expressed frustration about virtual laboratories, “You can find these nice programs, and you can push the button, and you

can do the calculations. You can watch videos of it. Until you can go in, and you start handling that and developing muscle memory on how to use [equipment], you're not learning how to do it."

Faculty members lamented the instructional struggles of teaching in the virtual Zoom environment, discussing technical issues and managing various screens of notes, slides, videos, and other content, observing the increased effort it took to share information virtually. There were conflicting attitudes about how much content can be shared effectively through videoconferencing. While some instructors felt less feedback from students allowed for the transmission of more material during a videoconference session, other instructors intentionally kept lectures brief to maintain student interest. Faculty members expressed that teaching virtual laboratories presented definite challenges in achieving learning outcomes. Overall, faculty members struggled with balancing the demands of teaching on videoconferences.

Let's chat. A noteworthy, unexpected, and positive result of teaching on videoconferencing came from the chat feature, according to faculty respondents. The chat feature is built into videoconferencing software to allow participants to have text-based conversation simultaneously with the on-camera interaction. This is an added communication channel to the videoconferencing classroom that the in-person classroom lacks. Faculty members mostly praised the chat function, which they observed encouraged engagement with students. Kathy noticed:

The chat box feature is kind of interesting because you'll be in the middle of something, and you'll see the chat questions popping up now. I thought that was neat because students seemed like they were a lot more likely to go ahead and type in a question than

to ask. And that was a really nice feature because people don't send you paper airplanes during class with a question or anything when you're in person.

Many faculty members discussed how the chat function has increased engagement with shy students who rarely speak in the face-to-face classroom. "Being behind a computer screen, for some reason, seems to help some students. The chat feature makes it better. For the introverted student, the chat feature was a really helpful thing," Sandy claimed. Faculty members explained introverts are more likely to interact on the chat, as it provides a way to ask questions of the professor without drawing attention to themselves in front of their peers. Faculty members found the channel extremely helpful in reaching students. "You flip the script for the introvert," Randy declared. "It's been a leveling for the introvert. Maybe, online education period has been because I think about students who have really difficult anxiety, depression, and now they are probably passing, and they wouldn't before."

Tony shared:

The chat option provides the questions people don't want to ask out loud...Because I have students, who in the classroom, I know that never say anything, and then, I'm on Zoom, and they're chatting privately. That's something important to remember; the fact that the shy students can interact with me...They feel more comfortable being on Zoom and being able to chat. Wouldn't it be nice to be able to have a face-to-face version of a chat box?

Randy added, "I have a couple of students who are the ones that I can consistently rely on privately chatting...but I really like that about the online format because their privacy is being protected and honored."

Sandy experienced success with the chat feature as well, observing:

The chat feature, when I had synchronized Zoom sessions, ended up being really helpful for those students because I would try to facilitate conversation. I would try to say, ‘OK, answer me out loud, or you can out in in the chat if you have questions.’ And, it was also really helpful for some students that didn’t want to say things publicly. They could send me a private message in the chat, so that they didn’t have to...The chat feature’s a really helpful component for students that are a little more quiet, so that’s one positive to it.

When we go back face to face, I am interested in trying to come up with some type of anonymous sort of engagement like that within the classroom for those students that are quieter.

However, other faculty members found the chat feature to be distracting and added difficulty to their classroom management abilities. “Frankly, I find it very difficult to even keep up with the chat while doing the other pieces,” Ted revealed. “I stop and read, and some people put chats together like six lines long, and you’re like, time out, let me read this chat. OK, let me answer that question. It loses its flow for me...I feel it creates this disjointed piece, and I really wonder who’s paying attention to what.”

Videoconferencing tools include a chat feature, which expands the communication to include text in addition to visual and audio channels. Faculty noted this additional communication channel provides a low-risk method for students to ask questions who normally feel uncomfortable speaking out loud. By adding an additional communication channel, though, the chat feature may further distract some instructors as they seek to balance the many layers of the videoconference environment.

When worlds collide. Faculty members recognized that teaching through videoconferencing from their homes to students who are also either at home or in their private

residence hall rooms creates an intersectionality of identities and spaces that causes dissonance, stress, confusion, and fatigue for both students and faculty. This collapsing of spaces presents several challenges to faculty and students alike. Faculty described these dynamics in different ways, expressing how they complicate videoconferencing communication situations.

Tony described, “You’re bring people into the spaces where you’re not used to having what could be strangers or acquaintances...” Amy ruminated, “I wish I could put my finger on it, but there is something about the environment...it’s difficult to separate and to turn off the work...Even when we were on campus more, I was bad to come home at night and still work on things and maintain those boundaries, but it makes it nearly impossible now.”

“It’s just a different environment you’re projecting from. It’s somewhere you’re used to being yourself...I feel like I come across better...I say more openly what I think,” Tony noted.

Randy defined the difference in terms of intentionality, explaining:

When I have to intentionally go into the classroom, there’s something I’m teaching my brain about this is the time to learn. And with Zoom, two minutes beforehand, I may have been watching the game or hanging out with my friends and slid into the side room watching it on my phone. It doesn’t feel as intentional. So, I think that face-to-face is just really helpful for my mind and body to kind of go, “OK, I’m going to be something different now.”

Sandy is concerned about what her students may be feeling, saying:

The students have all sorts of circumstances, especially the students that are living at home right now. They’ve got maybe a social situation that they don’t want to share with the world...Our students might have a little brother or a little sister, or they might be a caretaker for somebody. I don’t want to be the person that says you have to share that

with the entire class by virtue of having your camera on. I'm very aware that there are also sensitive issues that I don't want to infringe upon.

Amy was also sensitive to students' home spaces, saying, "They don't feel comfortable with people seeing their home environment." Angela described the dissonance she feels having her work and her home life share the same space. She worries about her students, too, contemplating:

I still think I grapple with all the different intersections of my identity, and I know our students do that, too. So, I am the same. I'm going to treat everybody the same. I'm going to be the same human being in the head of the holler and on the campus. But also, I play two different roles, right? I am the professor on campus, and I am mom, and I am daughter and caregiver to my parents when I'm at home. And so, when this forced us online, we then had to mesh all of our identities, all our personalities together. We no longer straddled the line. The line disappeared, and so, Professor, Mom, and all these identities had to come together. And, I know our students are dealing with that, too. For some of our students, school's a safe space, school's the place they go to get away from things at home, or vice versa, home is the place they escape this world of pressure that they don't feel like they fit in. All of a sudden, though, all of these things are together, and we don't have that separation anymore, just like I don't have a separation of home and work. They don't have a separation of home and school. And so being in that personal space is hard when you're having to play a different role... You don't want to make your sacred space a workspace. So, space is a big deal for me... And I feel for our students.

Embarrassing moments occurred due to the remote teaching and learning aspect of many

Zoom classes. Several faculty members related some of those incidents. Kathy recalled, “It’s interesting when you see things that you wouldn’t see face to face in a classroom, like somebody’s cat jumping on their shoulder. One time, someone’s husband walked across the kitchen, and he only had pajama pants on.” Amy shared that one of her male students came to a meeting shirtless. “That was something that I had to address...it was just wildly inappropriate,” she related. Mark remembered informing a student to not Zoom in the bathroom. “He asked if I minded he went to the bathroom, and I said, ‘Sure. That’s fine.’ He started picking up the laptop, so I just said to leave that here. We could stop.” Another faculty experienced a more serious situation in which a student recorded a video assignment as “some kind of domestic argument” happened in a room next to her.

Trying to teach students’ the value of professionally appearing on videoconferencing was another challenge that faculty members faced. Amy discussed how she taught them to position themselves in a room and pay attention to lighting. “You’re at home. It’s more relaxed, but you still need to appear as professional in said spaces. They have to learn how to have a professional face in a nonprofessional space.”

Communication technology’s influence in everyday life increased due to the pandemic, and several faculty members were concerned about how this influence broke down boundaries between work and home. “They start expecting you to email them back at 2 in the morning, and that’s problematic...It changes your work-life balance dramatically,” according to Tony. Amy shared:

There’s also this thing...that I should always be available because I am at home. What else could I possibly have to do? Even though I should be setting boundaries and saying, no, this is time for my family; this is time for me. I think it’s harder to say those things to

colleagues, like I have other things to do. Well, what do you have to do? It's a pandemic. Where are you going to go? That's something mentally that I have wrestled with.

Mark also expressed trouble with maintaining appropriate boundaries:

I need to establish better boundaries, though... They've learned that I'm always around, so I have meetings all day, and then, they pop on and just ask, 'Can I have a meeting?'

It's like 7 o'clock at night, 10 o'clock at night, it's 12 o'clock, and I do because I've not created those boundaries, so I have these impromptu meetings that just happen,

whenever. That may be different if I were working from an office, not from home. But I don't have day or night anymore; it's just working around the clock. That gets exhausting because they don't really stop even on the weekend.

Faculty noted the difficulty in teaching remotely as their home and work lives merged on screen. Challenges to presenting themselves on videoconferencing included feeling dissonance as they negotiated their public selves in their private spaces and the intersection of their work and home identities, which led to the blurring of boundaries between work and home.

Size matters. Faculty members clearly identified size as an essential factor in determining the potential success of videoconferencing sessions. Whether discussing their own courses, meetings they attend, or virtual conferences, the size of a videoconferencing session contributes to the session's effectiveness, according to respondents. Larger videoconference sessions translate into more one-way communication and less two-way communication between participants.

Size of the class affects the ability of instructors to engage students. "I can't really get students to interact with me as much. They're not as eager, and they're intimidated, too, by larger class sizes," according to Adam. He observed, "I think they feel more comfortable talking in

small groups where everybody has their camera on...Students are less apt to talk if they can't read the room, if they can't see their classmates."

Ted claimed, "It worked really well with the small class because they all kept their screens up." He continued, "A group of four or five or six people can have a real conversation. It's very different that 20, 30 students. It just becomes a one-sided conversation...I think people just disengage from it."

Mark disclosed, "I would guess probably 75 percent of my Zooming with students is with small groups or individuals." He explained that it is an efficient tool for working with students one-on-one with paper assignments, sharing:

I can't imagine going through a paper with a student again trying to lean over their shoulder when I can share a screen and talk to them and highlight, mark up things on a paper and the comments on the side. Then, they can have a copy of it that's there; that's permanent, and I do also. And they can go through and listen again. All of the comments I gave them, so they have a videotape.

Amy agreed, "I offer one-on-one Zoom sessions or smaller group sessions when I hear a lot of the same questions about certain things, and that seems to be productive." She continued, "When I have a few students, they're more likely to talk to me and actually turn on the camera. When I get, it seems like even more than eight to ten students, is when they start to freeze up and don't participate much."

In adapting videoconferencing to their courses, faculty members determined the size of the class and the number of students participating in the videoconference significantly affects their ability to engage students. The professors agreed that smaller groups encourage more

interaction and overall effectiveness. Small group and individual meetings with students on Zoom produced the best outcomes, according to the faculty respondents.

Disconnected. Internet connectivity and access to adequate technology were concerns faculty members expressed related to the use of videoconferencing in their courses. Living in a rural region, many faculty members experienced difficulties with connectivity that affected their abilities to manage their courses from time to time. Additionally, they were concerned about students access to technology and Wi-Fi as many come from low-income homes.

“I think my biggest concern is just will it hold up,” Angela related. “Will my internet hold up through this meeting?” Sandy mentioned:

I do wonder, given where we’re geographically at...the tech problems. I ran into a lot of tech glitches with student that maybe don’t have internet, or their internet went out, or they financially don’t have that type of access they need to be able to do this sort of thing. And, I know I had a couple students that we had to work with to try to get laptops, for example, because they didn’t have one at home. They just relied on computers on campus to do their stuff. So, I think having poor resources, poor internet structure, and hardware are barriers for the particular population that we serve.

Mark also discussed how stressful and disruptive technological problems are, recounting: One in three times, you get in there, and the technology doesn’t work; you can’t get your screen to share, or the internet’s not doing well, and people are being dropped off all the time. And you have to go back and redo things over and over again. Sometimes, the whole thing shuts down. I tell them if we went off when we need to come back and tell them five minutes or whatever. And then, that kind of panic when we get back on, and I’m watching to see if the rest of the class shows up, and there’s always a few that don’t

come back, and I don't know if they've just lost internet or if they just went to lunch...It's good when technology works, but it's a nightmare when it isn't.

Further complicating the use of videoconference sessions in courses is the sporadic internet that exists in rural areas. Faculty members discussed how intermittent connectivity negatively affects the flow of their communication during videoconference sessions with students. Technical issues provide another dimension of interference in the communication process during synchronous online courses.

State of anxiety. Anxiety was commonly mentioned by faculty members who revealed Zoom interplays with their anxiety levels in different, individual ways. For those who normally feel anxiety, Zoom can be a comforting form of interaction. Faculty members shared accounts of how being able to socially interact with others during a time of social distancing relieved their anxiety. Others conveyed how videoconferencing adds to their levels of anxiety, especially in large sessions with people they do not know. Instructors also expressed concern for students and how their anxiety may be affected by the communication technological tool.

Some faculty reported feeling comfortable interacting with students through the communication technology. "I'm enjoying it a little more than face-to-face, sometimes," Mark confided. "The reason for that is I have a little bit of social anxiety because I'm not the loud person in the room generally. Sometimes it [Zoom] gives me a little bit of distance that I like."

Kris also revealed that Zoom "takes away" some of her anxiety. "Part of what is anxiety and depression is I don't like to feel isolated...Having this [Zoom] allows me to have something to get in touch with people, and that helps out tremendously," she explained.

However, some faculty members disclosed their anxiety with being on camera. "Any time I have the camera on, that anxiety level goes up...I feel like people are staring at me

because I'm bad about looking at everybody in the Brady Bunch boxes. I find myself looking around at people, and I'm like, oh, they're doing the same thing with me," Amy confided. She elaborated, "As compared to an in-person meeting, in a lot of cases, I feel more anxious, especially if it's with people that I don't interact with a lot." Others were sensitive to how students with anxiety might feel overwhelmed by videoconferences. "I don't want to be the person that tells the student that severe social anxiety that you have to turn your camera on to be present," Sandy related.

According to the faculty respondents, anxiety interplays with videoconferencing in multifaceted ways for individual faculty and students. Some perceived the communication tool to relieve anxiety by providing meaningful connections to students, while some faculty acknowledged videoconferencing increases their anxiety level, especially situationally. Faculty members also realized some students may have anxiety that affects their participation during videoconference sessions.

Zooming in on faculty fatigue. Faculty members recognized fatigue after videoconferencing sessions is a complex construct affected by multiple factors. In addition to effects from anxiety, increased effort required to teach and communicate on VC was a major driver of the feelings of exhaustion for faculty. Faculty members also discussed the effects of multiple Zoom sessions, multi-tasking during synchronous classes, and the type of video call. The breakdown of classroom norms, the prevalence of one-way communication, and intense feelings of disappointed were also identified as contributing to faculty members' level of Zoom fatigue. According to Kathy, "I find it more tiring to teach on videoconference than in person." Other respondents agreed. "I just feel tired," Ted admitted.

Serial Zoom sessions was identified as a primary cause of Zoom fatigue. Karen characterized, “Back-to-backs are the worst, going from one video thing to another video thing...the whole serial Zoom things are the worst.” Amy admitted, “Today, for example, I will have had multiple Zoom meetings. After that, I feel exhausted. I’ve really just been sitting here for three hours, but I do feel exhausted.” She continued, “There have been days when I’m in meetings for five hours in a row. After that, I need a nap.” Mark agreed, relating, “I’m frankly exhausted by the time I’m done because I do all these conferences one after another after another, and it starts to blur.” Some faculty members acknowledged the ease at which you can schedule Zoom sessions and move seemingly effortlessly from one to another session as problematic. Tony described the issue:

Sometimes, my voice is just dead, especially if you had back-to-back classes, or you have a meeting and class. That is so much easier to do on Zoom than anywhere else. I feel like I can go from a meeting to a class to a class. I’ve got my own computer with all my stuff, and it’s seamless versus I’ve got a meeting here. I’ve got a transition. Get ready. Go here. Transition.

Amy agreed, relating:

That’s something that I need to work on is spacing things out a little more because I don’t think I would schedule meetings like that if they were face to face, but because all I have to do is click off one to another, you do schedule them back to back...Another thing I am notorious for is not scheduling time for me to eat lunch. I’ll just have meetings all through the time I should have been eating lunch...Zoom makes [self-care] more challenging.

Some faculty members associated their fatigue with increased levels of anxiety they feel

being on camera. Tony explained:

Maybe it's a subconscious anxiety from being on camera. It's like you're putting on a television show...I know that people are there virtually, but it's the feeling of being front stage in your backstage. Goffman talks about that, when you let someone backstage, usually they have to be pretty close to you, or it creates cognitive dissonance, or anxiety, or whatever it is.

Tony argued that there should be "degrees of separation between where we feel comfortable and where we are on and managing impressions." Adam discussed, "I do think your space matters, and it contributes to Zoom fatigue. And to what degree or what are you doing on the Zoom call? I do think staring at a screen hurts your eyes. So, if you do it too long without breaks, it's not good."

Kathy admitted Zoom is "mentally fatiguing, just being on camera all the time." Angela also discussed the effect of the camera, sharing, "It's almost like you're putting on a show, right? Like you're having to perform for a camera, and so, there is that feeling of holding yourself back...I try not to look at myself while I'm on the screen." She elaborated that she keeps her camera off when she is in large meetings because she feels more self-conscious, but during small meetings, she keeps her camera on. "I do have that self-conscious, sort of, I don't want people to watch if I'm just sitting there listening...I feel awkward about that." Mark described:

I think you just have to be on...There's an awareness that I'm recording myself. This is going to be something that's going to be shared with other students again, and it's permanent...I feel like I have to be on the whole time...I do not like to see myself. I do not like to hear myself...I think there's a level of stress with that, not being comfortable with being in front of a camera all the time.

Other faculty members argued the type of Zoom meeting influences the level of Zoom fatigue. Kris maintained that when she is a passive participant, her Zoom fatigue increases. “Where it’s just like I’m very passively listening to what’s going on and not actively involved in what is happening...those are super draining for me.” Adam said, “the type of engagement in the Zoom call” and “the content of the Zoom meeting” affect fatigue. Amy shared that she is more anxious the larger the group is on Zoom, and that contributes to her feeling fatigued.

Multi-tasking and increased effort also caused faculty to feel fatigued after participating on Zoom. At a certain point, faculty feel “overwhelmed.” Mark admitted, “Sometimes, it’s just really stressful. I’m just really frazzled by the end of it because it’s been a constant somebody emailing me, ‘I still can’t get online. Can you get me online?’ I’m trying to do that at the same time I’m teaching.” Kris described, “You just get overloaded. It’s like the more you do the Zoom stuff, the less appealing it seems to be.” Ted described a problem with Zoom is an overload of stimuli between video feeds, audio, and the sidebar text chat. He claimed, “People do not parallel process. We just shift back and forth.” Classroom management becomes more difficult as he juggles sharing screens, reactions, chat, and taking questions. The multi-tasking required “leaves you exhausted,” according to Ted. He elaborated:

You have to focus on way too many things, chat versus the video. I think there’s a bit of fatigue because you end up with poor audience interaction. You can’t really feed off those expression expressions real well because so many people just leave the blank screen or their avatar or whatever. I think that creates a little bit of a fatigue factor there.

Kathy also blamed multi-tasking, in part, for her fatigue, explaining:

When I want to point out something to students in the classroom and if I have a PowerPoint slide up, I feel like I can say, “Oh, you know this,” and make them aware that

that's really an important thing, whereas if you're sharing a screen, you can run your cursor around the screen and stuff, but it just takes a little bit more effort...Now I have to share my screen, find my point, the whole thing. So, it's just a little bit more technical expertise needed.

Mark agreed, relaying, "I think that it can be exhausting to get it all wound up, everything where it's going to work right, where it's going to switch to slide when I want to go to the slide, and then they'll go to the video clip when I want the video clip, and they're going to be able to see it...A lot of times there's all this other stuff that you want to come together.

For Angela, ending Zoom classes is distressing. She explained, "When you walk out of a physical classroom, your students are still around you, and you're walking out, and they still want to talk to you. So, you have that sort of decompression from the class." The situation violates those classroom norms on Zoom. "All of a sudden, it's just gone. So, you have to decompress by yourself in a very different way," she observed. Sandy concurred, "You can't carry on individual personal conversations with students after Zoom."

Adam described how playing a role contributes to fatigue. He explained:

When we're in public, we're acting. We're putting on this face, no matter what we feel, how we are, where we're at...But you are playing this role, and the same thing applies to being a student. You're playing this role of a student, you're paying attention, you're doing what you're supposed to. So, it is mentally taxing...It's a little more relaxing in person for long periods of time. I think it does get a little more tired virtually...maybe it's not ideal for our eyes to be staring at a screen all day...I think it also may deal with the Zoom structure. If it's more interactive and discussion-based, it's probably not as

tiring...But if it's more lecture, where it is just one-way communication, it probably is tiring...It's boring. It's dull.

Some faculty members expressed they feel disappointed after teaching on Zoom when they feel as if they didn't reach their students. In "a teaching session, especially if there hasn't been a ton of student involvement, which is the majority of times, you have that, gosh, that was probably a huge waste...I'm just completely frustrated," Randy expressed. Ted felt similarly. "I didn't pull any energy from the audience because there was no energy, no audience. I had lots of blank Hollywood squares. [I'm] very unfulfilled. I didn't necessarily feel like I actually reached anybody." Sandy admitted that she feels "demoralized," explaining, "To quote one of our colleagues, I feel like a 'Zoombie,' and I will hang up the Zoom call and just feel a bit deflated because I love teaching. I love what I do. In this last year, having to do it all on Zoom has been demoralizing and exhausting." Sandy elaborated:

I feel like I've not been doing my job as well as I could, and I feel like some of these conversations, particularly in my upper-level classes, are such important conversations when you consider what's happening in our world. There's so much political tension and racial tension and all this stuff happening. I feel like these conversations are important for helping students make sense of the world and find their place in it and how they want to contribute to shaping the world through their individual careers and lives. And I just feel like I'm not able to that in the format I've been given. And that's nobody's fault. That's the result of the pandemic. But it's just a bit exhausting. I just feel like I'm not able to accomplish what I need to accomplish....I feel like whenever I hang up a conversation that has been really stiff and stifled, and I've had to drag things out of people, that it's just fleeting and demoralizing...I just feel like I'm failing.

When sharing their experiences with Zoom fatigue, faculty members identified many reasons they feel tired after videoconference sessions, ranging from anxiety with being on camera to the content and number of Zoom calls during a day. The source of their fatigue included the stresses from multi-tasking and their dismay when they feel students do not engage in the session. Sessions that feature more one-way communication were also labelled as more tiring. Faculty respondents conveyed an array of causes for Zoom fatigue, noting that the complicated communication tool produces a variety of effects that contribute to an overall feeling of exhaustion.

Back to the future. Faculty members are conflicted about the future of videoconferencing in higher education. While some find the communication technology offers many benefits in terms of convenience and flexibility for students, others expressed concern that the college classroom may never be the same. Ted reflected, “It’s pretty amazing what we’re doing right now.” But, other faculty are apprehensive about the long-term effects of synchronous online instruction.

Mark claimed, “Some things are just better on Zoom,” as he discussed the advantages of working through a paper with a student on videoconferencing. Amy also shared an assignment that she adapted to Zoom for a class, and she intends to keep teaching it with that tool. Students worked in pairs and recorded their interactions. “That worked out really well, and that was all done using Zoom,” she said.

Angela said she plans to continue to incorporate it in her classes “to be able to do those interactive work type things. But, also, if we have situations where we can’t get there because of weather.” Sandy related, “I think, on the one hand, it can be really helpful because if we are back to normal...and a student isn’t able to get there for whatever reason, we can now Zoom them into

class and that barrier is gone.” Adam added, “I think it will be an acceptable alternative if it’s really unsafe,” especially in times of severe weather.

Tony predicted, “Zoom virtual lecture class might become more frequent than it would have ever happened without Covid...I think for certain classes, it’s better, or it can be better part of the time. It’s not an all or nothing.” Kathy agreed, reflecting, “In the future, I think they’ll be a lot more use of videoconferencing in online classes, more so than before.”

Tony elaborated that information that is more “functional” is “conducive” to learning on videoconferences while “certain information that is more interactive, you want to be face to face.” Adam expressed, “I think a lot of things are food for just email. Then, if it’s more serious, you can have a synchronous Zoom. If it’s something that’s really, really significant, then you should probably meet in person.” Randy noted that the type of work and time spent may indicate when videoconferencing may be useful. “I think that there are definitely times it’s really important, maybe some type of collaboration face to face. You’re going to do a half day together, let’s not do it on Zoom. But, for a 40-minute meeting, sure let’s do Zoom.”

Faculty members intend to use Zoom to continue to provide help to students remotely. Randy imagined, “I think about a football player who might be at [another college] but is having an issue. Maybe, we’re more likely now...to get on Zoom for ten minutes, share a screen, and show him something, and then, he can do it right then.” Ted also plans to continue to help students through videoconferences. “I think it’s going to have a big role because there are some good things I like. I like being able to schedule a help session, which is optional, and have the students show up, and we just talk. I think it’s good for them,” Ted shared.

The ability to record lectures is seen as beneficial for athletes and others who may not be able to attend an in-person class. “The videotape idea of it has been good. I like the ability for,

especially when we talk about sports and things like that, the ability for students to go back and see the lecture,” Ted said. Mark also liked the record feature to use for student presentations. “I love having the videotape to go through.” He explained he can review the video with students, and they can identify ways to improve speaking skills.

Faculty members mentioned they are excited about the continued ability to bring outside speakers into their classrooms. Tony remarked, “You can bring in so many more guests using Zoom...I like the fact that we have a Zoom classroom. We can bring people’s enthusiasm to discuss things. I think that’s a very huge positive.” Randy also recognized, “We can save a lot of costs as an institution by doing” speakers on Zoom.

Others are dismayed about the lasting impact on higher education. “Unfortunately, this pandemic has changed education forever,” Kris stated. She feels students will “expect more from faculty members going forward” and more “flipped classrooms” will result. Amy also observed, “I do think that, and especially now it seems, students have had a taste of what it can be. I think we’re going to see more students expecting more flexibility in courses...If you give students the option of whether to Zoom or to come in person, they choose Zoom...It’s kind of like Pandora’s box has been opened.” Sandy cautioned, “I have some concerns that with everything going digital. We’re going to remove the human component.”

Regardless of the role videoconferencing may play in the future higher education classroom, many faculty members acknowledged there is a need for further training. “What I would hope is there would be more training sessions that would help people make the transitions that, sadly, are going to be the future of education,” Kris observed. Randy likened the learning curve to middle school. “This awkward middle school phase of technology, I don’t like being

awkward. I know it's going to get better and be handsome and beautiful and stunning at some point, but I'm not there yet."

Faculty members mused about whether these concerns are felt by students, who they perceive as more comfortable with the invasive use of communication technologies. "I think it's that generation, too," Mark reflected. "I think they just pop on. They don't think about it. For me, it's more of a preparation sort of thing...It's just as natural as email to them to just hop on Zoom and say hello."

After being hastily integrated into college classrooms, the fate of videoconferencing in higher education remains to be determined. Faculty respondents recognized the utility of the synchronous communication tools in certain situations. They also seek ways to more effectively implement videoconferencing in their courses. Faculty members are also concerned about the future of college teaching and whether students will expect them to accommodate a flexible, highly personal learning environment in which they will continue to simultaneously include face-to-face learners and online learners while ensuring an engaging experience for all. These apprehensions further add to their burgeoning workload and contribute to their feelings of exhaustion.

Summary of faculty interviews. Faculty members use videoconferencing to teach because the medium's richness closely mirrors face-to-face interactions, allowing them to engage students in discussions and other meaningful learning activities at a distance. However, the communication technology presents several challenges, including technical problems, internet accessibility, and Wi-Fi connectivity issues. Additionally, due to the medium's camera and microphone features, many students do not actively participate in class lectures and lessons, and even when they do, the videoconferencing tool complicates the communication process due to

lack of nonverbal communication cues and the violation of verbal communication norms. Teaching to an audience of multiple screens or a wall of black boxes can be distressing. The technology creates a conundrum for educators to confront as to engage students fully, their cameras and microphones need to be on to encourage dialog and interaction. Yet sometimes, internet connections are not strong enough to sustain video and audio channels, and at other times, students may not feel comfortable with their surroundings or home environments to display their video and audio on screen to an audience of their peers. In an effort to maintain equity, most faculty members do not mandate students be on camera during videoconference class sessions, leading to decreased engagement and interaction. Moreover, videoconferencing's continuous self-feedback stream can distract users and increase their level of anxiety. Faculty members indicated the size of class sessions was critical in the effectiveness of teaching through videoconferencing, with smaller groups enjoying more successful communication outcomes. Regardless of how they use videoconferencing in their teaching, all faculty members admitted to feeling Zoom fatigue, and they cited a variety of factors that contributed to these tired feelings. Faculty members discussed the increased effort it takes to teach during a videoconference, the type of content covered, participation during the video call, and the number of videoconferencing sessions during a day as contributing to Zoom fatigue. Further, several expressed they have anxiety about being "on," while others described the pressure of performing a "show" for students. Ultimately, some faculty members felt demoralized teaching in this environment because despite their best efforts, they worried they weren't reaching students. Adding to the feelings of Zoom fatigue, several faculty members are concerned the convenience and ease of videoconferencing have blurred the boundary lines between work and home, and they feel as if they must be available seven days a week, 24 hours a day. Finally, the faculty were conflicted

about the future of videoconferencing in higher education. They look forward to the increased flexibility and accessibility the communication technology tool offers during times of severe weather and when they or students cannot attend class for personal or professional reasons. However, faculty were concerned that students will now expect all classes to be recorded and that may increase their workload while eroding the learning process. Table 5 summarizes the themes that emerged from the faculty interviews.

Table 5

Explanations of Themes from Faculty Interviews

Theme	Explanation
The next best thing	Faculty members used VC in their courses because it is similar to face-to-face communication.
Talking heads and black boxes	Faculty members felt like talking heads in the VC classroom, lecturing to disengaged students without their cameras on.
Juggling act	Faculty members struggled to manage instructional materials in VC.
Let's chat	VC's chat feature encouraged introverted students to communicate more with instructors.
When worlds collide	Faculty members experienced an intersectionality of their identities, participating in VC in their private spaces.
Size matters	Faculty members reported smaller classes worked more effectively on VC.
Disconnected	Faculty members expressed concerns about adequate internet connections for their students and themselves.
State of anxiety	The use of VC increased the anxiety levels of some faculty members, while decreasing the anxiety levels of others.
Zooming in on faculty fatigue	Faculty respondents identified multiple causes of Zoom fatigue, including the increased effort it takes to teach on VC, anxiety with being "on," and the type of content and participation.
Back to the future	Faculty members see increased VC in higher

education positively and negatively.

Student Interviews. Eleven in-depth, semi-structured student interviews were conducted, and findings demonstrated significant differences and similarities with the faculty members' responses, revealing the videoconference experience is markedly distinctive for faculty and students during class sessions. The student respondents described themselves and their peers as "overwhelmed" and "stressed" as they suddenly felt somewhat lost, attempting to negotiate a completely virtual college experience. While they realized that professors and the institution were often trying to do the best they could, they were frustrated with remote learning, citing difficulties with connecting to internet, communicating with instructors, and finding the energy to fully engage in their courses. Their frustrations were fueled, in part, by questions about the value and quality of the education they were receiving, noting critical differences with how they previously communicated in their courses.

The reflective, interpretive analysis identified six themes within the student interviews. Although students acknowledged the convenience of videoconferencing for classes, they felt significantly restricted in their ability to interact with their instructors and classmates. Their reflections are elaborated in the identified theme, "Muted." The students also viewed the Zoom sessions as an "obligation," and they criticized the sessions' quality of instruction. Students expressed frustration about their inability to stay focused during synchronous online videoconferencing sessions, and their viewpoints are offered in the theme, "Zoomed out." The camera represents a dilemma for students, and their opinions about its use are shared in the theme, "Camera shy." Like the faculty members, students were also mindful of technical issues with the use of the technology, and their thoughts are discussed in the theme, "Glitches." Students also admitted to feeling Zoom fatigue after videoconference sessions, and the theme,

“Zooming in on student fatigue,” presents their reasons for the feelings of exhaustion. Overall, students accepted the use of videoconferencing will affect their futures considerably, and their ideas are explored in the theme, “Back to the future 2.”

Muted. One of the key features of Zoom and other videoconferencing applications is the ability to turn the audio feed on and off. The microphone on-off feature allows hosts and participants to control the levels of external noises heard on the video call. Since professors lead the lectures and discussions on synchronous class videoconferences, most students participate with their audio off. In some cases, professors require students to have their audio feed turned off during class sessions. A consequence of these actions is that students are essentially silenced during these classes. Feeling muted during their videoconference classes was a common feeling among the student respondents, and they felt unable to communicate freely with their professors or peers. Zane admitted, “I’m usually muted with my camera off...Doing a lot of Zoom, you don’t have that much interaction between students and even some professors who set out to where you can only see the professor, and so, you don’t have any interaction between students.” Chad observed, “So, the cameras being off. Everybody’s muted. And when the teacher would ask, ‘Do you guys have any questions?’ ... in the Zoom lecture, nobody is going to have a question because they’re afraid to unmute their mic and turn on their camera.” Stacy was troubled about communication during Zoom classes, sharing:

It’s really hard to participate in them, I feel like, because all of the classes that I’ve had that do the same lectures at a set time, the professor always mutes all of the students, and you have to get the professor’s attention to speak, and sometimes, it’s really hard because I do the hand waving emoji thing and do all that. And sometimes they don’t see it. I’ll start waving to the camera and try to get their attention. And sometimes, there are so

many people in the class that they don't see me. So, I feel like it's just hard to participate and actually be involved in classes when it's like that...There's a barrier between student and professor, and you can't cross it...I feel kind of hidden and in the background.

The microphone on-off button further confuses normal conversational patterns. Christy noted, "With videoconferencing, you might not ask as many questions because you don't want to talk over everybody." Leah felt similarly, stating, "You can't see everybody that's on the screen. I have to use my phone. My laptop doesn't have a camera. I wasn't comfortable because not only can I not see everybody, but whenever I go to speak, somebody else is going to speak, and it's kind of that awkwardness that you get in in-person class, but then, there's that laugh that you get with the in-person class that you don't get over videoconferencing." Zane contrasted how Zoom interactions during class differ significantly from in-person class interactions, explaining:

During Zoom, it's harder to ask questions in real-time, and they'll only check to see if they're questions every 10-15 minutes, whereas in person, you can raise your hand, or just ask your question during the lecture. Whereas, on Zoom, if they come back 10-15 minutes later during the lecture, it may be something completely irrelevant now, or something that you may have forgotten about during the lecture if you just do the hand-raise function, rather than using the text box.

Erica found internet connectivity affected her ability to communicate and ask questions during Zoom class sessions. "If they can't hear you when you're trying to ask questions, it's hard to go with the lecture when you're not understanding...If there's any problem with audio or video, it's hard to keep the class flowing. There's been a few issues where I ran into the problem of not being able to hear them, and them not being able to hear me."

Chad felt that the lag on videoconferencing happens even when the internet connection is stable, and he disliked how it impacts communication. “It’s more disingenuous. Honestly, I feel like the screen dividing us automatically makes that interaction more disingenuous. And it feels like there’s a delay, even though we both seem to have good internet connection. There’s still a delay in communication, and we can’t feel the energy radiating off one another as well.”

Rene is conflicted about the use of Zoom for classes. “I have a love-hate relationship with them,” she joked. She continued, “I don’t like speaking up in them, but I like to be able to see your teacher and see others in the class and get their opinions on stuff, too.” She explained her reluctance to talk in Zoom class sessions, saying “I hesitate to speak. I’m afraid I’ll interrupt somebody or talk over someone...When I’m in person, I get more interested, so I speak out more, but I’m a little antsy to do that online, and I’m afraid I’m going to interrupt someone.” So, she participates with the audio off.

Leslie also expressed she is concerned about interrupting, sharing, “I feel like discussion isn’t as encouraged online as it is in person because it can be seen as an interruption to the speaker...Being online sucks some of the fun out of it.” Erica also mentioned, “You do feel like you’re interrupting. I’ve gotten that sentiment on video chats if you turn your mic on...So, a lot of people won’t interact with the professor because they feel like they’re interrupting lecture on Zoom.” Christy explained, “With videoconferencing, you can’t really see who’s going to talk at what time. Most of the time, when you’re face to face, somebody will raise their hand, or you get a little bit of a warning. But with videoconferencing, you might have people talking all over each other. And then, it’s hard to distinguish who said what and who wants to talk next. I feel overwhelmed because I don’t know to listen to or what I’m supposed to be doing.”

Chad described asking questions in videoconferences as a hassle, sharing:

When you go to respond to something or ask a question, you unmute yourself just long enough to do it, you rush through the question, and then, you mute yourself back. And then, when you get the answer that you were looking for, if there was any follow-up, you feel a lot more nervous to ask it because everybody wants to get off the Zoom call. So, anything that you're doing, you feel like you're holding them up, and you're delaying them getting back to their day.

Melissa described the Zoom class sessions as “no different than being in class in person.” However, she warned that professors must set guidelines in advance, so students know how to ask questions for the class to run smoothly on videoconferencing. “If they don't set those guidelines, sometime, you get the issue of a couple of people wanting to ask questions at the same time,” she explained.

Wes also misses talking with other students. “You're missing the vibes you'll get with the people in the class, with the professor, and even the after-the-class interactions.” Leslie agreed, “When I'm in an in-person classes, I have a small room with me and my friends, and we're talking about the content,” but on Zoom, “you can't exactly have a little side conversation while other people are having a conversation.”

According to the students, the chat feature only alleviates part of the problem. Stacy related, “It's still overlooked because a lot of times when professors are doing those lectures, they aren't even looking at the screen. For most of my classes...they're standing, lecturing, referring to the PowerPoints on their boards, and they aren't even paying attention to the Zoom screen.” Leah agreed, relating, “People send through the chat messages on videoconferencing...questions, and sometimes, those questions aren't seen until the very end of class, and that specific topic has been covered already.” Christy shared, “There's been times that

I've typed questions in the chat box before, or I've waited until class is over and email my professor my questions because I don't want to interrupt them." Erica observed it's harder to communicate with classmates on chat, too. "It's a lot harder to connect with other students because you can, of course, utilize the chat and ask each other questions, but I feel like it's easier to just lean over" in person, she explained.

Smaller classes or groups seem to be more successful for students. Stacy shared, "With lectures on Zoom, in the smaller classes, it feels more informal where we're all allowed to give our feedback and we're not forced to be muted." Rene agreed, relaying, "I know that if we break into these smaller groups and have a videoconference, the discussions go by so much quicker and just easier." Kayla also found small group sessions to be "engaging" because they enable students to ask more questions. "You got to express your ideas and your thoughts, and that's engaging to me," she said.

The structure and features of videoconferences create an environment that discourages two-way communication, according to the student respondents. They expressed dissatisfaction because they often feel muted, literally and figuratively, in their courses. Students felt the videoconference hinders the real-time interaction that it purports to offer because they feel uncomfortable unmuting their microphone to ask questions, citing the action directly interrupts the instructor and it is difficult to gauge appropriate times to ask questions to avoid overlapping. Normal communication patterns are adversely affected in the mediated environment, leaving students feeling silenced and muted.

Zoomed out. Struggling to understand the synchronous online learning mode, students attempted to meet its unique demands and expectations, but they found the learning and the experience often left them dissatisfied with the process and results. Student respondents labelled

the videoconference sessions “pointless” and an “obligation,” as they increasingly zoned out. According to Chad, “Another thing that creates a level of anxiety is when they’re on Zoom, I’m sure they feel as though the quality of education that they’re receiving is not matching the quality that they were receiving beforehand. And they’re like, well, why am I even here? Why should I feel like this is even worth my time?” Stacy claimed, “I’m just not getting what I should be getting out of classes because I really like participating and communicating back and forth to the professor and other students. And, if I’m just sitting there, listening to the lectures, and they’ll ask questions, and you’ll be trying to answer, but they’re not seeing you try...I’m doing the best that I can.” Zane expressed his frustration, “I feel like it’s a lot easier to not learn as well on them [Zoom calls] as you do face to face. It’s easier to find yourself doing something else...whereas in class, you wouldn’t be doing that...It gives more opportunity to just not pay attention to what’s going on in lecture.” Leah agreed, saying, “Most of the time, I feel like I haven’t learned anything from that videoconference.” Kayla echoed, “I feel like it’s pointless sometimes. I’m just like, this could have been done differently. We met for ten minutes. We didn’t need to do this.”

Students were frustrated with the sessions that primarily featured one-way communication. Zane claimed, “With a Zoom call class, a lot of times, you dread it until it gets there, and then, when it gets there, it drags by because you have to listen to the professor.” Kayla complained, “The videos that she posted was just reading off the PowerPoint and never really explained anything, but then, the Zooms were also reading off the PowerPoint and not explaining anything and not engaging. And I was like, this is pointless.”

The videoconferences became an unwelcome addition to students’ routines. Rene described Zoom lectures as the “task” of the day. “The task of the day is to sit through them, and my body gets tense,” she described. Leslie described, “Whenever you hop on a screen, it’s like

there's no pleasure, only business." Chad depicted the Zoom lectures as "forced communication. It feels disingenuous, and you question whether or not it's worth being there. So, you have to try twice as hard or three times as hard just to get something out of the class." Stacy shared, "You are getting the same information...you're still getting your lectures. You're still being able to take all your notes, and everything you need, but the difference is I just feel so disconnected." Leslie agreed, "The content's the same, but the way it's delivered is completely different and a lot less exciting. It's an obligation. I've got to put on a nice shirt and do my hair and sit for an hour. It feels more like an obligation than in-person classes did."

Students found it hard to concentrate during videoconference class sessions, decreasing their desire to participate in them. Leah claimed, "For me, personally, I find it very, very easy to get distracted and lose focus of what's going on in the moment. So, whenever my professors are like, you don't have to have your camera on, or you don't have to have your microphone on, I found it super easy to get distracted and find different apps or websites on my phone and just not paying attention in class."

Students explained that the shift to learning from home came with additional motivational challenges. For Stacy, "It's so hard to wake up in the morning and get ready to get onto a Zoom call because if you miss it, it's on Canvas, and it makes you unmotivated. You don't want to go to class." Leah quipped, "Videoconferencing is the lazy man's way of going to class." Rene disclosed that professors also seem to be unmotivated on Zoom, saying, "Some professors, I can tell, just aren't as thrilled to do it as they would in person. So, I think that has affected their teaching method or style or their lectures."

Stacy described how participating at home is problematic, detailing:

I've noticed when I have to do the Zoom lectures, I live in a really loud household, so

sometimes, it's really hard for me to find like a quiet place...A lot of times, it's super loud in my house, and there's a lot going on. I feel a lot of students might have that same problem with the Zoom lectures because they can't turn their cameras on, and there would be like people walking behind them or trying to talk to them, especially on campus...and it's distracting...I'm usually doing things from the comfort of my bed, which adds a lot of unmotivated attitude to it because I just lay here and do it.

Chad revealed, "Most of my friends will hop on the Zoom call and go back to sleep and set an alarm for when class ends to leave the Zoom call." Leslie admitted, "Sometimes, I actually fall asleep, which is bad, but it's not as engaging as an in-person class is. It's hard to keep my attention, just looking at a little box, especially if it's just lecturing. If there's a little bit of student communication, it's a little bit easier."

In contrast, Stacy feels she was more productive when she came to class in-person because she was in a "working, class environment." She voiced real concerns, stating:

I just don't feel like I have a lot of motivation to do anything...I feel like mental health has been something that nobody's talking about with online classes and stuff, especially in college, because they just assume most classes in college are online. They're dealing with it. But for me, I never had hardly any online classes like this. So, I was ripped away from like a study schedule, and it was really hard. And it's still really hard for me to find a good pace and a good balance between everything, and I'm overwhelmed a lot. I get stressed out a lot because I don't know how to schedule myself, and I can't keep myself motivated or focused on work long enough if I'm in my house.

Her feelings may be echoed by others who seem to be struggling with online learning.

Leslie shared, “Grades are declining. A lot of intelligent people, their grades are declining because of it.” Leah noted, “Some majors work with Zoom and online learning, and they’ll be fine, but some majors do not work... This will work for psychology, or education, or music, but when you get to stuff like math and science, it’s impossible.”

However, other students like the videoconference sessions because the live interaction increases their motivation to work on their classes. According to Wes, a Zoom session with a class improves his morale, relaying, “It’s brutal, of course, but it helps give you a boost that you may need.” He elaborated that asynchronous courses make him “not so motivated,” but that a Zoom class forces him to focus on the class. “We still do have some kind of normal school. It gives you the motivation.” Chad agreed, noting, “I feel like there’s a sense of obligation and normalcy attached to it with the live lectures.” Wes suggested students treat a Zoom class like a face-to-face class. “I think if you get up and get yourself ready, like you’re going to go to class to go to Zoom, you won’t feel like you’re just sitting through a boring lecture on your phone with your video off and your mic muted, and you’re not really listening to it. But if you got up like you’re going to class, it would almost feel like you were in class.”

Faced with muted microphones and feeling unable to engage in meaningful communication in their courses, many students feel dissatisfied with videoconference class sessions. They question their value, leading them to label them as “pointless.” Feeling “obligated” to attend, students then reported difficulty concentrating on the synchronous online class sessions. While a few students appreciated the daily routine the synchronous videoconferences offered, most were left disappointed and disillusioned with learning in the virtual environment.

Camera shy. In a videoconference, the role of the ever-present camera creates opportunities and perceived threats for students. Students reflected on its intrusive presence in their homes, dorm rooms, and lives. Christy discussed students' reluctance to turn on their cameras during videoconferences, sharing, "For the most part, they don't really want to get dressed up, or they don't want to look presentable...A lot of them get hung up on that, or they might be doing two things at one time." Student respondents offered numerous reasons they and their peers are apt to turn their cameras off. Zane claimed:

I feel like I concentrate better when my camera's off because I don't feel like everybody's looking at me...It's just something that you're thinking about, too, during a Zoom call...I feel like I have to be extra cautious about how I move. When I think about it, it seems like being too anxious about it because, in reality, nobody is looking at anybody out there watching the picture, but it's still something that in the moment, you're thinking about and being hypersensitive to when you're on a Zoom call.

Leslie pointed out that students turn off their cameras when they tune into the videoconferences, "so they can get their participation points or their attendance points and go about their day." Zane agreed, arguing:

Honestly, I feel like a lot of students are, at this point in the year, especially, burned out, and the teachers will give them a grade for being there on them [Zoom sessions], and honestly, they might still be in bed at that point, or they might be taking a nap, and then they turn on their computer and turn the camera off just so they get their grade for that...They may not like the class, so they don't really want to be seen or engage...They're burned out and don't really want to be seen.

Leah asserted, “If the professor says you don’t have to have your camera on, 90 percent of the students will not have their camera on. So, that way it looks like they’re in class, and that it makes me feel really awkward trying to have mine on when nobody else is on.” However, when the professor requires it, she said, “It keeps me on track and on focus, and it forces me to sit down and actually pay attention and stop getting so distracted.” Rene also maintained most students want their camera off. “I would want my camera off,” she said. “If it’s a big class, just because where I sometimes don’t pay attention, and I don’t want them to see me looking around or not paying attention.” When her camera is on, she relayed, “I’m always constantly looking and making sure I don’t have something wrong, like if my shirt’s not fixed or hair or whatever... You can see yourself in your little camera, so you’re constantly looking at not only the other people...but I always look at myself and just make sure that nothing’s out of place or looks weird.” Kayla agreed, noting, “I’m always paying attention to myself and how I look and how I present myself. You see all of the funny videos of people on Zoom, and they are doing something wrong, or they’re asleep, or they get up, and they don’t have pants on, and stuff like that. That is what terrifies me.”

Stacy complained, “Most people don’t even have their cameras on. Most people are probably asleep because nobody’s ever participating.” Leslie shared, “Sometimes, I turn it off if I’m just listening to a lecture, but if it requires talking to people, I’ll turn the camera on. I do that because a lot of people keep their cameras off, and I want to encourage them to theirs on because these are people I don’t really get to see and talk to, so I’m just like, turn your camera on, guys. Come on.”

On the other hand, Christy said:

I like to have my camera on because I do want my professor, who I'm talking to, to know that I'm engaged and that I'm paying attention. In most of my classes, there's been more people have their camera off than on, and when the professor was to call on them, it takes them more time to respond because they might be doing something else at the time. But my preference is to have the camera on, and I have had professors require you to have the camera on, so they know that you're listening and that you're engaged.

Wes confided he keeps his camera on because he encourages other students to do likewise. "So, I don't want to be a hypocrite. I always try to get my camera on," he said. But, he acknowledged, "I talked to people, of course, and they're like, 'I just don't like having my camera on because I don't like looking at myself and seeing myself next to people because I feel people looking at me.'" But he responded to that by saying, "Most of the time, they're not looking at you. They're trying to figure out what they're doing because they're looking at themselves, too."

Chad observed, "I feel like I'm the only person with my camera on, but it is awkward." Leah shared that when professors require her to have her camera on, "It makes me feel like I'm being held accountable for being in class just the same way as me sitting in class."

Melissa said her professors required students to keep their cameras on, "so you can see everybody," but some students kept their cameras off, and she reasoned, "Maybe they haven't fixed their hair or whatever that day, or maybe they just don't want anybody to see whatever room they're in or where they are." Kayla offered, "They might be in their pajamas, or they might not want someone seeing their surroundings, like their bedroom or their house, or maybe they're driving, and they can't."

Stacy argued that it's hard to open your private space to others. "Most people have it [camera] off. I feel like this is because when you're in your house or in your dorm, that's your private space, and I feel like people just aren't comfortable with showing that part of their lives to everyone in the class." Leah added, "Most Zoom calls take place in a person's home like they're in bed or they're in their dorm. And if they're in their dorm, they have to deal with their roommates. They have to deal with the noise." Erica offered, "During lectures, where we're in dorms or homes, it can be hard because there's so many other people running around and other stuff going on in the background. They usually keep their video and audio off."

Chad offered some students may not like being recorded. He explained, "People just aren't comfortable with being on camera, honestly, especially when they see that little recording light that's on for people to post the lecture afterwards. People get scared...maybe it's social anxiety."

The majority of students participate in videoconference classes with their cameras turned off, and the student respondents provided numerous reasons for their camera shyness. Many acknowledged students don't want to take the time to get ready for a videoconference session as they would for an in-person class. Students shared being on camera often increased their anxiety due to the awareness that others were watching them, and they also admitted they self-monitor themselves on the self-feedback screen. Other students may be multi-tasking during the class sessions, completing other tasks, driving, or even sleeping. The camera opens students' private environment, whether that be at home or in a dorm, to others, and they may not be comfortable sharing their private lives with their peers on screen, especially if it is recorded. The camera, an intrusive component of videoconferencing, becomes a site of contention for student participants in videoconference classes.

Glitches. Videoconferencing technology is dependent upon access to both suitable devices and internet connections. Students expressed numerous concerns and complaints about access to adequate internet connections. Erica remarked, “It’s hard if there’s any connection issues.” Surprisingly, these feelings were universal whether students lived on or off campus. For example, Zane explained the issue:

The Wi-Fi on campus is really spotty sometimes, and the dorms, especially when there’s a lot of people who are on them at the same time, it’s hard to hear that information and be able to get it down accurately because even if you hear three-fourths of a sentence, and three or four words out of it, that could be a huge impact on how you understand the content that they’re teaching, and how well you perform on further assignments and tests.

Leslie, a commuter, also reported connection problems, sharing, “I have internet issues, and I’m always running to my grandparents’ house, going down the road to a place I can get service. I’ve sat in my car and done some classes before. In that aspect, I’m not comfortable because I don’t always have the resource.” Rene also observed:

A lot of times, there can be technical difficulties... We don’t have great Wi-Fi or internet services in a lot of places. When we had to go for that lockdown...I know a lot of kids struggled with that. They’d have to go somewhere else and find Wi-Fi because they couldn’t do it in the house...And that can be hard. And I guess it’s easier when you’re at the university, but if you’re a commuter, I’d say a lot struggle with it in our area.

Kayla described how students face additional challenges when they attempt to collaborate on Zoom for class projects. “Zoom has a timer if you don’t have premium,” she explained. “There’s a 40-minute timer. One time, I was working on a lab, and it took us six sessions. We had to do six separate Zoom calls, 40 minutes a piece for it.”

Struggles with technology and its requirements to function properly are a major concern for students. The student respondents recognized that trouble with access to adequate devices or issues with intermittent internet can negatively affect the ability to participate in videoconferences. These technological challenges need addressed, according to the student respondents.

Zooming in on student fatigue. Students are tired, and they shared how videoconferences contribute to their overall sense of burnout as they discussed how and why they experience Zoom fatigue. “You’re exhausted for about an hour,” Chad said. He claimed it was due to the digital interactions and what he described as “digital anxiety.” He elaborated, “I feel like it requires more energy because you’re thinking about all of these other things, especially if your camera’s on. You’re like, what’s going on around me? Is there background noise? What factors are playing into this interaction?” Zane expressed, “Honestly, sometimes, I feel like it drains more from me than doing something in person.” He blamed the fatigue on “looking at the screen a lot,” and detailed:

I know recently with Apple products, they do the screen time studies and how often you’re on your phone, and a lot of studies show the more often you’re on your screen and exposed to LEDs on screen, your brain activity increases a lot, and it drains more out of you than being face to face. So, I think that has a lot to do with it, and it just drains me a lot because I feel like even though you might be in your room...it’s a lot to keep up with, especially if there’s a lot of people on Zoom and trying to hear everybody’s questions. And if you’re on a big Zoom call, and some people don’t mute their microphones, that’s just added stress onto where you’re trying to listen as well.

Leah also described the fatigue:

It feels like a strain because at some point, I am trying to look at my computer screen to see the PowerPoint that's going on or see the screen-sharing that my professors are doing and staring at a screen for an hour to an hour and a half, it can make you, especially your eyes, really tired. I guess it's the overworking of your brain to focus on multiple things at once from your screen, to what's going on around you, to what your professor is saying, and I do feel exhausted afterwards...It takes double the time and double the energy to focus on what's going on in lecture.

Kayla shared:

My roommates and I are all the same major. Three of us are in the same class, so normally the way it goes is I'm sitting in the living room with my headphones in listening to Zoom. And then my other friend, my one roommate, is sitting in the living room listening to it, and the other one's in her room listening to it. Once we get done, we all just take our headphones out, and we reconvene, and we're all like, oh my gosh, that was so tiring.

She attributed the tired feelings from staring at the screen and poor posture. Although she uses blue-light glasses during the sessions, she said, "The screen still gives me a headache."

Zane attributed part of his fatigue to message overload, saying, "It's a struggle to keep up with and take notes and then look at the screen and keep listening, and a lot of times, it's like sensory overload on a Zoom call." Christy disclosed she felt "overwhelmed. Because I feel like I'm trying to take notes and trying to engage, so I try to answer questions, but then I forget. My train of thought is just everywhere. So, it's overwhelming." She added, "I don't know if it's the strain on my eyes or the exhaustion from multi-tasking. I have to listen. I'm writing down. I'm also trying to engage." Stacy also considered the many stimuli she must attend to during the

video call, describing, “I’m afraid they’re looking at me, so I have to sit up and pay attention and read the PowerPoint or whatever the professor has on the screen. I have to pay attention to that, and it can be straining, like makes your head hurt by the end of it.”

Erica blamed her fatigue on multi-tasking. She observed:

I feel like we’re all locked in our dorms or at home. We’re usually doing other stuff while we’re on the Zoom, carrying our laptops or phone around. So, we’re doing other stuff and trying to focus on the Zoom at the same time. And plus, we’re not as deeply involved in-person and surrounded by that. So, you don’t feel woken up and involved. That can make you feel tired, too.

Wes described his fatigue, saying, “Sometimes, you’re just drained.” He attributed his fatigue to the type of Zoom call, and calls that emphasize one-way communication are more tiring. “OK, there is a Zoom vibe,” he explained. “If it was a dead Zoom call, where the professor talked with no interaction between students and professor,” then that is more tiring. He further elaborated, “If anybody has questions, nobody’s asking them. Basically, you just sit there. It’s something you could have watched on YouTube.”

Stacy also pinpointed one-way communication in lectures as contributing to fatigue, detailing:

When I’ll be in a Zoom like that, and you’re just sitting there listening to someone lecture, and there’s no class participation, so there’s no other voices to listen to, and there’s no change in the conversation that this professor is having, it’s boring because most in-person lectures, there’s always feedback from the students when the professor says something, people have questions or raise their hand, get an answer right away. That

leads to different conversations and different points of the lecture. But when it's just the professor speaking and no participation no feedback from anyone else, it's hard.

Kayla described being "anxious and tense. My anxiety after a Zoom call with a bunch of people. I can feel myself just go back and relax." Rene also said she feels tense during Zoom sessions, and when they're over, "I'm always relieved. I can relax." Several students disclosed after a Zoom lecture, they are so tired they sleep afterwards. Leslie remarked, "It's sitting on the couch and looking at a screen for an hour. It's not exactly invigorating. So, you just want to take a nap afterwards." Stacy admitted, "Usually, when it's over, I end it, and then go back to bed." Kayla added, "I have a headache, and my brain needs a break while I lay in bed for an hour." Christy offered, "I automatically want to take a nap."

For Melissa, the fatigue is associated with the formal atmosphere of videoconferences, describing:

You have to present yourself in a professional way, and it's like being on all the time, all day. You don't have a moment to come sit back and take a little bit of a break. At least, there are days where I haven't had the chance to take a break. And when you're concerned about your appearance, especially on a meeting, or how you present yourself, and you want to make sure that you're professional, and you adhere to Zoom etiquette, there's just a little pressure, and then when it's over, you're just exhausted because you've been 'on' all day.

She further detailed the feeling of "being on," by saying, "It's like you can't relax. You're always making sure that you're trying to set up straight, that your expressions are professional. It's just like everybody's watching you...and you can't relax."

Christy also commented on the role of posture and inadequate furniture for her fatigue, saying:

For me, I like to be in an area where I have lots of room. I don't want to do it from my bed or somewhere because I write down my notes, and I have my iPad, so I need a stable area. So, most of the time, I do it from the kitchen table. So then, I'm sitting her all day at my chair, so that makes me physically exhausted and then a little achy. By the time I'm done with classes, I want to sit in a comfy chair."

Zoom fatigue is attributed to several factors, according to the student respondents. They feel "drained" by the structure of the videoconference. Several discussed the anxiety of being on camera, the difficulty in multi-tasking, and the boring nature of lectures. Citing eye strain, back aches, and mental exhaustion, the videoconferences leave the students feeling "overwhelmed."

Back to the future 2. Students recognized their videoconferencing experiences in the past year have prepared them for a future in which, more than likely, the communication technology will figure prominently. Chad remarked, "A lot of working remotely and learning remotely are going to become popular in the near future because we've seen that we can do it." Rene conveyed, "I think that it's going to have a larger role in society." But, she is confident she has the skills now "to adapt to it." Kayla sees videoconferencing continuing to play a large role in education and medicine. "I've embraced it," she said. "It's just the new normal for me." Erica added she thinks videoconferencing will help make education and some careers easier. She predicts videoconferencing will be a part of graduate school. Leslie also believes videoconferencing will play a significant role, but she is "not excited because I value in-person experiences." Wes reflected, "I think some people may have realized, we're saving a lot more time to get this thing done virtually, and we're saving space. So, we can just keep doing it like

this.” Melissa responded, “There’ve been a lot of times we’ve done the meetings for this or that, or we’ve done a Zoom lecture, and after it’s over, I found myself thinking, ‘Man, why didn’t we do this before?’ So, I think this will change the future because this is an easier format for a lot of settings.” Zane remarked, “I think it’ll be pretty common in the future, a lot more common than it was pre-pandemic.” He cited doctors’ appointments, job interviews, and meetings as ways in which videoconferencing will continue to be utilized.

Videoconferencing offers the ability to remotely communicate with visual and audio channels, simulating face-to-face interactions. During 2020, the use of videoconferencing in higher education became normalized, and student respondents recognized the technological tool’s utility will only enhance its use for education, medicine, and the workplace. While they appreciate its value, they also understand its limitations. Their experiences in the past year have prepared them to Zoom into the future.

Summary of student interviews. Student respondents expressed conflicting views about the use of videoconferencing in their classes. While they acknowledged the positive attributes of videoconferencing with their professors and classmates, which included real-time interaction and a stabilized schedule, in practice, the structure of the live sessions resulted in stifled, inhibited communication with professors and peers. The videoconference structure created an environment that discouraged direct feedback because students felt if they turned on their audio or video that they were breaking conversational norms by interrupting the instructor. Even if they attempted to ask or answer questions, in large classes, their professors may not notice their active hand waving or the handwaving function, leaving them feeling even more muted. Further, they considered if they unmuted their audio to ask questions, other students would be inconvenienced by having to stay on the videoconference longer than necessary. In some cases, professors

required students' video and audio to be turned off, so the instructors' demonstrations would not be diverted to a student's screen, so students felt physically hidden and silenced. In turn, the videoconference sessions became an "obligation" that students described they endured from their homes or dorm rooms as they attempted to concentrate while they dodged the everyday noises and interruptions around them and at the same time tried to ensure they maintained adequate Wi-Fi to participate in the session. Frustrated with live sessions that were primarily monotonous lectures of one-way communication, many students logged onto the sessions but quickly turned off their video and audio, while they simultaneously completed other tasks. Other students attempted to participate with their cameras on, but they felt on display and anxious about what other students thought of them as they struggled to listen, take notes, and understand content in a new, virtual learning environment that not only discouraged direct communication with the instructor but prevented much direct communication with their peers. By the end of synchronous videoconference class sessions, students were left exhausted. They credited their feelings of tiredness to a number of factors, including their screen time, feeling tense, message overload, and anxiety. Although they recognized the communication tool's shortcomings, most of the students reported they have adapted to the videoconference environment and are prepared for the medium to continue to play a significant role in their lives. The emergent themes from the student interviews are presented in Table 6.

Table 6

Explanation of Themes from Student Interviews

Theme	Explanation
Muted	Students feel discouraged from asking questions and interacting on VC. They don't

Zoomed out	want to interrupt instructor or overlap with peers. Students feel dissatisfied with VC class sessions. They label them as an obligation and pointless.
Camera Shy	Students prefer to participate in VC classes with their cameras off for multiple reasons. They are anxious about what peers will think. They are multi-tasking while in class, and they are concerned about the distractions in their backgrounds.
Glitches	Students are concerned about using VC because internet connections are intermittent.
Zooming in on student fatigue	Students reported they experience Zoom fatigue for a number of reasons, including screen time, message overload, and anxiety.
Back to the future 2	Students anticipate using VC in future for education, healthcare, and careers.

Analysis

The case study's analysis was triangulated through the use of multiple sources that included document analysis, a faculty survey, a student survey, faculty interviews, and student interviews. An interpretive, reflexive process was used to address the research questions, which were:

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?

RQ3: How does mediated communication through videoconferencing affect college students as they learn online?

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?

Videoconferencing Experiences in Higher Education

Overall findings for RQ1 and RQ3 include a complex picture of how videoconferencing is experienced by faculty members and students as they participate in online teaching and learning. Faculty and students both praised and criticized the use of videoconferencing in the college classroom. While they recognized the medium's ability to bridge distances, offer flexible opportunities for education, and connect with others, their enthusiasm for the communication technology soon waned as videoconferencing's limitations surfaced. The result was a mediated communication environment that presented numerous challenges for both faculty and students to navigate. Although videoconferencing offers both video and audio, providing nonverbal and verbal communication channels, their mediated nature cause disruptions to natural communication patterns and flow, according to faculty and student participants.

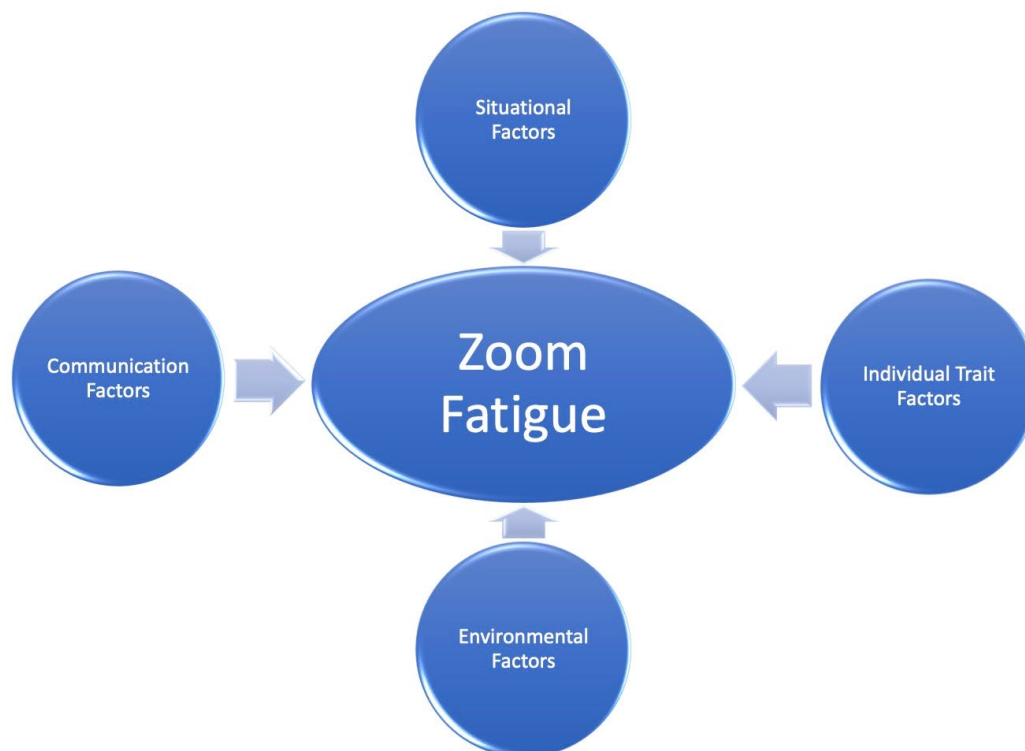
Frustration faced both faculty and students as they attempted to overcome videoconferencing's communication shortcomings. Faculty and student experiences with videoconferencing use during class sessions are seemingly juxtaposed. While faculty members are clearly disheartened by the lack of engagement during videoconferences with students and strive to pull students into the conversation, the videoconference structure inhibits students from interacting because they fear interrupting their instructors. The mediated environment with its capabilities for audio and video feeds to be turned on and off create an atmosphere that inherently discourages the lively discussion it promises, resulting in primarily one-way communication that leaves both faculty members and students wanting for more genuine, natural interactions. The feelings of frustration with the medium's communication limitations, the multiple sensory demands, and the anxiety of being on camera lead videoconference participants to feel exhausted.

Model of Zoom Fatigue

This sense of exhaustion was evident in the survey results and interview findings. The newly identified phenomenon of Zoom fatigue was reported by both faculty and students, and they recognized multiple factors cause it in response to RQ2 and RQ4. Further analysis and interpretation of the data leads to a proposed theoretical model of Zoom fatigue that includes four key dimensions that cause fatigue: situational factors, individual trait factors, environmental factors, and communication factors (see Figure 17). These factors are outlined in Table 7.

Figure 17

Model of Zoom Fatigue



Situational factors are defined as aspects related to the specific conditions of a videoconference,

such as the number of videoconferences scheduled a day, the size of the videoconference, the relationship among participants, the type of content shared in the videoconference, the level of participation (host or participant), and the amount of interaction during the videoconference. Individual trait factors include a participant's characteristics, which consist of personality type, anxiety level, motivation, self-awareness, and self-esteem. Environmental factors encompass those external elements, including background distractions, physical location, furniture, type of device, camera and microphone settings, and internet connectivity. Finally, communication factors emphasize the interaction components of verbal and nonverbal communication, which include conversation flow, lack of nonverbal cues, awkward silences, interruptions, overlapping, and feedback. The combination of these factors functions to impact the level of Zoom fatigue videoconferencing participants feel, according to survey and interview data.

Table 7

Factors of Zoom Fatigue

Situational	Individual Trait	Environmental	Communication
number	personality	background	gestures
size	anxiety level	physical location	facial expressions
relationships	self-awareness	furniture	eye contact
type of content	self-esteem	device accessibility	pauses
host or participant		camera setting	interruptions
amount of interaction		microphone setting	overlapping
		internet connectivity	feedback

Conclusion

This study examined the impact of videoconferences and Zoom fatigue on faculty and students in online courses. The use of synchronous learning in online course design is increasing, and this study found its implementation allows for benefits and challenges for both faculty and students. Zoom fatigue is a multi-dimensional problem that affects videoconferencing participants in meaningful ways worthy of further examination.

This chapter presented the findings from a single site case study. The case site and participants were described. Findings from document analysis, qualitative surveys, and in-depth, semi-structured interviews were detailed. Identified themes were offered. Analysis and interpretation of data led to a proposed model of Zoom fatigue. A discussion of the findings, their implications, along with the study's limitations and suggestions for future research are addressed in Chapter Five.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this qualitative, single-site case study was to examine how undergraduate faculty and students experience the use of videoconferencing in online courses and explore why these sessions cause Zoom fatigue. This research sought to better understand how mediated communication through videoconferencing affects the teaching and learning processes in higher education online courses. The use of videoconferencing increased exponentially during 2020 after a global pandemic abruptly shifted most college classes online. Throughout the year, university faculty and students used the communication technology in light of required social distancing measures. This study explored how the synchronous online instructional strategy affected teaching and learning for faculty and students. The pervasive use of videoconferencing in everyday lives quickly led to the identification of a new phenomenon, Zoom fatigue, which is defined as the exhaustion felt by videoconference participants. This research examined the causes of Zoom fatigue for faculty and students in a higher education context and advances a model for understanding the factors that contribute to this phenomenon. The findings of this study will better inform university faculty and administrators about how to best implement the use of videoconferencing on their campuses and in their courses to increase student engagement while achieving learning outcomes.

This chapter includes a summary of the study's findings and an in-depth discussion of those findings from empirical and theoretical perspectives. The practical and theoretical implications of the research are reviewed along with an analysis of the study's delimitations and limitations. A number of avenues for future research are recommended. Finally, a conclusion of the research is provided.

Summary of Findings

For this research study, a single-site case study methodology was utilized to explore the research questions at a liberal arts university in central Appalachia. The research design included document analysis, faculty survey, student survey, faculty in-depth interviews, and student in-depth interviews. Data collected from the documents, surveys, and interviews were coded using a reflective, interpretive technique and viewed through a communication theoretical lens.

Research Questions

The purpose of the research study is exploratory in nature, focused on understanding the effect of mediated communication through the use of videoconferencing tools, such as Zoom, on faculty and students in college courses. In particular, the study sought to academically examine a new phenomenon, recently labeled as Zoom fatigue in the popular press, and explore why this phenomenon is experienced by faculty and students who use videoconferences in their online courses. To gain a focused, yet deep, understanding of this research problem from multiple perspectives, a qualitative case study was deemed most appropriate (Yin, 2018) to address the following research questions:

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online?

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online?

RQ3: How does mediated communication through videoconferencing affect college students as they learn online?

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online?

The case study's data collection methods were triangulated through the use of multiple sources that included document analysis, a faculty survey, a student survey, faculty interviews, and student interviews. The case study cultivated a complex understanding of faculty and student perspectives through the analysis of 1,358 narrative comments on course evaluations, 35 faculty surveys, 67 student surveys, 10 in-depth faculty interviews, and 11 in-depth student interviews. The triangulation of multiple data collection methods and sources from the case study site enhanced the study's validity and reliability and provided a rich description of how videoconferencing is experienced by faculty members and students as they participate in online teaching and learning, enhancing the study's transferability. An understanding of the newly identified phenomenon of Zoom fatigue and its causes were carefully noted and a theoretical model of Zoom fatigue was proposed.

RQ1: How does mediated communication through videoconferencing affect college faculty members when they teach online? Videoconferencing played a significant role at the case study site with a majority of faculty members reporting they implemented live videoconference sessions in their courses during 2020 to simulate in-person learning. Videoconferences offered faculty an opportunity to provide students with remote yet synchronous communication through video and audio channels, providing nonverbal and verbal communication that closely resembled a face-to-face classroom. Faculty members explained they sought the use of the videoconferencing tools to engage students interactively when remote teaching was required. Unfortunately, the transition to synchronous, virtual classes through videoconferences was not seamless nor as engaging as instructors had hoped.

To begin, the communication technology presented several challenges, including technical problems, internet accessibility, and Wi-Fi connectivity issues. Some faculty members

experienced difficulties maintaining adequate connections for the videoconferences to run smoothly, and many students often had device or internet problems that were exacerbated by the case study's site in a rural region. Faculty members were often stressed about their own technological issues and worried about their students' ability to connect. These concerns were ever-present for faculty members as they used the communication tool to instruct their courses. To alleviate some of the bandwidth issues, prevent background distractions, and ensure students' video and audio feeds were not viewed as the primary screen during lectures, some faculty members required students to turn their audio and video off during videoconference class sessions, which created additional difficulties for engagement.

Even when not instructed to do so, many students chose to participate in the live videoconference sessions without their camera and audio activated. To maintain equity and not make students feel uncomfortable about sharing their private spaces with others, many faculty members did not mandate students be on camera during videoconference class sessions, leaving instructors often teaching to "a wall of black boxes," representing unseen, unknown students. Faculty members felt exasperated because they do not know if the students were paying attention, multi-tasking in their home or dorm rooms, or even sleeping. Although the faculty members chose to offer synchronous, videoconference class sessions to engage students and answer their questions in real-time, the structure and features of the videoconference created an atmosphere that was strikingly not engaging or interactive, and faculty members felt they were not reaching students with the necessary content. Several explained they felt "unfulfilled" and inadequate.

Overall, faculty members expressed it required increased effort to teach online through live videoconference sessions compared to teaching face to face. They explained it took longer to

adequately prepare for videoconference sessions, and they complained about the technical expertise needed to multi-task during the session, switching from video feeds to PowerPoint slides, watching the chat box, responding to student questions, monitoring email and Canvas messages for students who may have lost service, and in the midst of it all, attempting to impart content to students in an engaging manner. They shared the experience was sometimes overwhelming.

The videoconference environment produces further communication issues as well. Although the videoconferencing tool provides visual and audio channels, the communication process is complicated due to the mediated nature of the communication. There is a lack of many nonverbal communication cues and a violation of verbal communication norms. Silences, overlapping, and interruptions are some conversational conventions that are disrupted through the use of videoconferencing, leading to additional communication breakdowns and problems. Faculty often described conversation on videoconferences as “awkward” due to these issues.

Some faculty disclosed videoconferencing’s continuous self-feedback stream distracted them and increased their level of anxiety. This additional layer of the videoconference’s features caused some faculty members to feel uncomfortable. They explained they feel as if they have to be “on,” and that classes almost feel like a “show,” featuring them in the role of a “talking head,” reminiscent of television news broadcasts.

Faculty members were conflicted about teaching their courses from the private spaces of their homes, and they discussed the intersectionality of their identities. For some, they felt as if their public and private selves were merged, creating dissonance. They were uncomfortable being on the “front stage” in their “backstage,” and these feelings added to their overall level of stress.

One area of positivity for the faculty members as they taught in the videoconference sessions was the addition of the chat feature. The text-based, chat feature, which is active during videoconferences, allows participants to type comments or questions in a sidebar next to the video feeds. Many faculty members shared they believe this feature encouraged introverted, shy students to participate in classes more than they did in face-to-face class sessions. They wondered how they could incorporate a similar feature in a face-to-face class to enable quiet students the ability to have a greater voice.

Faculty members also found success using videoconferences for individual, small groups, or small classes. The size of videoconference sessions was deemed crucial for determining teaching effectiveness through videoconferencing. Smaller groups were more successful at achieving communication and learning outcomes.

RQ2: Why does videoconferencing fatigue occur when faculty members use videoconferencing tools to teach online? All faculty survey and interview respondents reported feeling Zoom fatigue to some degree after class videoconferencing sessions, and they described their feelings as both mental and physical fatigue. The faculty attributed their feelings of Zoom fatigue to multiple causes, including increased effort, anxiety, and physical reactions. They detailed the type of content covered during the session, the level of participation during the video call, and the number of videoconferencing sessions in which they participate during a day as contributing to Zoom fatigue. The anxiety of being on camera and performing for students added to some faculty members' feelings of exhaustion. Some faculty members felt despair because despite their best efforts, they worried they weren't reaching students in meaningful ways, and these feelings and worries increased their fatigue. Several faculty members were concerned the convenience and ease of videoconferencing have blurred the boundary lines between work and

home, meaning they never feel they aren't at work, so the constant pressure from a lack of separation between work and home added to their feelings of fatigue. For faculty members, Zoom fatigue is a multi-dimensional phenomenon.

RQ3: How does mediated communication through videoconferencing affect college students as they learn online? According to the qualitative comments on course evaluations and a student survey, students reacted favorably to the use of videoconferences in their courses. A systematic analysis of institutional documentation written by students demonstrated many positive responses to the use of Zoom in their online courses. They characterized faculty who used the Zoom platform as “caring,” “accessible,” and “available” to help them navigate the transition between in-person and online learning modalities. The student comments on the evaluations did not express any dissatisfaction about the use of videoconferencing tools for educational purposes. Nearly 90 percent of student survey respondents reported extensive experience with live videoconference class sessions during 2020, and their comments were primarily positive although some labeled the sessions as “boring.”

However, the student perspectives offered during the in-depth interviews described a markedly different experience. The interview respondents shared an experience seemingly in contradiction to the one presented by faculty members. While student respondents acknowledged videoconference class sessions were an attempt to bring “normalcy” to online courses through real-time communication and scheduled routines, they reported the reality of live videoconference class sessions were in stark contrast to in-person classroom interactions. Students noted difficulties with connecting to the internet which complicated participation in the videoconference sessions for their peers and themselves. The structure of the videoconference sessions created an environment that discouraged direct feedback and resulted in restricted

communication with professors and peers. The students cited communicating with their instructors was inherently difficult during videoconference class sessions, describing how many faculty members asked them to mute themselves during lecture to prevent distractions from random noises and interference. The act of unmuting themselves, asking a question, and re-muting themselves seemed like an impolite interruption, so the students said they did not feel comfortable asking questions during live class sessions. They also expressed concern that when they unmuted themselves to ask a question, they would talk over the instructor or another student. Between the fear of interrupting and overlapping, the students felt discouraged from any active participation during the videoconferences. Furthermore, if they did ask a question, the action of unmuting and re-muting was seen as such a hassle that it further deterred follow-up questions or back-and-forth dialog. Additionally, any type of interaction was also dissuaded due to the perception that other students would be kept on the videoconference longer than necessary, and they did not want to inconvenience anyone.

In large classes, the act of answering a question or getting the attention of the instructor was further confounded because the instructor could not view all the session's participants on one screen. Some students expressed difficulty in being recognized by instructors when they attempted to answer questions because they were never seen. They felt hidden and silenced in their classes. These feelings added to the students' views of a live videoconference session as an "obligation" and an unpleasant "task" that they endured to get class points. The primarily one-way communication during the videoconferences produced frustration among the students who felt hidden, muted, and distressed, leaving them with little energy or motivation to fully engage in their courses. They questioned the quality of the education they were receiving, noting crucial differences with how they previously communicated in their face-to-face courses. The students

felt the synchronous videoconference sessions were monotonous and boring and since their active participation was hindered due to the mediated environment's structure, many students logged onto the sessions without their video and audio activated, so they could simultaneously complete other tasks. The few students who attempted to participate with their cameras on reported they felt self-conscious about how their peers perceived them. They also shared the challenges of listening to the lecture, taking notes, and understanding the content in an unfulfilling videoconferencing environment that prevented much direct communication with their instructor and peers. Overall, the videoconference sessions were not satisfying to the students in terms of interaction, engagement, or value.

Students reported slightly more positive experiences with videoconference sessions in smaller classes. Smaller class sizes alleviated some of the communication problems and encouraged more students to participate with their cameras on. They also appreciated the use of videoconferences when they used them to collaborate with peers in small groups.

RQ4: Why do students experience videoconferencing fatigue when they use videoconferencing tools to learn online? The document analysis of the student evaluation comments did not mention a sense of tiredness caused by videoconferencing. However, a majority of the student survey participants reported feeling Zoom fatigue after class videoconferencing sessions, and they labelled their feelings as both mental and physical fatigue. Student survey respondents primarily ascribed their fatigue to increased screen time and boredom.

Student interview respondents described they felt “exhausted” by the end of synchronous videoconference class sessions. They attributed their feelings of tiredness to a number of factors, including screen time, message overload, and anxiety. The feelings of frustration with the

medium's communication limitations, the multiple sensory demands, and the anxiety of being on camera led videoconference participants to feel exhausted. Students discussed how increased screen time caused eye strain and headaches. The respondents said keeping up with all of the screens, the screen-shared notes from the instructors, videos, chat boxes, and notetaking created a strained environment in which they felt tense during the videoconference and tired afterwards. When they participated in videoconferences with their video feed on, they reported anxiety from constantly monitoring their appearance on the self-feedback video and worrying about how they looked to their peers. For students, videoconferences were stressful environments that caused them to feel tired and exhausted when they ended, and many shared they would sleep after a video call.

Themes

Through the coding and analysis process, many themes emerged from the in-depth interviews with faculty and students, with little overlap between the two groups. At times, the perspectives of the faculty and students seemed to be in apparent contradiction as their experiences with the mediated communication of videoconferences diverged greatly. Faculty members were dismayed by the lack of engagement during their videoconferences with students as they described how much they struggled to pull students into meaningful conversation. At the same time, the structure of the videoconference inherently discouraged students from actively participating in the discussion because they feared interrupting their instructors or overlapping their peers. The mediated environment, with its video and audio functions, produced an atmosphere that intrinsically hindered interaction, consequently causing communication that was primarily one-way, awkward, and dysfunctional. The result was dissatisfaction expressed by faculty members and students who desire more genuine, natural interactions. These feelings of

frustration with the videoconference's communication limitations, along with its multiple sensory demands, and the anxiety of being on camera led videoconference participants to feel fatigue after participating in the videoconference sessions. These perspectives and views were demonstrated in a number of identified themes during data analysis.

Themes from faculty surveys and interviews. A number of themes emerged from the qualitative comments on the faculty surveys and during the extensive faculty interviews. Ten themes emerged from the interpretive analysis of the faculty interviews: The next best thing, Talking heads and black boxes, Juggling act, Let's chat, When worlds collide, Size matters, Disconnected, State of anxiety, Zooming in on faculty fatigue, and Back to the future. The first theme discusses how faculty members selected videoconferencing as part of their online instructional methods because they expected videoconference communication to be "the next best thing" to face-to-face communication. Respondents pointed to the communication technology's ability to present media richness, offering verbal and nonverbal communication through video and audio feeds.

As respondents further shared their experiences, the mediated environment of videoconferences did not deliver the engaging, interactive online class dynamic which they had hoped to encourage. The videoconference classroom presented numerous challenges for faculty members as identified in the next theme, "Talking heads and black boxes." Faculty members described an uninviting online classroom environment that primarily featured one-way communication they described as "awkward" because so many students participated in synchronous online class sessions without their video and audio activated. When discussion happens through the videoconferencing tool, the communication process is disrupted due to a

lack of nonverbal communication cues and the violation of verbal conversational norms, adding to the awkwardness.

Using videoconferences to teach online demands a technical skill set, and faculty members expressed how much extra effort is required to meet the instructional strategies of teaching through Zoom in the theme, “Juggling act.” Faculty members described how they juggled switching screens, sharing content, answering questions, and monitoring the chat box, email, and Canvas inboxes. Their attention was divided, and they felt overwhelmed at times.

One part of the instructional strategies that faced faculty members in videoconference sessions was the use of a chat feature that is part of videoconferencing applications and discussed in the theme, “Let’s chat.” Faculty revealed an unintended benefit of teaching virtually through videoconferencing was the addition of this text-based, direct feedback channel, and they shared the chat box encouraged introverted and usually quiet students to ask more questions and communicate more than in face-to-face classrooms. Through the chat feature, faculty members felt they could reach this particular group of students in a new way, and they pondered how they can build on that success in an in-person classroom.

Faculty disclosed another dimension of teaching virtually and remotely through videoconferences is an intersection of their multiple identities, and this idea is explored in the theme, “When worlds collide.” Respondents shared they feel uncomfortable presenting a public self in their private spaces. They described how videoconferences require them to be “on” the front stage, as they are literally on camera, while they are participating in the backstage of their private or safe places. The collision of these two spaces in one creates dissonance and adds to their stress levels.

According to faculty respondents, “Size matters” in determining the effectiveness of live videoconference class sessions. This theme explains that more communication and interaction is facilitated in smaller videoconference sessions. Faculty discussed how individual and small group videoconferences result in more lively discussion with students, leading them to suggest that not all courses may be well suited for the videoconference environment.

The implementation of synchronous videoconference class sessions is dependent on access and connectivity. Faculty members expressed concerns about their ability and the capacity of their students to maintain the required high quality internet connections in the rural, remote areas of Appalachia. These concerns are addressed in the theme, “Disconnected.”

According to faculty participants, videoconferencing interacts with individual anxiety levels in different ways, and these are analyzed in the theme, “State of anxiety.” Videoconferences increased the anxiety levels of some respondents due to a number of stress factors, including multi-tasking, being on camera, and participating in home environments. However, high-anxiety participants who were feeling isolated, decreased their anxiety through the participating with others on videoconferences.

In the theme, “Zoomed in on faculty fatigue,” the newly identified phenomenon of Zoom fatigue is examined as faculty members attributed their feelings of tiredness to several factors. Anxiety and stress felt during videoconferences contributed to feelings of exhaustion afterwards. Faculty members cited the increased effort it takes to teach during a videoconference as affecting their fatigue. Also, the amount of participation during a videoconference and the number of videoconferencing sessions during a day contributed to Zoom fatigue. Additionally, some respondents described the stress of being “on,” and the pressure of performing a “show” for students led to feelings of tiredness after the sessions. Some faculty members felt distressed after

the videoconference sessions because they were frustrated in their ability to connect and interact with students, and these feelings added to their fatigue. These ideas informed the development of a model for Zoom fatigue.

Finally, faculty members contemplated how videoconferencing may impact the future of higher education in the theme, “Back to the future.” Faculty respondents are concerned the convenience and ease of videoconferencing have blurred the boundary lines between work and home, and they wonder if Pandora can be put back in the box. While they recognize videoconferencing offers increased flexibility and accessibility during times of severe weather and when they or students cannot attend class for personal or professional reasons, there is a concern that students will now expect all their classes to be recorded. If so, this would significantly increase faculty members’ workload and possibly erode the learning process. Faculty members are unsure if the experiences of the in-person, face-to-face classroom will return, or whether Zoom has forever changed the rules.

Themes from student evaluation comments, surveys, and interviews. Multiple sources of data from undergraduate students revealed various themes related to the use of videoconferencing in their courses and Zoom fatigue. A number of themes emerged from data collected from students. A systematic review of institutional documentation of the qualitative comments from students revealed three prominent themes: recorded videos, Zoom, and professor availability. Students identified these factors as central to their academic success. The students highlighted positive reactions to the use of recorded video lectures and Zoom and in their online courses. Faculty availability was also noted as a primary concern for students, and they described how faculty used communication technologies, such as Zoom and email, to demonstrate they cared about the students and their success. Sentiment analysis of student comments about the use

of videoconferencing in online courses revealed they were mostly positive, and Zoom fatigue was not mentioned in the student evaluation comments.

The themes from the institutional documentation informed the survey instrument and interview protocol, to understand them deeper. A reflective, interpretive analysis of 11 in-depth, semi-structured student interviews revealed six themes, including Muted, Zoomed out, Camera shy, Glitches, Zooming in on student fatigue, and Back to the future 2. Together, these themes provide a deeper understanding of how students experienced videoconferencing in their courses and why they felt Zoom fatigue after participating in videoconference sessions.

The first theme, “Muted,” describes how students felt as they participated in synchronous videoconference class sessions. Student respondents reported the structure of the videoconference significantly restricted communication with their instructors and classmates, essentially leaving them muted. The videoconferencing’s mediated environment discouraged students from giving direct feedback to instructors and severely hindered their ability to interact with peers during class sessions. To facilitate instructors’ lectures, students often turned off their video and audio, leaving them appearing as muted black boxes. Even when they had their cameras on, students felt uncomfortable turning on their audio to ask questions because they perceived the act as an impolite interruption. The greater potential for overlapping also dissuaded students from attempting to ask questions. In large classes, students further felt muted and hidden because instructors can only view a set number of student video feeds at one time. All of these factors left students feeling silenced, unseen, and undervalued in their own educational experiences.

As students began to understand the awkward, unfulfilling reality of videoconference classes, they started questioning their value. Student respondents described the Zoom sessions as

an “obligation,” and they labelled them as “pointless,” leaving them unsure of the quality of education mediated through the videoconferences. The theme, “Zoomed out,” considers these frustrations as students struggled to balance the demands of online learning in a videoconferencing mediated atmosphere that left them disappointed and disillusioned.

The theme, “Camera shy,” considers how the camera setting symbolizes a predicament for students to address while they participate in videoconferences. Student respondents disclosed some instructors required student cameras to be turned off, so that the instructor’s camera would be the focus during lectures and demonstrations. Other instructors allowed students to choose how to participate. In large classes, respondents shared they felt their participation was unwelcome and discouraged because the synchronous online sessions were primarily “boring” and “monotonous” lectures that featured one-way communication. Most students kept their cameras off during these kind of class sessions. Others claimed they tried to keep their cameras on, but they inevitably felt uncomfortable and on display. Student respondents were conflicted about whether their camera should be on or off during class sessions, and many factors figured into their decisions about camera use.

A primary concern of students was the ability to even turn on, connect, and participate in videoconference classes because many detailed problems with adequate internet to do so. The theme, “Glitches,” describes their technological issues. Students who were supposed to be able to participate in synchronous videoconferencing from the comforts of their homes were often rushing to their cars to go to relatives’ homes or fast-food restaurants to find the required bandwidth. Other students lacked devices other than smartphones from which they attempted to complete their coursework and learn.

“Zooming in on student fatigue” addresses why student respondents explained they felt tired after videoconference class sessions. Similar to the faculty members, the students explained a variety of factors contributed to their feelings of exhaustion after videoconferencing and why many of them just wanted to nap afterward. Zoom class sessions left them often feeling “overwhelmed,” and fatigue closely followed. They cited increased screen time, message overload, and anxiety for causing their Zoom fatigue.

In the theme, “Back to the future 2,” student respondents reflected on the impact that videoconferencing will have on their education and careers. Students acknowledged that the pandemic accelerated the use of videoconferencing and normalized it for many situations. Therefore, they believe it will continue to be a predominant method of communication after the pandemic and into the future. While the student respondents realized the communication tool’s limitations, most of them claim they have adapted to the unique challenges offered by the mediated videoconferencing environment, and they feel prepared to continue to use it in the future.

Zoom Fatigue

Data from the faculty and student surveys and interviews were analyzed to develop a working framework for explaining why videoconference participants experience Zoom fatigue. This multi-dimensional phenomenon associated with videoconferencing can be described through four primary factors that include: situational factors, individual trait factors, environmental factors, and communication factors. Situational factors are identified as elements of the videoconference, such as the number of videoconferences scheduled a day, the size of the videoconference, the relationship among participants, the type of content shared in the videoconference, the level of participation, and the amount of interaction during the

videoconference. Individual trait factors include personality type, anxiety level, and self-esteem, while environmental factors are identified as background distractions, location, furniture, and internet connectivity. Communication factors include the lack of nonverbal cues on videoconferences and the violations of verbal expectations. Together, these four factors influence an individual's level of Zoom fatigue and are represented in a proposed model of Zoom fatigue.

Discussion

Since much of the research about the use of videoconferencing in higher education focused on older, site-to-site videoconferencing technology and was conducted from a quantitative approach, this study addressed a gap in the historical literature and considered the effects of web-based videoconferencing in college classrooms from a qualitative perspective. Limited research studies include a faculty perspective (Adams, 2019) as the literature tends to focus on student outcomes. Although Bailenson (2021) and Lee (2020) discussed observations about the phenomenon in general, no research studies have explored the recently identified phenomenon of Zoom fatigue or have considered it in a higher education context. This qualitative case study was exploratory, seeking to emphasize faculty and student experiences with web-based videoconferencing and investigating causes of videoconferencing fatigue. The empirical evidence in this study contributes to mediated communication, higher education, and distance education scholarship. Findings confirmed some previous research while advancing new areas of research needing further study. These results will be discussed in terms of existing empirical research and within the framework of media richness theory, expectancy violations theory, and self-presentation theory.

Empirical

Despite being viewed as a close substitute for face-to-face communication, past research studies demonstrated communication through videoconferences violates users' expectations of nonverbal cues and conversational patterns (Ferran & Watts, 2008; O'Connaill et al., 1993; Storck & Sproull, 1995). This study confirms these assertions and extends their analysis further. The research agrees with previous literature that found students have more negative attitudes toward synchronous online learning than face-to-face classroom instruction (Bell & Federman, 2013; Bernard et al., 2014; Clayton et al., 2010; Cole, 2016; Koenig, 2010). Both faculty and student respondents expressed a clear preference for in-person classes, followed by asynchronous online courses, and then, synchronous online classes. In part, this is because videoconference instruction is more teacher-centered and less interactive than other instructional methods (Al-Samarraie, 2019), a fact that was also supported by the current research. Student respondents repeatedly discussed the "boring," "monotonous," and "pointless" lectures on videoconferences, and they explained they felt muted and silenced because the structure of the videoconference discouraged direct feedback.

Further, the findings support previous research that found communication through videoconferencing violates several conversational norms, such as turn-taking and nonverbal cues (Ferran & Watts, 2008; Storck & Sproull, 1995), and expands those violations to include interrupting. Student respondents explained they restricted their direct feedback during videoconferences due to a fear of interrupting their professors or talking over their peers. Instead, they kept their microphone on mute and remained a passive participant. Current findings also support the research by Schroenenberg et al. (2014) who found that even small transmission lags in videoconferencing make it difficult to communicate verbally and nonverbally. Faculty

members, especially, noted problems in communicating due to lack of nonverbal cues, describing they felt restricted while teaching on videoconferencing because the camera did not allow them to use the gestures, eye contact, and movement they were accustomed to using while leading class sessions. Popular press articles cited prolonged eye gaze and an emphasis on facial cues as contributing to feelings of Zoom fatigue (Beck, 2020; Sander & Bauman, 2020; Tufvesson, 2020), but the current research did not find any evidence to support these assertions. In opposition, the few faculty members who mentioned eye contact and facial expressions discussed their desire for increased eye contact and facial cues, and they explained they attempted to communicate these features by using additional lighting during their videoconference class sessions.

Faculty members frequently discussed several challenges they faced in implementing videoconferencing in their courses. The current study is, therefore, consistent with existing literature about the requirements necessary to include videoconferences in a pedagogically sound manner. Notably, past studies have found the process requires significant time on the part of faculty as well as institutional support through training (Andrews et al., 2008; Fitzgibbon, 2003; Hudson et al. 2012; Knapp, 2018; Liu & Alexander, 2017; Martin, 2005), and this aligned with faculty respondents in the current study who advocated for more training and discussed at length that teaching on videoconferencing takes more time and effort than teaching face-to-face. Existing literature also recommended the effective implementation of videoconferencing as a tool to deliver content requires instructors to be innovative and creative in their course design (Basaran & Yalman, 2020; Martin, 2005), including the use of break-out groups, virtual poster sessions, show-and-tell, whole group discussions, polling features, chat, virtual hand raising, and small group meetings (Bensching, 2020; Hudson et al., 2012; Knapp, 2018), and the current

study confirms these recommendations as both faculty and students observed smaller groups, breakout rooms, and chat contribute to videoconference effectiveness. In agreement with other research (Andrews et al., 2008), the current study found long lectures do not transition well to videoconferencing. Student respondents complained the primarily one-way communication is “boring” and “monotonous,” which contributed to their fatigue levels. Results from the student survey support the work of Kobayashi (2017) who found students preferred recorded video lectures with slides and audio to videoconference lectures.

One of the notable differences in the findings of this study compared to previous literature (Bensching, 2020; Francescucci & Rohani, 2019; Skylar, 2009) is that students did not report their sense of connection increased in synchronous online learning compared to asynchronous online environments. Past research found the use of videoconferencing increased engagement and a sense of community among class members (Al-Samarraie, 2019; Scagnoli et al., 2019; Soffer & Nachmias, 2018; Themelis & Sime, 2020; Watts et al., 2016), but this effect was not supported by the current study’s findings. Student respondents described a vastly different experience in which they felt disconnected from their peers and unable to interact. Furthermore, the frustrations felt by the student respondents in the current research do not align with research that found students in online courses reported they communicated better with instructors than students in face-to-face courses (Soffer & Nachmias, 2018). In contrast to existing literature, student respondents described an environment that discouraged interaction, connection, and direct communication, emphasizing difficulty in getting instructors’ attention during synchronous videoconference class sessions and problems asking and answering questions. The videoconference structure deterred them from interacting with instructors, and they complained waiting for email responses was time-consuming.

Historically, the literature primarily focused on remote learners who chose to study online and at a distance, whereas the current study concentrated on learners who were forced into online learning due to social distancing measures, so their units of comparison are different. Participants in some previous studies (Gillies, 2008; Themelis & Sime, 2020) compared their experience with synchronous online learning to asynchronous online learning and determined the synchronous online environment through videoconferences created more community. Compared to asynchronous courses, synchronous videoconferences added communication channels and permitted students to see and hear their instructors and peers in ways they could not do asynchronously. However, in the current study, participants compared the synchronous online instruction to face-to-face instruction, and in comparison, synchronous videoconferences are less media rich, thus providing less opportunity for community building. These results are comparable to the findings of other studies (Doggett, 2008; Francescucci & Rohani, 2019; Umphrey et al., 2008) in which students compared face-to-face instruction to online synchronous instruction and found the videoconferences decreased presence, interaction, and communication. The expectations and perceptions of the current study's student participants align with research that compares synchronous online instruction to face-to-face instruction.

While students reported videoconference class sessions did not build community and connection, the documentation from spring 2020 revealed students appreciated faculty members' efforts to communicate with them through email, recorded videos, and Zoom. They used words, such as "caring" and "compassion" to describe these efforts, which included Zoom office hours and class sessions. This finding supports past research that determined media selection sends a meta-message to others with media-rich channels conveying a closer relationship between supervisors and subordinates (Kingsley Westerman et al., 2018).

The current research extends distance education scholarship to consider whether synchronous videoconferences as an instructional delivery method interacts with student motivation. While Clayton et al. (2010) found that students' achievement goals, self-efficacy, and learning strategies were related to their motivation and instructional delivery preferences, synchronous online instruction was not included in the analysis. In other studies (Altiner, 2015; Umphrey et al., 2008), students rated synchronous videoconference courses lower than face-to-face courses in terms of instructor presence, communication, and interaction. Students in the current study reported low levels of motivation when courses were delivered through synchronous videoconferencing. Extending its influence on understanding student motivation, the study confirms research (Lafave, 2016) that found student motivation was connected to positive instructor behaviors, such as, interaction, immediacy, and social presence. In this study, students reported low motivation in videoconference class sessions and also described low interaction, immediacy, and social presence with instructors, supporting the work of Peterson (2019) who found the use of videoconferencing did not increase student satisfaction nor decrease transactional distance.

College students prefer the autonomy to select which communication technology tools to use in their courses (Abdelmalak, 2015; Jang, 2015; Gutierrez-Porlan et al., 2018; Ledbetter & Finn, 2018; Palmer et al., 2014; Volvanta & Avraamidou, 2018), as this study confirms. For instance, student respondents reported they preferred recorded video lectures to live videoconference lectures that are not interactive (Kobayashi, 2017). They also disliked when instructors forced them to participate in videoconference class sessions with their cameras activated. Consistent with the historical literature, college students prefer autonomy about the use of technology and online in their courses (Abdelmalak, 2015; Jang, 2015; Gutierrez-Porlan et al.,

2018; Ledbetter & Finn, 2018; Palmer et al., 2014; Volvanta & Avraamidou, 2018), and that extends to the use of videoconferencing. Student respondents expressed they prefer the live class sessions be optional.

The concept of space and the impact of the physical learning environment were concerns for both faculty and students. Respondents in this study reported they sometimes felt uncomfortable using videoconferencing to communicate from their private spaces, which agrees with past research (Ferran & Watts, 2008). As students participated in these synchronous sessions from their homes and dorms and instructors taught from their homes, there was a clear merging of private and professional spaces. Chromey et al. (2016) found students view some communication channels as educational and professional while other communication channels are perceived as social and personal. The current study extends that analysis to include videoconferencing platforms and the faculty perspective. Faculty and students discussed how blurring these lines created problems for them while on the videoconferences as their families, roommates, and pets created distractions and interferences. The situation also increased their anxiety, stress level, and contributed to feelings of fatigue afterward. Faculty and students expressed they prefer to participate in learning activities separate from their private or safe spaces.

Adding to their stress and fatigue levels, faculty members and students expressed they experienced anxiety due to a hyper-awareness of the self through the camera's continuous feedback video, confirming existing videoconferencing research (deVasconcelos Filho et al., 2009; Dewal, 2016; Ferran & Watts, 2008) that found this feedback increases self-consciousness, self-awareness, and may affect self-esteem. Respondents in the current study disclosed the self-presentation feedback made them feel anxious and distracted as they focused more on

themselves than the content of the videoconference. They described constantly self-monitoring behaviors, checking their hair, clothes, background, and expressions.

Finally, the current study extends existing videoconferencing scholarship to consider the factors that cause Zoom fatigue, a recent phenomenon (Bailenson, 2021; Lee, 2020). Faculty and students presented numerous reasons for their sense of tiredness after videoconferences, describing Zoom fatigue as a multidimensional concept. The research confirms part of Bailenson's (2021) arguments, concerning self-evaluation, reduced mobility, and cognitive load, but it contradicts part of the author's assertions about eye gaze. While faculty linked the exhaustion felt on videoconferences to increased effort, anxiety, stress from multitasking, and a sense of performing, students connected their tiredness to increased screen time, message overload, boredom, and anxiety. The differences in reasons faculty and students experience Zoom fatigue indicate that the factors may be dependent upon whether the videoconference user is a host or participant. The participant's role in the videoconference seems to affect the level of fatigue and contributes to its causes.

Theoretical

From a theoretical perspective, findings from this single-site case study can be understood through media richness theory (Daft & Lengel, 1986), expectancy violations theory (Burgoon & Hale, 1988), and self-presentation theory (Goffman, 1959). Additionally, other theories, such as diffusion of innovations (Rogers, 2003), media naturalness (Kock, 2005), muted group (Ardener, 1975), and politeness theory (Brown & Levinson, 1987) illuminate aspects of the findings. Together, these theories can provide a way to analyze the study's emerging themes.

Media Richness Theory. Faculty members' media selection in their courses can be viewed through the theory of media richness (Daft & Lengel, 1986), which maintains media can

be ranked according to the richness conveyed with face-to-face seen as the richest. Media are evaluated according to the following factors: timeliness of feedback, message personalization, language variety, and the number of communication cues and channels (Daft & Lengel, 1986). As the theory predicts, faculty members reported they evaluated videoconferencing as the closest to in-person classes, and this was reflected in the theme, “The next best thing.” A survey participant described, “Without Zoom, there would be no face-to-face contact with students. It’s an excellent tool for extending personal presence in an online course.” A faculty member shared during the interviews, “I was trying to recreate that in-person experience.” Students agreed with faculty perspectives, with one survey respondent explaining, “It [Zoom] best resembles an in-person class.” Media richness theory provides a framework to understand faculty members’ selection of videoconferencing for online courses as the communication technology offers the potential for immediate feedback, message personalization through the chat function, the opportunity for language variety, and visual and oral communication channels. Based on the theory and videoconferencing’s communication capacities, the medium should closely simulate face-to-face classes.

According to the theory’s tenets, faculty and students would evaluate synchronous videoconference online classes as preferential to asynchronous online classes because the synchronous environment is richer in terms of media richness. However, the results of both the faculty and student surveys revealed faculty and students preferred face-to-face courses, followed by asynchronous online courses, and then synchronous online courses. These findings are counter to the principles of media richness. Individuals do not always make selections based on the richness or leanness of media; other factors are also considered. While the theory is useful

in explaining media selection in online courses, to better understand online modality preferences, other theories are more useful.

Expectancy Violations Theory. Expectancy violations theory (Burgoon & Hale, 1988) provides a framework for understanding how faculty and students experience violations of expected interpersonal communication patterns during videoconferences. According to the theory, expectancies are communication preferences individuals develop based on social norms, and when these expectancies are violated, individuals evaluate the violations as either positive or negative. Originally founded within nonverbal contexts, through the years, expectancy violations theory's applicability as expanded to include virtual environments (Burgoon et al., 2016; Tandoc et al., 2020; Wadell, 2020), and this study extends that research focus to videoconferences. Within higher education, expectancy violations theory has been used to explain students' communication and technology preferences (Broeckelman-Post & MacArthur, 2018; Chromey et al., 2016; Ledbetter & Finn, 2018) as research has demonstrated students prefer a moderate use of technology in their classes and communication with their instructors that confirm their expectations.

The current study found support for this theory in understanding how faculty and students perceived communication through videoconferences. While they expected the interpersonal communication to closely approximate face-to-face communication, those expectations were violated in several ways, and those violations were evaluated negatively by both faculty and student respondents. While faculty violations emphasized more nonverbal violations, student violations focused on violations to verbal patterns.

Faculty members' frustrations with videoconference communications emphasized the inability to see a wide range of nonverbal behaviors. This idea was frequently mentioned and

contributed to the theme, “Talking heads and black boxes.” Instructors’ expectations for interaction were clearly violated when most students opted to participate in videoconference class sessions without their camera or microphone activated. Faculty were frustrated in their attempts to engage and interact with students during videoconference sessions as they were often faced with a wall of black boxes on the videoconference screen. They discussed how the lack of energy on the videoconferences and the difficulty in reading the virtual room decreased their teaching effectiveness. Many faculty respondents also felt confined by the camera as they taught on videoconferences. Their movement, gestures, and eye contact were limited, and they expressed the lack of nonverbal cues they could communicate to students was also disappointing. Lack of direct feedback from students and the inability to communicate effectively nonverbally violated faculty expectations, leading them to describe the interactions on videoconferences as “awkward.” As one respondent described, “Lack of feedback, lack of nonverbal cues, gestures, facial expressions, all that is lost.”

Student respondents also expressed negative feelings about expectancy violations during videoconferences as they were disappointed to find communication on videoconferences did not follow the same conversation framework as in-person classes. The mediated differences between videoconferences and in-person interactions, included a number of issues, including interruptions and overlapping, that violated students’ expectations. Students discussed how difficult it was to communicate with their instructors and peers during videoconferences. They were frustrated that asking and answering questions were confounded through videoconferences, explaining instructors often didn’t see them waving at the screen or trying to get their attention due to the structure of the videoconference. Since most classes required multiple screens of participants to see all of the students, getting the instructor’s attention was problematic in ways that are not

similar to face-to-face classes. Students also demonstrated issues in asking questions. Again, the structure of the communication tool requires a participant to unmute, ask the question, and then mute themselves again. The process itself is perceived by students as a hassle. Further, the potential of interrupting their instructor or peers discourages students from even attempting to ask questions. Pauses and overlapping, or talking over other participants, were also expectancy violations for the students. Overall, they viewed the flow of conversation on videoconferences as stifled and awkward. The fear of appearing rude along with a desire to not draw attention to themselves created an atmosphere that refrained much direct communication between students and instructor or among students. These violations were met with negative feelings toward the use of videoconferences in their courses.

Self-Presentation Theory. Goffman's (1959) self-presentation theory offers a valuable foundation for analyzing social behavior in mediated contexts. Faculty and student respondents expressed they are acutely aware of being on camera during videoconferences, and self-presentation theory provides an explanation of how videoconferencing participants attempt to manage their impressions during videoconferences. According to self-presentation theory, individuals constantly monitor and manage the images they present to others as they intentionally perform roles on what Goffman (1959) called the front stage. Through their appearance and manner, individuals present their idealized self to others on the front stage, while their true self remains private on the backstage.

Self-presentation theory has significant implications for understanding faculty and student behavior during videoconferences. A self-feedback video characterizes videoconferences, such that participants have a continuous view of themselves next to the faces of other participants (deVasconelos Filho et al., 2009; Fosslie & Duffy, 2020; Kobie, 2020;

Sander & Bauman, 2020), generating a constant awareness of one's self-presentation impression and behaviors. In terms of self-presentation theory, videoconferencing participants can be viewed as actors on the front stage, managing the audience's impressions of them while perpetually monitoring their own appearance and performance. Participants' concerns about their appearance can distract them from concentrating on the purpose of the communication and may contribute to lower self-esteem (Davis, 2020; deVasconcelos et al., 2009). These ideas were explored in the faculty theme, "State of anxiety" and the student theme, "Camera shy." Many faculty and student respondents disclosed they obsessively monitor their appearance when their camera is on during videoconferences. One faculty member shared, "I feel like people are staring at me because I'm bad about looking at everybody in the Brady Bunch boxes." Student respondents often mentioned the unease they feel in seeing themselves on camera. One student admitted, "I'm always paying attention to myself and how I look and how I present myself." Another added, "It's just like everybody's watching you...and you can't relax." Faculty and students indicated the anxiety felt from consistently monitoring their self-presentation to others contributed to Zoom fatigue, and these reflections are discussed in the themes "Zooming in on faculty fatigue" and "Zooming in on student fatigue."

While faculty and students taught and learned remotely, the videoconference class sessions were often taught from home to students participating at home or in their dorm. This situation created a complicated context for the videoconference as faculty and student participants performed on the front stage while they were actually located in their backstage, or private space. This merger of these spaces caused dissonance, anxiety, confusion, and fatigue for some respondents. These ideas were explored in the faculty theme, "When worlds collide" and the student theme, "Camera shy." One faculty member explained, "Maybe it's a subconscious

anxiety from being on camera. It's like you're putting on a television show...I know that people are there virtually, but it's the feeling of being front stage in your backstage." A student offered, "[W]hen you're in your house or in your dorm, that's your private space, and I feel like people just aren't comfortable with showing that part of their lives to everyone in the class."

The anxiety that accompanies constant monitoring of impression management during videoconferences can lead to fatigue after the session. The videoconference is essentially one long performance, and the effort required to remain on front stage, in front of oneself, is difficult and draining. The effort is intensified when multiple videoconferences are held in one day. Further adding to the feelings of anxiety from constantly monitoring the self on screen is the fact that many faculty and students participate in class videoconferences from their backstage, private spaces. Many of self-presentation theory's ideas are insightful in describing how faculty and students experience videoconferencing in higher education contexts.

Additional theoretical perspectives. Additional communication theories may provide explanations for some of the study's findings and emerging themes, including diffusion of innovations (Rogers, 2003), media naturalness (Kock, 2005), muted group (Ardener, 1975) and politeness theory (Brown & Levinson, 1987). The diffusion of innovations theory is useful in describing the sudden mass adoption of videoconferencing as a primary method of communication in 2020. Media naturalness theory may contribute to an understanding of the communication differences between face-to-face and videoconference interactions. Muted group theory may provide a powerful way to interpret students' feelings about being muted during classes held on videoconferences. Finally, politeness theory frames the reason students are uncomfortable interacting during videoconference class sessions.

The diffusion of innovations theory, advanced by communication scholar Everett Rogers (2003), asserts some innovations spread quickly while others do not and attempts to understand the process of adoption. According to the theory, the rate of adoption is similar to an S-curve, with adoption slow at first until it hits a critical mass when a sudden rise in adoption occurs. Four factors affect the diffusion process: time, the innovation, communication channel, and social system (Rogers, 2003). While videoconferencing technology had been available for years, its diffusion reached a critical mass in 2020 when the perception of the technology was perceived as advantageous compared to other communication options. Further, in higher education, videoconferencing tools, such as Zoom and Microsoft Teams, were compatible with existing learning management systems and easy for faculty and students to access and use, since many of them had experience with FaceTime, a similar technology. Videoconferencing was viewed as convenient, easy, and compatible with faculty and students' lives, values, and experiences. Communication channels, including mass media and social media, also touted videoconferencing's ability to smooth the transition to working and learning from home, playing a role in the technology's massive adoption. Finally, the social system of higher education played a large role in the diffusion of videoconferencing in classes as opinion leaders on campus, including administrators, information technology specialists, and instructors quickly implemented the tools. The diffusion of innovations theory illustrates how the use of videoconferencing in the college classroom, and throughout society in general, was widely adopted during the pandemic in 2020.

The research provides an interesting examination of media naturalness theory. Media naturalness theory, first proposed by Ned Kock (2004; 2005), attempts to explain why individuals select certain media in various contexts based upon evolutionary biology. The theory

contends that over time, humans have naturally selected certain traits and abilities to understand verbal and nonverbal communication. Natural media are evaluated as those that most closely approximate face-to-face communication in terms of vocal communication, facial expressions, and synchronicity, and the theory's principles assert that the more natural a medium is, the less cognitive effort is required for participants to communicate effectively. According to the theory, videoconferencing is perceived as a natural medium because it is able to convey vocal and visual cues synchronously, and therefore, it should take little cognitive effort on the part of participants (Kock, 2005). However, the findings of the current study contradict the assertion that videoconferencing is a natural medium. Many of the respondents shared videoconference interactions did not seem natural to them. Faculty and students consistently reported communication through the medium was awkward because internet connectivity caused problems as did the structure of the medium itself, leading to unnatural silences, interruptions, and potential to overlap. Communicating with "black boxes" when cameras were not used created even more unnatural communication patterns. Part of the media naturalness theory was supported. Since participants did not perceive the medium as natural, they also evaluated it as cognitively difficult, leading to videoconferencing fatigue, and this follows the theory's principle that less natural media increase users' cognitive load.

"Muted" was a compelling, yet disturbing, theme that emerged from the student interviews, and its ideas can be analyzed and understood through muted group theory (Ardener, 1975). Muted group theory explains how marginalized groups experience the process of exclusion through the use of language. While primarily used to explain the experiences of women, the theory can be applied to the student respondents' experiences in this study as mutedness refers to a group's inability to express themselves due to a dominant group's

influence. In the case of videoconference class sessions, students expressed they felt literally and figuratively muted in their classes. As subordinates in the videoconference class environment, students followed their professors' instructions and muted their microphones during the class sessions. Even when asked a question, students explained they were rarely seen because the structure of the videoconference prevented all of the student screens to be seen at once. Students said they would wave their hands actively on video and use the built-in hand-raising reaction emoji, but the professor would never see them and recognize them. According to the principles of muted group theory, this is an application of control on the part of the dominant group. The process left students confused about how to articulate their thoughts and ideas in the videoconference environment. They felt marginalized, hidden, muted, and silenced. Although these feelings were unintentional by the instructors of the courses, the result was the students felt they were a muted group.

Politeness theory (Brown & Levinson, 1987) explains why students felt uncomfortably constrained and restricted from providing feedback during videoconference class sessions. The theory maintains politeness is a culturally universal goal. Student respondents consistently described feeling hesitant to unmute their microphones, ask a question, and re-mute their microphone, citing they perceived the act to be an interruption of the instructor. Additionally, they feared contributing during discussions because they were afraid they would overlap their peers or instructor because turn-taking is more difficult to negotiate in videoconferences. Their timidity is based on a desire to not appear rude, which demonstrates a clear desire to save face and appear polite. According to politeness theory, individuals behave in ways to save face and achieve goals, such as politeness.

Implications

The purpose of this case study was to explore how the use of videoconferencing affects faculty and students in the college classroom, including why they experience videoconferencing fatigue. The interpretation of the study's data informed a working model of Zoom fatigue. The study's findings offer valuable insights for higher education administrators and faculty members as they plan and design online course delivery in the future. Further, analysis of the findings extends the understanding of several key communication theories and advances a proposed model of Zoom fatigue. The study provides significant practical and theoretical implications to consider.

Practical

Widespread use of videoconferences in the higher education classroom became prevalent in 2020 after a global pandemic necessitated that professors abruptly transition their face-to-face courses online in spring 2020, and social distancing measures required many faculty and students to teach and learn remotely in fall 2020. While videoconferencing technology had existed for years, the events of 2020 accelerated their implementation and usage in exponential ways. Faculty members selected the communication technology to deliver content due to its inherent media richness, perceiving the medium to closely approximate the face-to-face classroom experience. The prevalent use of videoconferencing in higher education resulted in unintended challenges for faculty and students. The findings of this case study suggest that videoconferencing can be used as a valuable method for instruction if it is applied in appropriate contexts with proper training and preparation. The indiscriminate utilization of videoconferencing in college courses as an absolute substitution for in-person interactions is ill

advised as the study's findings revealed several critical differences between videoconferences and face-to-face communication.

This case study's findings recommend the use of videoconferencing in college classrooms be implemented intentionally after extensive training and familiarity with the application and with much planning and preparation on the part of faculty members. The study revealed videoconferencing to be a complex construct for the higher education online classroom, and its utilization should be carefully designed as part of an online course's overall pedagogy. In short, videoconferencing is appropriate in some, but not all, classroom contexts. As past scholars (Bell & Federman, 2013; Clark, 1983; Clarke 1994) have illuminated, pedagogy, not content delivery, should guide learning. Videoconferencing is a communication tool for content delivery, and its successful use in the online classroom should be situated in an understanding of the larger scope of online education. The current study seeks to inform that understanding by providing an analysis of how videoconferencing is experienced by faculty and students.

The study's findings suggest several ways to improve the use of videoconferencing in online courses to achieve learning outcomes. The implementation of videoconferences into online course instruction should be planned and purposeful. For this reason, the findings advise faculty members do not plan sessions for a set time just because that is the course time. If a live, synchronous session is planned on videoconference, that session should have a purpose and function. Student respondents criticized class sessions that wasted their time, or they deemed "pointless." For instance, videoconferences should not be used to provide long lectures that feature primarily one-way communication from instructor to students. This type of instruction is not effective as a videoconference, as evidenced by both faculty and student respondents' experiences. When there is a large amount of content that instructors need to deliver to students

remotely, chunking the information into short, recorded videos is both preferred by students and more effective for achieving learning outcomes.

Further, instructors should realize large classes do not transition well into videoconference sessions because instructors are not able to see all of the students' screens at one time, essentially creating a virtual barrier between students and faculty that discourages student interaction. If videoconferences are used for large class sizes, the findings suggest the classes be broken into smaller groups as small groups communicate more effectively on videoconferences, according to both faculty and students in the case study. Setting up smaller group videoconference sessions to cover content is advised so that all students feel seen and heard. Smaller groups tend to encourage students to participate in videoconferences with their cameras on, adding to the potential for engagement, and faculty may encourage the use of videoconferences for small groups either through the breakout group functions during class videoconference sessions or through group project assignments they complete on their own time. Student respondents reported they were disappointed that they could not easily communicate with peers through class videoconference sessions, so intentionally designing those opportunities will increase student-student interaction, which improves learning outcomes.

Past research and the current findings suggest that students prefer when professors do not mandate synchronous videoconference class sessions. Students prefer autonomy in their learning. Therefore, scheduling optional sessions, recording them, and encouraging attendance through incentives are effective strategies to appeal to students.

In addition, to encourage interaction, student respondents recommended that faculty members provide guidelines that address how students should ask questions during videoconferences. These guidelines should refer to how and when they can participate with their

microphone unmuted as well as the use of the chat box and reactions, such as hand-waving emojis. Faculty members need to ensure students understand and are comfortable with these policies prior to holding online videoconference discussions. Along those lines, faculty members should consider the use and functionality of the chat box and provide students directions for its use. Identifying a class member or teaching assistant to monitor the chat box will improve its successful implementation. Including the use of polling and reactions during videoconference class sessions also improves student focus and engagement, according to faculty respondents.

Another method of facilitating concentration on the part of students and faculty members is to keep content simple. Faculty members should not plan to include too many screen switches during a class session; less is more. Faculty members who switch between PowerPoint slides, videos, demonstration screens, and others continuously throughout a class session reported they get overwhelmed and lose focus while students also struggled to keep up with too many messages in a single session. Findings indicated faculty members should narrow the content to manageable bits of information and ensure that any screen changes are smooth and necessary to avoid information overload.

The findings offer suggestions for higher education administrators as well. To begin, videoconferencing should be seen as a supplemental tool for online course delivery and not a substitute for in-person instruction. Secondly, faculty and student respondents advocated that not all types of courses can effectively use videoconferences. For instance, while some scientific laboratory sessions can be taught using online simulations, not all can. Administrators should work with their faculty members to ensure a sound pedagogy is in place in which videoconferences is part of the online delivery methods. To assist that process, training is desired and required. Additionally, if a course plans to use synchronous online videoconferences, the

course size needs to be kept manageable. Student respondents cautioned that all participants should be able to be viewed on one screen on the videoconference. Administrators have relied on videoconferencing for many meetings and workshops, and to alleviate fatigue, they should schedule these sessions similarly to in-person meetings, being careful to schedule breaks and being cognizant of length of the videoconference and time of day. Do not assume participants will turn off their camera and microphone to accommodate needed breaks because many will not. Finally, administrators need to respect faculty members' boundaries and privacy. Teaching remotely does not mean that faculty members are suddenly on the clock 24 hours a day. The ability to Zoom does not guarantee that a faculty member is available any time of the day. Respect free time and family time. Administrators need to understand the difficulties and challenges of blurred work and private spaces by demonstrating respect and communicating they appreciate their time and sacrifices.

Finally, the case study's findings illuminated how and why faculty and students experience Zoom fatigue, informing a proposed model of Zoom fatigue. While causes for this recently identified phenomenon have been deliberated in the popular press, this study offers qualitative research findings that confirm some of those assumptions and refute others. According to the findings of this study, Zoom fatigue is a multifaceted problem that is compounded by a number of factors. Situational factors, such as the number of videoconferences scheduled a day, the size of the videoconference, the relationship among participants, the type of content shared in the videoconference, the level of participation, and the amount of interaction during the videoconference, contribute to the level of Zoom fatigue after the videoconference. Individual trait factors, such as personality type, anxiety level, and self-esteem also influence how videoconferences are experienced and affect Zoom fatigue. Environmental factors, such as

background distractions, location, furniture, and internet connectivity also impact the videoconference experience and the level of Zoom fatigue felt. Communication factors also play a role in Zoom fatigue, as the effort to communicate on videoconferences is greater than the effort required to communicate face to face. With fewer nonverbal cues and violations of verbal expectations, videoconference participants work harder to reach shared meaning, and that cognitive effort adds to the Zoom fatigue level.

To prevent Zoom fatigue, the findings indicate that videoconference participants consider a number of controllable factors in the model and plan accordingly for the aspects they cannot control. Situational and environmental factors are elements participants can actively affect. Scheduling can be controlled, so participants should not schedule serial Zoom sessions as the study's respondents explained back-to-back, continuous videoconferences significantly adds to Zoom fatigue. Therefore, space videoconferences apart, avoid too many in one day, and be sure to practice self-care by taking breaks in between sessions. To the degree possible, videoconference participants should control their background and environment; if participating at home, attempt to create a professional space within the private space, if possible. Even more important is the type of furniture participants use for videoconferences, as posture is important during the session and also contributes to the physical fatigue after a session. Another factor that participants can control is their level of engagement. Interacting on the videoconference through direct feedback, chatting, or the use of reactions will keep participants focused and motivated to listen, whereas passive listening behaviors cause more fatigue. While videoconference participants cannot control every dimension of the session, controlling certain factors will help alleviate some Zoom fatigue.

Theoretical

From a theoretical perspective, the study extends the application of media richness theory, expectancy violations theory, and self-presentation theory to videoconference contexts within higher education. Media richness theory is useful to explain faculty members' media selection in their online courses and to appreciate their selection of videoconferencing. Expectancy violations theory's applicability is extended to videoconferencing situations in the current study and provides a framework to analyze how participants respond to communication patterns mediated through videoconferencing. This study expands the scope of self-presentation theory to videoconference situations and provides an analytic tool for understanding how participants manage their impressions through videoconferences.

Videoconferencing is a media rich medium, according to the principles of media richness theory, which evaluates a medium's richness or leanness based upon its timeliness of feedback, message personalization, language variety, and the number of communication cues and channels. (Andrews et al., 2008; Daft & Lengel, 1986). Originally derived to assess how managers select media to communicate equivocal messages to subordinates as part of the information processing literature, media richness theory's influence remains as media scholars continue to apply it to various new media. Recent media richness research has emphasized social media contexts, and the current study adds to previous media richness literature that considered videoconferencing in education (Andrews et al., 2008). According to media richness theory, if face-to-face classes are not possible, then videoconference class sessions should be preferred by students and faculty. In analyzing the data, this study found mixed support for media richness theory. Faculty survey and interview respondents confirmed they evaluated various instructional media, according to the principles of media richness, and chose to implement videoconferencing because it closely

simulated face-to-face communication. However, findings based upon the student survey and interviews do not agree with the tenets of media richness. Students reported they preferred asynchronous online courses to synchronous online courses, and they also expressed a preference for recorded video lectures compared to videoconference lectures. Overall, the theory's principles may apply in some, but not all contexts and situations.

Expectancy violations theory provides a foundation for analyzing how participants experience violations of their communication expectations during videoconferences. The theory was developed to better explain how people respond to unexpected nonverbal communication behaviors that violate social norms (Burgoon & Hale, 1988), and since that time, communication scholars have found its principles can be applied to understand how individuals respond to unexpected violations in a number of contexts. This study continues the focus of expectancy violations theory scholarship within higher education settings. Findings support the principles of expectancy violations theory and past higher education literature, as student respondents reported they preferred the use of communication tools and technology that did not violate their expectations (Broeckelman-Post & MacArthur, 2018; Chromey et al., 2016; Ledbetter & Finn, 2018). The current study furthered the expectancy violations scholarship by exploring student perceptions about the use of videoconferences in online courses and whether they experienced any violations of expectations. Student respondents revealed videoconference class sessions violated several of their academic expectations. They reported they were not comfortable participating in classes with their peers from their private settings. They also found the structure of the videoconference sessions deterred them from asking questions and hindered them from interacting with their peers, clear violations from their previous college class experiences. Faculty also described how their expectations for teaching were violated in the videoconferences,

as students did not engage with them, the room was difficult to gauge in the mediated atmosphere, and a wall of black boxes presented definite challenges.

Additionally, the research expands the influence of expectancy violations theory to explain the limitations of interpersonal communication in videoconferences. Faculty and student respondents shared the mediated environment impacted their capacity to communicate, verbally and nonverbally. While they expected the videoconferences to approximate face-to-face communication, the reality was the mediated communication on videoconferences was awkward, disjointed, and more formalized. Faculty and student respondents described a number of expectancy violations, including concerns with pausing, interruptions, overlapping, lack of nonverbal cues, and less feedback. The expectancy violations were evaluated negatively by both faculty and students, leaving them unfulfilled, disappointed, and tired.

Self-presentation theory applies a theatrical metaphor to understand how individuals manage their behavior in social situations (Goffman, 1959), and it provides a foundation for impression management and identity scholarship. The theory describes people as actors, and when they are behaving in social situations, they are performing on the front stage, attempting to behave intentionally to influence others' opinions of them. They project their idealized self on the front stage, compared to the authentic self they are when they are in private settings or their backstage.

Recent self-presentation scholarship has focused on the use of self-presentation strategies in digital communication and virtual environments (Lin et al., 2017; Oiu et al., 2012; Riu & Liu, 2020; Walther, 2007; Wang, 2015). The current study expands the focus of self-presentation theory to videoconferences in a higher education context. Videoconferences provide a virtual stage in which participants must perform on the front stage, although they may be participating

in their homes or dorm rooms, which is their backstage. Faculty and student respondents revealed this merging of the front stage and backstage created dissonance, confusion, and stress, which they said added to their sense of videoconferencing fatigue. Additionally, the continuous self-feedback video caused several faculty and student respondents to feel self-conscious and distracted because in terms of self-presentation theory, they were constantly monitoring their self-presentation behaviors on screen next to the other participants. The effort was exhausting, and they shared that the prevalence of their self-presentation concerns increased their anxiety and distracted their attention from the content of the videoconference, significantly contributing to their level of videoconferencing fatigue.

Model of Zoom Fatigue

Based upon interpretation of survey and interview data, a model of Zoom fatigue is proposed to provide a foundation for further study. Findings support understanding Zoom fatigue as a multi-dimensional phenomenon that is experienced uniquely by individuals. Therefore, the proposed model of Zoom fatigue appreciates these experiences and identifies four principal elements of the phenomenon: situational factors, individual trait factors, environmental factors, and communication factors. While situational factors address conditions of a specific videoconference, individual trait factors consider internal characteristics of participants. Environmental factors include external features, and communication factors evaluate interaction patterns. Together these factors contribute to the level of Zoom fatigue participants experience. This study provides the basis for expanding the theoretical explanation for Zoom fatigue.

This study offers noteworthy implications for better understanding media richness theory, expectancy violations theory, and self-presentation theory. The study's findings support many of the theories' principles, and its focus on the use of videoconferencing in higher education

contexts expands the theories' applicability. The utility of media richness theory, expectancy violations theory, and self-presentation theory for analyzing faculty members' and students' experiences demonstrates the theories' continued significance for studying mediated communication while a proposed model of Zoom fatigue promises a direction for explaining why the phenomenon occurs.

Delimitations and Limitations

Delimitations

The case study was conducted in the context of online learning offered at a small, private liberal arts university in Appalachia. The case was bounded by the faculty and student perceptions of those who had participated in synchronous online videoconferencing teaching and learning at that university during spring and fall semesters of 2020. Data was collected during two months in 2021. The case study site was selected due to the researcher's ability to access the site and because the university is similar to other small, private liberal arts universities.

Limitations

The major limitation of this study is that it is limited in scope for one period of time at one institution. This study was limited by a purposeful sample that decreases the generalizability of the findings. The sample size, geographic location, and a lack of diversity also affect its generalizability to all university and college faculty and students. The case study approach ensures that this limitation does not negatively affect the findings as a deep understanding of one case can be applied to understand similar cases. Since the case study was a small, independent, private liberal arts university, the findings may not translate to public universities, large universities, institutions in other regions, or primarily online institutions. Students at the site are primarily traditional college-aged, and many are residential students who expect in-person

learning. These characteristics influence their perceptions and experiences. Other types of students, such as non-traditional or online learners, may experience videoconferencing and Zoom fatigue differently.

Faculty and student impressions of the use of videoconferencing may have changed over time. This is a possible limitation to the study as their impressions in spring 2020 may have been different than in January and February 2021 when data was gathered for the surveys and interviews. Participants' adaptability to the videoconferencing environment may have influenced their responses as they may not represent accurate recollections. Furthermore, the perceptions of the students at this case study site choose to study at a small, private liberal arts institution that is typically provides face-to-face instruction in small classes. The experiences of the students in the case study were forced online, so their perceptions of the use of synchronous online instruction may differ from other students.

Qualitative research requires the researcher to be instrumental in the research process. Therefore, the researcher's background, experiences, and assumptions are reflected in the study, influencing the data collection, data analysis, and how interpretation of findings. As a faculty member with significant experience, the researcher was able to gain access and establish rapport with the study's participants; however, the role also affected how the research was conducted and analyzed. This limitation was counteracted by the fact that the researcher had not used synchronous videoconference class sessions in online classes. Further, a Christian perspective informed the researcher, and thus, the research. While an identified limitation, this perspective led the researcher to take care in ensuring ethical procedures were followed.

Recommendations for Future Research

Since this study is exploratory in nature, the findings imply several avenues for future research to gain additional insights about the nature of mediated communication through videoconferencing, the problems associated with videoconferencing fatigue, and the application of synchronous videoconferences in higher education. As is often the case with qualitative research, follow-up research from a quantitative perspective will be useful in investigating the study's findings and addressing questions that arose as a result of the data gathered.

As the current study explores the use synchronous videoconferences in online courses, a number of additional questions resulted from the investigation. While online education had been growing in importance and prevalence for years, the events of 2020 accelerated online learning's impact on higher education. Further examination is needed about how those effects will translate into the higher education landscape in the future. Previous to 2020, the majority of online learners were non-traditional women who sought to study while balancing other life demands. With significant online learning experience, younger students may or may not be more likely to study online. It is essential higher education institutions further study the factors that contribute to online education preferences. This study illustrates how more research is needed to determine how students' intensive experience with online education will affect their education modality preferences in the future. The role of videoconferencing in higher education classes needs to be further studied as students may expect face-to-face classes to be broadcast simultaneously on videoconference while being recorded. If these expectations are met, the higher education classroom may be forever changed. It is vital student expectations for face-to-face and online learning be measured.

Further, this qualitative, single-site case study featured a small, private liberal arts university in Appalachia. Therefore, further research at other types of higher education institutions and at various geographic locations should be considered to determine if the experiences of the faculty members and students at this site resemble the experiences of faculty and students at other institutions that are not comparable in size or mission. Similar studies need to be conducted at large, public universities; small, private colleges in other regions; online institutions; and medium-sized institutions. Moreover, for-profit institutions have considerable experience in teaching online, so the inclusion of videoconferencing sessions may be perceived differently by students at those types of institutions. Additionally, this study explored the experiences of faculty and students in higher education, but it did not include staff members in its scope of analysis. Staff and administrators' experiences would also be valuable in understanding how videoconferencing and Zoom fatigue affects the higher education context.

The purpose of the study was to explore why videoconferencing fatigue occurs in higher education settings, and the data revealed Zoom fatigue as a complex, multidimensional concept worthy of further study. The study demonstrated there were psychological and physiological effects from virtual communication through videoconferencing, and a model of Zoom fatigue was advanced. Examination of the study's findings provides direction for future scholarship to further understand the phenomenon of Zoom fatigue and test some of the preliminary factors identified in the proposed model of Zoom fatigue. A number of factors have been initially identified based upon the study's data analysis. To further investigate the phenomenon, quantitative research to solidify the relevant factors and their relationship to Zoom fatigue is recommended. Specifically, Zoom fatigue is attributed to situational factors, individual trait factors, environmental factors, and communication factors. Follow-up studies to test these factors

with a wider audience is necessary to better understand how videoconferencing fatigue operates. Such research should examine situational factors, including the number of videoconferences scheduled a day, the size of the videoconference, the relationship among participants, the type of content shared in the videoconference, the level of participation, and the amount of interaction during the videoconference. Individual trait factors should also be considered, such as the role of personality type, an individual's anxiety level, and the interaction of self-esteem. Environmental factors, such as background distractions, location, furniture, and internet connectivity should also be assessed in terms of how they affect fatigue. Communication factors, including difficulties in verbal and nonverbal communication, should be analyzed in future Zoom fatigue research. Further research is required to test the multiple variables associated with videoconferencing fatigue and investigate how the dimensions potentially interact with one another.

Follow-up study on some of the study's themes are also suggested. For instance, videoconference's chat function presents an interesting unit for future analysis. While faculty members expressed strongly the chat feature gave shy, introverted students a larger voice in the college classroom, this anecdotal evidence warrants further investigation. By administering a personality inventory and examining chat box conversations, researchers can determine whether a relationship exists between personality type and utilization of the chat feature in videoconferences.

Another theme from the faculty and student interviews worthy of future research is the use of the camera feature in videoconferences. Student use of the camera during videoconferences and their personality type, self-esteem, and self-presentation behaviors deserve further research attention. Student perceptions of others presented on the videoconference camera is another area of research that include examining their impressions of peers and

instructors. For example, research could examine whether an instructor's appearance on videoconference influences students' perceptions about instructor credibility, instructor presence, and satisfaction with the course and instructor.

According to the study's findings, the size of a videoconference impacts its effectiveness. Additional research is necessitated to determine whether the level of engagement and interaction on videoconferences is dependent upon the number of participants in the videoconference. Size of the session may also influence other factors, such as the decision of whether participate with their cameras activated.

Interpersonal communication research that considers the effects of videoconferences on existing and new relationships is another direction for future study. Such research could assess whether the level of familiarity with the participants on videoconferences affects the process. Additionally, some faculty members expressed they have been able to meet new colleagues and establish an effective working relationship through Zoom, describing these new colleagues as friends. However, student respondents described their inability to build relationships with instructors and peers on Zoom. Future research is justified to determine how videoconferences affect individuals' ability to build and maintain relationships with others.

More research is also required in how people behave in videoconferences. During the interviews, some respondents wondered whether people are less sympathetic or ruder in videoconferences than they are in face-to-face situations. However, student respondents reported they worry about interrupting or overlapping others, so they do not un-mute their microphones. If videoconferencing remains a prevalent part of everyday life, these issues deserve attention.

Finally, this study focuses on the higher education environment. Further analysis of how videoconferencing is experienced by participants in other settings is merited. For example,

studies should explore how the mediated communication of videoconferences affects individuals in other work settings, in worship settings, and in social settings is worthy of consideration.

Further examination is needed to understand how Zoom fatigue may impact participants in these settings, so a comprehensive understanding of the phenomenon may be gained.

The current study addresses its research questions and provides a deep understanding of how faculty and students experienced videoconferencing in their online classes. While it identifies a framework for explaining why participants feel videoconferencing fatigue, further study is warranted and necessary. Since videoconferencing is a communication tool that will likely continue to impact people's lives in meaningful ways, such research is critical for higher education institutions and others to consider.

Conclusion

This qualitative single-site case study explored the use of videoconferencing in higher education courses and why faculty and students experience videoconference fatigue. A deep understanding of the use of videoconferencing in teaching and learning came into focus by gathering institutional documentation, administering faculty and student surveys, conducting in-depth interviews, and analyzing the multiple sources of data. Through further analysis and reflection, a model of Zoom fatigue has been proposed that outlines four significant dimensions that contribute to the phenomenon, including situational, individual trait, environmental, and communication factors.

The future of higher education continues to be shaped by technology and online learning. It is essential stakeholders realize how to best reach students through online education as its prominence in higher education is well established. Although videoconferencing technology had existed for years, a global pandemic in 2020 normalized videoconferencing in many settings,

including higher education. This study describes how faculty members included videoconferences as part of their response to an abrupt transition to teaching online because videoconferencing was perceived as a rich medium to communicate with students, closely mirroring face-to-face classroom interactions.

In practice, faculty and students found the media rich videoconferences to be deficient in a number of ways that negatively affected the communication technology's ability to facilitate natural conversation and interaction. Faculty and student experiences with videoconferences in courses greatly diverged, although both expressed frustration and dissatisfaction. Faculty members felt disappointed because many students did not interact on the videoconferences, with most of them opting to keep their cameras off during the sessions. This produced an environment in which faculty were often teaching to a wall of black boxes and unable to coax students to engage with the material or them. Meanwhile, in an apparent contradiction, students reported feeling hidden and muted on videoconferences because the organizational structure of the mediated environment deterred their active participation. They cited instructor policies that required microphones be muted to prevent random external noises as creating an unintended outcome that discouraged direct feedback. Students felt uncomfortable with the process of muting and un-muting the microphone feature to ask or answer questions because they feared interrupting or overlapping. In short, videoconferencing complicates many of the dimensions of the communication process, including feedback and nonverbal communication. Stifled communication and disjointed videoconferences left faculty and students desiring more natural interaction. As one student explained, videoconference class sessions are "not genuine." The result was faculty members realized they weren't reaching students, and students felt they weren't learning. While videoconferences can effectively be implemented within college

courses, the effort requires significant training, time, and design by faculty to ensure students are engaged with the material and don't view the sessions as "pointless."

If all of this sounds exhausting, that's because it is. Zoom fatigue, a recently identified phenomenon, emerged from the prevalent use of videoconferencing. This study advances a working model of Zoom fatigue to explain the multi-dimensional factors that lead to videoconferencing fatigue. As videoconferencing will likely remain a dominant method of communication in the foreseeable future, it is essential its impact on education, relationships, work, worship, and leisure continue to be examined. The proposed model of Zoom fatigue offers a foundation for understanding how the phenomenon affects videoconferencing participants. Although the mediated, virtual communication environment offers opportunities and challenges for its participants to negotiate, the question remains, "Who's Zoomin' who?"

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APPENDIX A**LIBERTY UNIVERSITY.**
INSTITUTIONAL REVIEW BOARD

January 6, 2021

Chandra Massner
Carol Hepburn

Re: IRB Exemption - IRB-FY20-21-309 Zooming in on Zoom Fatigue: A Case Study of Videoconferencing in Higher Education

Dear Chandra Massner, Carol Hepburn:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form 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 should be made available

without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office

Appendix B

Consent Form for Faculty

Title of the Project: Zooming in on Zoom Fatigue: A Case Study of Videoconferencing Fatigue in Higher Education

Principal Investigator: Chandra K. Massner, Ph.D. student, Liberty University

Co-investigator: Carol Hepburn, Adjunct Professor, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be 18 years of age or older and be an undergraduate faculty member at the University who taught online courses in spring 2020 and fall 2020 semesters. 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 project.

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

The purpose of the study is to explore Zoom fatigue in higher education. Zoom fatigue is the exhaustion users feel when they participate in videoconferences. This research will explore how this feeling affects faculty and students in online courses.

What will happen if you take part in this study?

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

1. Answer survey questions about your experiences teaching in the spring and fall 2020 semester, which should take 10-20 minutes.
2. Submit an email address if you are willing to participate in a follow-up interview, which would be scheduled at a late time and take 30-60 minutes.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include understanding how the use of videoconferencing in higher education affects faculty and students.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

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[s] will have access to the records. Participant responses will be anonymous. Data will be stored on a password-locked computer and may be used in a dissertation report and in future presentations. After three years, all electronic records will be deleted.

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

Participants will not be compensated for participating in this study.

Does the researcher have any conflicts of interest?

The researcher serves as a professor at the University of Pikeville. To limit potential or perceived conflicts, the study will be anonymous, so the researcher will not know who participated. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?

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

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

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

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

The researcher conducting this study is Chandra K. Massner. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at ckmassner@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Carol Hepburn, at chepburn1@liberty.edu.

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[s], you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By clicking on the button below, you are agreeing to be in this study. Make sure you understand what the study is about before you continue. If you have any questions about the study after you completed the survey, you can contact the study team using the information provided above. You can print a copy of the document for your records.

“I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study by clicking ‘Begin Survey.’”

Appendix C

Consent Form for Students

Title of the Project: Zooming in on Zoom Fatigue: A Case Study of Videoconferencing Fatigue in Higher Education

Principal Investigator: Chandra K. Massner, Ph.D. student, Liberty University

Co-investigator: Carol Hepburn, Adjunct Professor, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be 18 years of age or older and be an undergraduate student at the University who was enrolled in courses during the spring 2020 and fall 2020 semesters. 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 project.

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

The purpose of the study is to explore Zoom fatigue in higher education. Zoom fatigue is the exhaustion users feel when they participate in videoconferences. This research will explore how this feeling affects faculty and students in online courses.

What will happen if you take part in this study?

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

1. Answer survey questions about your experiences in the spring and fall 2020 semesters, which should take 10-20 minutes.
2. Submit an email address if you are willing to participate in a follow-up interview, which should take 30-60 minutes.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include understanding how the use of videoconferencing in higher education affects faculty and students.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

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[s] will have access to the records. Participant responses will be anonymous. Data will be stored on a password-locked computer and may be used in a dissertation report and for future presentations. After three years, all electronic records will be deleted.

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

Participants will not be compensated for participating in this study.

Does the researcher have any conflicts of interest?

The researcher serves as a professor at the University of Pikeville. To limit potential or perceived conflicts, the study will be anonymous, so the researcher will not know who participated. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?

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

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

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

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

The researcher conducting this study is Chandra K. Massner. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at ckmassner@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Carol Hepburn, at chepburn1@liberty.edu.

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[s], you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By clicking on the button below, you are agreeing to be in this study. Make sure you understand what the study is about before you continue. If you have any questions about the study after you completed the survey, you can contact the study team using the information provided above. You can print a copy of the document for your records.

“I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study by clicking ‘Begin Survey.’”

Appendix D

Faculty Recruitment Letter

Dear colleague:

As a graduate student in the School of Communication and the Arts at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of my research is to explore Zoom fatigue in higher education, and I am writing to invite eligible participants to join my study.

Participants must be 18 years of age or older and undergraduate faculty members at the University who taught remotely during the spring 2020 and fall 2020 semesters. Participants, if willing, will be asked to complete an online survey. It should take approximately 10-20 minutes to complete the survey. Participation will be completely anonymous, and no personal, identifying information will be collected.

At the end of the survey there is an option to submit your email address if you are willing to participate in a virtual, recorded interview, which will be scheduled at a later time and take 30-60 minutes. The survey platform will pull your email address from the survey and provide it to the researcher in a separate report to maintain the anonymity of the survey results. If you choose to provide your email address, and if you are selected to participate in an interview, a separate consent form containing more information will be emailed to you, and you will need to sign and return it via email. Interview participants will be provided access to a transcript of their comments to review.

In order to participate, please click here:

<https://www.surveymonkey.com/r/MBJPLZ6>

A consent document is provided as the first page of the survey. The consent document contains additional information about my research. After you have read the consent form, please click the button to proceed to the survey. Doing so will indicate that you have read the consent information and would like to take part in the survey. I sincerely appreciate your time and insights.

Respectfully,

Chandra K. Massner
Ph.D. Student, Liberty University
ckmassner@liberty.edu

Appendix E

Student Recruitment Letter

Dear student:

As a graduate student in the School of Communication and the Arts at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of my research is to explore Zoom fatigue in higher education, and I am writing to invite eligible participants to join my study.

Each participant must be 18 years of age or older and an undergraduate student at the University who was enrolled in courses during the spring 2020 and fall 2020 semesters. Participants, if willing, will be asked to complete an online survey. It should take approximately 10-20 minutes to complete the survey. Participation will be completely anonymous, and no personal, identifying information will be collected.

At the end of the survey there is an option to submit your email address if you are willing to participate in a virtual, recorded interview, which will be scheduled at a later time and take 30-60 minutes. The survey platform will pull your email address from the survey and provide it to the researcher in a separate report to maintain the anonymity of the survey results. If you choose to provide your email address, and you are selected to participate in an interview, a separate consent form containing more information will be emailed to you, and you will need to sign and return it via email. Interview participants will be provided access to their comments.

In order to participate, please click here:

<https://www.surveymonkey.com/r/M92BLXL>

A consent document is provided as the first page of the survey. The consent document contains additional information about my research. After you have read the consent form, please click the button to proceed to the survey. Doing so will indicate that you have read the consent information and would like to take part in the survey.

Your time and thoughts are appreciated!

Respectfully,
Chandra K. Massner
Ph.D. Student, Liberty University
ckmassner@liberty.edu

Appendix F

Survey Questions for Faculty Participants

What is your age?

What is your gender?

Male

Female

Prefer not to answer

Other

How many years have you taught college classes?

Prior to 2020, how many online courses had you taught?

More than five

Three to five

One-two

None

What is your preferred method of instructional delivery?

In-person, Face-to-Face

Synchronous Online (with a set meeting time)

Asynchronous Online (no set meeting time)

Hybrid (a mixture of online and in the classroom)

Why is that your preferred method of instruction?

Compare your courses in spring 2020 before the shift to online instruction to after the shift was made. Comment on how you accomplished this transition.

How would you describe your online courses in 2020?

Asynchronous (no set meeting time)

Synchronous (set meeting time)

A blend of asynchronous and synchronous

Other

What kind of delivery methods did you use in your online courses in 2020 (select all that apply)?

Recorded video lectures

PowerPoint slides with recorded audio

PowerPoint slides with no audio or video recording

Live videoconferencing lectures

Links to related to video content

Links to related print content (books, articles, etc.)

Other

Why did you make these selections?

Do you prefer to use asynchronous or synchronous methods when teaching online courses?

Asynchronous

Synchronous

Why do you prefer asynchronous or synchronous online teaching?

How has videoconferencing affected your teaching since March 2020?

Please describe your use of synchronous videoconferencing in your courses.

On average, how much time do you spend in a week videoconferencing

in meetings?

for virtual office/student hours?

advising?

lecturing?

socializing?

Other (Specific)

How do you prefer to participate in a videoconference, such as Zoom, lecture (select all that apply)?

Camera on

Camera off

Audio on

Audio off

Chat feature

Why is that your preference?

When you have your camera on, how do you feel about seeing yourself on the screen?

What do you like about using videoconferencing tools, such as Zoom, in your online classes?

What do you dislike about using videoconferencing tools, such as Zoom, in your online classes?

How often have you felt tired during or after the use of videoconferencing tools, such as Zoom?

Never

Rarely

Sometimes

Often

Always

Why do you think you feel tired during or after the use of videoconferencing tools, such as Zoom?

How would you describe your tiredness during or after videoconferences?

Physical tiredness

Mental tiredness

Both physical and mental tiredness

I do not feel tired.

Appendix G

Survey Questions for Student Participants

What is your age?

What is your gender?

Male

Female

Prefer not to answer

Other

What is your class rank (year)?

Freshman (have earned less than 30 credit hours)

Sophomore (have earned 30-59 credit hours)

Junior (have earned 60-89 credit hours)

Senior (have earned more than 90 credit hours)

What is your major?

What is your preferred method of instructional delivery for your college courses?

In-person, in the classroom

Synchronous Online (with set class meeting time)

Asynchronous Online (no set class meeting time)

Hybrid (a mixture of online and in the classroom)

Prior to 2020, how many courses had you taken online?

More than five

Three to five

One-two

None

Please describe how you felt when your in-person classes transitioned to fully online in spring 2020.

What kind of delivery methods did your instructors use in spring and fall 2020 (select all that apply)?

Recorded video lectures

PowerPoint slides with recorded audio

PowerPoint slides with no recorded audio or video

Live videoconferencing lectures

Links to related video content

Links to related print content (books, articles, etc.)

Other (Be specific)

Which delivery method do you prefer your instructors use in online courses?

Recorded video lectures

PowerPoint slides with recorded audio

PowerPoint slides with no recorded audio or video

Live videoconferencing lectures

Links to related video content

Links to related print content (books, articles, etc.)

Other (Be specific)

Why do you prefer that method in online classes?

On average, how much time do you spend in a week videoconferencing (Zoom)?

Do you have experience with the use of synchronous videoconferencing in your online courses (such as Zoom)?

Yes

No

If yes, please describe your experience with the use of synchronous videoconferencing for course lectures.

How do you prefer to participate in a videoconference, such as Zoom, lecture (select all that apply)?

Camera on

Camera off

Audio on

Audio off

Chat feature

Why is that your preference?

When you have your camera on, how do you feel about seeing yourself on the screen?

What do you like about videoconferencing tools, such as Zoom, in your online classes?

What do you dislike about videoconferencing tools, such as Zoom, in your online classes?

How often have you felt tired during or after the use of videoconferencing tools, such as Zoom?

Never

Rarely

Sometimes

Often

Always

Why do you think you feel tired?

How would you describe your tiredness during or after videoconferences?

Physical tiredness

Mental tiredness

Both physical and mental tiredness

I do not feel tired.

Appendix H

Recruitment Letter for Faculty Interviews

Dear colleague:

I am grateful for your participation in my Zoom fatigue faculty survey, and I appreciate the opportunity to follow up with you in a Zoom interview.

As you know, my research is part of a dissertation project required for completion of a doctorate in communication at Liberty University.

I am writing to ask when it would be convenient for me to schedule a Zoom interview with you in the next few weeks. If you could send me a couple of days/times, I will reply with a Zoom and calendar invitation. I anticipate the interview to last 30-60 minutes. I am attaching the required consent form for you to sign and return to me before the interview.

My qualitative research is a case study, and the research I have done so far is quite exciting. I am anxious to speak to you and others to discover deeper insights. I cannot thank you enough for supporting my work.

Respectfully,
Chandra Massner
Ph.D. Candidate, Liberty University

Appendix I

Recruitment Letter for Student Interviews

Dear student:

I am grateful for your participation in my Zoom fatigue student survey, and I appreciate the opportunity to follow up with you in a Zoom interview.

As you know, my research is part of a dissertation project required for completion of a doctorate in communication at Liberty University.

I am writing to ask when it would be convenient for me to schedule a Zoom interview with you in the next few weeks. If you could send me a couple of days/times, I will reply with a Zoom and calendar invitation. I anticipate the interview to last 30-60 minutes. I am attaching the required consent form for you to sign and return to me before the interview.

My qualitative research is a case study, and the research I have done so far is quite exciting. I am anxious to speak to you and others to discover deeper insights. I cannot thank you enough for supporting my work. If you have any questions, please reply to this email, or you may call me at [REDACTED].

Respectfully,
Chandra Massner
Ph.D. Candidate, Liberty University

Appendix J

Interview Protocol for Faculty Participants

1. I'd like to talk with you about your preferences in online teaching. What does effective online teaching mean to you? How do you prefer to set up your online courses?
2. Let's talk about your experiences using videoconferencing in your online courses. How do you feel when you lecture on videoconferencing? How do your students respond?
3. I'd like you to compare videoconferencing in your classes to other kinds of interactions with your students. For instance, can you describe how videoconferencing is different from face-to-face interactions or online discussion forums in classes?
4. How do you feel after videoconferencing with your class? Have you ever felt tired after videoconferences? Why do you think you feel that way?
5. How do you anticipate you will use videoconferencing in the future? What role will it play in your courses, career, or personal life?

Appendix K

Interview Protocol for Student Participants

1. I'd like to talk with you about your preferences in online learning. Can you describe a perfect online course?
2. Let's talk about your experiences using videoconferencing in your online classes. How does you feel when you're in a synchronous videoconferencing session? What is it like?
3. I'd like you to compare videoconferencing in your classes to other kinds of interactions. For instance, can you describe how videoconferencing is different from face-to-face interactions or online discussions in classes?
4. How do you feel after a class videoconference? Have you ever felt tired after videoconferences? How often? Why do you think you feel that way?
5. How do you anticipate videoconferencing will affect your life and career in the future?

Appendix L

Consent Form for Faculty Interviews

Title of the Project: Zooming in on Zoom Fatigue: A Case Study of Videoconferencing Fatigue in Higher Education

Principal Investigator: Chandra K. Massner, Ph.D. student, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be 18 years of age or older and be an undergraduate faculty member at the University who taught online courses in the spring 2020 and fall 2020 semesters. 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 project.

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

The purpose of the study is to explore Zoom fatigue in higher education. Zoom fatigue is the exhaustion users feel when they participate in videoconferences. This research will explore how this feeling affects faculty and students in online courses.

What will happen if you take part in this study?

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

1. Answer about five open-ended questions about your experiences with videoconferencing, which should take about 30-60 minutes. The interview will be recorded.
2. Review a transcript of your comments for accuracy.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include understanding how the use of videoconferencing in higher education affects faculty and students.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

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 through the use of pseudonyms. Interviews will be conducted on Zoom, and others will not be able to overhear the conversation.

Data will be stored on a password-locked computer and may be used in a dissertation report and future presentations. After three years, all electronic records will be deleted.

Interviews will be recorded and transcribed. Recordings will be stored on a password-locked computer for three years and then erased. Only the researcher will have access to these recordings.

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

Participants will not be compensated for participating in this study.

Does the researcher have any conflicts of interest?

There are no conflicts of interest.

Is study participation voluntary?

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

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

If you choose to withdraw from the study, please inform the researcher that you wish to discontinue your participation. 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 Chandra K. Massner. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at ckmassner@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Carol Hepburn, at chepburn1@liberty.edu.

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[s], you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You may download and print a copy of this document for your records. The researcher will keep a copy with 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.

Please select one of the options below:

The researcher has my permission to audio-record me as part of my participation in this study.

The researcher has my permission to video-record me as part of my participation in this study.

Printed Subject Name

Signature & Date

Appendix M

Consent Form for Student Interviews

Title of the Project: Zooming in on Zoom Fatigue: A Case Study of Videoconferencing Fatigue in Higher Education

Principal Investigator: Chandra K. Massner, Ph.D. student, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be 18 years of age or older and be an undergraduate student at the University who participated in courses during the spring 2020 and fall 2020 semesters. 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 project.

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

The purpose of the study is to explore Zoom fatigue in higher education. Zoom fatigue is the exhaustion users feel when they participate in videoconferences. This research will explore how this feeling affects faculty and students in online courses.

What will happen if you take part in this study?

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

1. Answer about five open-ended questions about your experiences with videoconferencing, which should take about 30-60 minutes. The interview will be recorded.
2. Review a transcript of your comments for accuracy.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include understanding how the use of videoconferencing in higher education affects faculty and students.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

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 through the use of pseudonyms. Interviews will be conducted on Zoom, and others will not be able to overhear the conversation.

Data will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

Interviews will be recorded and transcribed. Recordings will be stored on a password-locked computer for three years and then erased. Only the researcher will have access to these recordings.

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

Participants will not be compensated for participating in this study.

Does the researcher have any conflicts of interest?

The researcher serves as a professor at the University. To limit potential or perceived conflicts, this portion of the study will be confidential, so identifying information will be kept private. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University or the University of Pikeville. If you decide to participate, you are free to not answer any question or withdraw at any time prior to submitting the survey without affecting those relationships.

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

If you choose to withdraw from the study, please inform the researcher that you wish to discontinue your participation. 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 Chandra K. Massner. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at ckmassner@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Carol Hepburn, at chepburn1@liberty.edu.

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If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher[s], you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You may download and print a copy of this document for your records. The researcher will keep a copy with 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.

Please select one of the options below:

The researcher has my permission to audio-record me as part of my participation in this study.

The researcher has my permission to video-record me as part of my participation in this study.

Printed Subject Name

Signature & Date